

Regular Posters

POSTER SESSION 1:

Abdominal Obesity/Body Fat Distribution

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HYPERTRIGLYCERIDEMIC WAIST IN MEN OF THE QUÉBEC HEALTH SURVEY: PREVALENCE AND ASSOCIATION WITH AN ATHEROGENIC AND DIABETOGENIC METABOLIC RISK PROFILE

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Objectives: We have previously reported that the hypertriglyceridemic waist phenotype (waist circumference ≥ 90 cm and fasting triglyceride concentrations ≥ 2.0 mmol/L) was a useful clinical phenotype to identify abdominally obese men characterized by an altered cardiometabolic risk profile. The objectives of the present study were to assess:

- 1- the prevalence of the atherogenic metabolic triad (simultaneous presence of hyperinsulinemia, elevated non-HDL cholesterol, small LDL particles);
- 2- the ability of hypertriglyceridemic waist to identify men characterized by the atherogenic metabolic triad in a sample of adult men representative of the Québec population (Québec Health Survey, 1990).

Methods: Fasting plasma lipoprotein-lipid and insulin concentrations as well as anthropometric measurements were assessed in a probability sample of 907 men aged 18 to 74 years.

Results: The prevalence of hypertriglyceridemic waist was 21% whereas 17% of men had the atherogenic metabolic triad. Among men with hypertriglyceridemic waist, 58% had the 3 features of the atherogenic metabolic triad whereas its prevalence was only 2% in men with both normal waist and triglyceride levels. Moreover, there was a 56-fold increase in the risk of having the atherogenic metabolic triad among men with simultaneous elevations in waist girth and triglyceride concentrations whereas being obese (BMI ≥ 30 kg/m²) was associated with a 6-fold increase in the risk of having the triad.

Conclusions: Results of the Québec Health Survey provide further evidence that the hypertriglyceridemic waist phenotype is a high-risk phenotype which is useful to identify abdominally obese men who display an atherogenic and diabetogenic metabolic profile suggestive of the presence of visceral obesity.

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ANTHROPOMETRIC MARKERS OF OBESITY/BODY FAT DISTRIBUTION: ASSOCIATIONS WITH SELECTIVE INDICES OF PLASMA GLUCOSE/INSULIN HOMEOSTASIS

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Objectives: To examine the specific association of waist circumference, hip circumference, BMI, waist-to-height and waist-to-hip (WHR) ratios to plasma glucose/insulin homeostasis indices.

Methods: 2249 patients (50.6% women, 54.5% non-Caucasian) without diabetes from 29 countries were recruited in an observational study. Anthropometric markers were assessed by 297 physicians. Abdominal fat distribution was measured by computed tomography. A 75g-OGTT was also performed.

Results: Waist circumference, waist adjusted for hip circumference, waist-to-height ratio, WHR and BMI were positively associated with fasting glucose, 120 min OGTT-glucose and HbA1c levels in men and women. After adjustment for waist circumference, hip circumference was no longer associated with plasma glucose/insulin homeostasis and was even negatively correlated with 120-min OGTT glucose in women (-0.06 , $p < 0.05$), and to L4L5-visceral adipose tissue area in men (-0.13 , $p < 0.0001$). In multiple regression analyses including waist, hip and BMI, one SD increase in waist circumference was associated with a significant odds ratio to present with impaired fasting glucose in men 1.62 (1.14-2.31) and women 1.70 (1.25-2.32), and with impaired glucose tolerance in men 1.71 (1.18-2.49). However, one SD increase in hip circumference was negatively associated with the presence of impaired glucose tolerance in men 0.65 (0.42-0.99) and women 0.58 (0.41-0.84). One SD increase in BMI was not predictive of the presence of a deteriorated plasma glucose/insulin homeostasis condition.

Conclusions: Waist circumference alone or adjusted for hip circumference and hip circumference adjusted for waist circumference are better anthropometric markers of altered plasma glucose/insulin homeostasis than BMI in this large, international cohort study.

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BOTH VISCERAL AND LIVER FAT ARE ASSOCIATED WITH THE INDIVIDUAL COMPONENTS AS WELL AS THE PRESENCE OF THE METABOLIC SYNDROME

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Objectives: To evaluate the relative contributions of visceral adiposity (VAT) and liver fat assessed by computed tomography (CT) to the metabolic syndrome (MetS) components.

Methods: The present cross-sectional analyses were performed in 1943 men and 1808 women from the international INSPIRE ME IAA study. Presence of MetS and MetS components (elevated fasting glucose, elevated blood pressure (HBP), hypertriglyceridemia and low HDL-cholesterol) were diagnosed according to NCEP-ATP-III criteria. Logistic regression analyses were performed to obtain the odds ratios (OR) and 95% confidence intervals for the presence of MetS or MetS components for each standard-deviation (SD) increase in VAT and liver attenuation (inversely correlated to liver fat), with adjustment for BMI, age, smoking status, region and physician's specialty.

Results: In both sexes, one-SD increases in both VAT and liver attenuation were independently associated with elevated fasting glucose (Men OR VAT 1.34(1.14-1.58), OR liver attenuation 0.74(0.65-0.84), Women OR VAT 1.95(1.63-2.35), OR liver attenuation 0.67(0.59-0.77), HBP (only VAT in men OR VAT 1.25(1.05-1.49), Women OR VAT 1.50(1.22-1.85), OR liver attenuation 0.85(0.73-0.98), hypertriglyceridemia (Men OR VAT 1.41(1.22-1.62), OR liver attenuation 0.68(0.61-0.76), Women OR VAT 1.97(1.67-2.33), OR liver

attenuation 0.69(0.61-0.77) and low HDL-cholesterol (Men OR VAT 1.16(1.01-1.33), OR liver attenuation 0.84(0.76-0.94), Women OR VAT: 1.69(1.44-2.01), OR liver attenuation 0.78(0.69-0.88). The OR for the presence of MetS were in men 2.00(1.66-2.41) for VAT and 0.67(0.58-0.76) for liver attenuation, and in women 3.91(3.07-5.03) for VAT and 0.66(0.57-0.78) for liver attenuation.

Conclusion: Both visceral adiposity and liver fat are significant independent determinants of the MetS and its individual components.

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BODY COMPOSITION CHANGES AMONG LACTATING MOTHERS IN ABIA STATE, NIGERIA

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Objectives: To evaluate body composition changes among nursing mothers in relation to their breastfeeding pattern.

Methods: This was a prospective study carried out at Federal Medical Centre, Umuahia, Abia State, Nigeria. 213 mothers were recruited consecutively during BCG immunization of their babies aged 0-7 days. At recruitment, the mothers were classified into exclusive and non exclusive breastfeeding (EBF and NEBF) groups. Maternal body weight, height, arm circumference and skinfold measurements were taken. Body fat (kg and %) and lean body mass (LBM) were calculated from predicted equations. These measurements were repeated during follow up visits at 6, 10, 14, 18 and 24 weeks. Data analysis was performed using SPSS version 13.

Results: There was no significant difference in anthropometric and body composition parameters between EBF and NEBF group of mothers throughout the period ($p > 0.05$). Significant changes occurred in arm circumference, triceps, percentage of body fat and lean body mass among the EBF group over the period ($P < 0.05$). The mothers in both groups were overweight ($BMI > 25 \text{ kg/m}^2$) throughout the study period. Initial weight and body fat (kg) loss occurred in both groups at 6 weeks, thereafter, there was progressive weight and body fat gain up to the 14th week, after which a slight decline occurred. LBM loss was higher in EBF (0.43kg/month) compared to the NEBF group (0.16kg/month) over the study period.

Conclusions: Irrespective of the breastfeeding pattern, this study revealed that there is no significant difference in body composition changes between EBF and NEBF mothers.

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ABDOMINAL AND MID-THIGH COMPOSITION IN SEVERELY OBESE SUBJECTS WITH OR WITHOUT TYPE 2 DIABETES; ASSOCIATION WITH INSULIN RESISTANCE

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Introduction: In severe obesity, the relationship of type 2 diabetes (DB II) on body composition / distribution, specifically abdominal and mid-thigh, are not known.

Objective: Compare body composition / distribution in severely obese subject with (DB II) or without (N-DB II) type 2 diabetes and evaluate the relationship with insulin resistance.

Method: Anthropometric measures, abdominal/mid-thigh computed tomography (CT) and fasting blood samples were performed in subjects with DB II ($n=13$) and N-DB II ($n=17$) groups.

Results: The groups were similar for age, sex, weight and body mass index (BMI). DB II group had an elevated fasting insulin value (196 ± 83 vs. 122 ± 59 rmol/L , $p=0.009$), insulin resistance (HOMA: 9.6 ± 3.8 vs. 4.2 ± 2.1 , $p < 0.001$) and glycated hemoglobin (7.1 ± 0.1 vs. 5.5 ± 0.1 %) compared with the N-DB II group. There was a significant difference between groups for mid-thigh subcutaneous adipose tissue (255.0 ± 37.1 vs. 283.3 ± 38.5 cm^2 , $p=0.009$), deep adipose tissue (15.2 ± 5.5 vs. 11.1 ± 4.1 cm^2 , $p=0.024$) and for visceral adipose tissue volume (2399.6 ± 502.6 vs. 1584.3 ± 415.2 cm^3 , $p < 0.001$); DB II vs. N-DB II respectively. However, there was no difference between DB II and N-DB II group in thigh normal density muscle or low density muscle (fat infiltrated). Finally, there were a positive association between insulin resistance, mid-thigh deep adipose tissue ($r=0.413$; $p=0.026$) and visceral adipose tissue ($r=0.462$; $p=0.013$).

Conclusion: Severely obese subjects with DB II have different fat distribution compared to N-DB II subjects: greater accumulation of thigh deep adipose tissue, visceral adipose tissue and lower accumulation of subcutaneous adipose tissue.

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PRECISION OF THE CORESCAN WITH GE LUNAR iDXA DENSITOMETER FOR THE MEASUREMENT OF VISCERAL ADIPOSE TISSUE IN SEVERELY OBESE ADULTS

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Visceral adipose tissue (VAT) is correlated with increased risk of cardiovascular disease and the metabolic syndrome. The gold standard for the measurement of VAT is CT and MRI which are both costly and expose patients to high levels of radiation. Recently, automated software, CoreScan, for the GE Lunar iDXA has been validated for measuring VAT against CT in normal weight populations.

Purpose: To evaluate the precision of CoreScan for VAT measurements in severely obese adults ($BMI > 40 \text{ kg/m}^2$).

Methods: 55 severely obese participants with a mean age of 47 ± 11 yrs, BMI of $50 \pm 5.9 \text{ kg/m}^2$, and mean body mass of 137.2 ± 23.5 kg took part in the study. Two consecutive iDXA scans with repositioning of the total body were conducted for each participant. The coefficient of variation (CV), the root-mean square (RMS) averages of standard deviations of repeated measurements, and the corresponding 95% least significant change were calculated.

Results: Precision estimates were: RMS SD of .294kg and a CV of 8.51%. No effects were seen for gender or degree of obesity. Further analysis using Bland-Altman plots demonstrated a mean precision bias of $-0.08 \pm .41$ kg giving a Coefficient of Repeatability of 0.81kg and a bias range of (-.89 to 0.73).

Conclusions: This is the first study to assess reproducibility of the GE CoreScan software among severely obese adults. These data demonstrate that there may be a lack of precision in measuring VAT and a need for further development of this software to assess this important clinical parameter in this population.

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ABDOMINAL OBESITY IS ASSOCIATED WITH CARDIOMETABOLIC RISK AMONG CANADIANS

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Objective: To determine risk factors associated with the total/HDL cholesterol ratio among Canadians.

Methods: Nationally representative data, the Canadian Health Measures Survey, cycle 1, 2007-2009 ($n=2174$), 1096 females and 1078 males aged 12-79y was used. We determined the prevalence of Metabolic Syndrome (MetS)

and the distribution of the components. Also, 3430 subjects from the same survey, 1828 females and 1602 males aged 20-79y, were studied to analyze the association between abdominal obesity (AbOb), defined by ethnic-specific cut-offs, and total/HDL cholesterol ratio considering fruit and vegetable intake, fat intake, sugar-sweetened beverages (SSBs), physical activity, and age groups as covariates. Sex-specific weighted logistic regression models were used to analyze the association. For generalizability, data were bootstrapped and alpha was set at 0.05.

Results: Overall, 39.1% (16.9% males vs 22.3% females) of Canadians had AbOb. MetS was diagnosed in 18% of Canadians aged 12-79y with the highest prevalence in adults 40-59y (7.8%). AbOb was the most prevalent defining component in individuals with MetS (89.7%). AbOb was a strong predictor of elevated total/HDL cholesterol ratio controlling for confounders (males: OR=2.57, $P=0.001$; females: OR=4.36, $P < 0.001$). Canadian adults (40-59y) significantly had higher risk of elevated ratio (1.6 and 1.5 times in men and women respectively) compared to older adults (60-79y). More frequent consumption of SSBs in Canadian women was associated with 1.4 time higher risk of elevated ratio controlling for covariates.

Conclusion: Findings suggest ethnic-specific AbOb defined by a simple measure of waist circumference is a strong predictor for cardio-metabolic risk among Canadian adults.

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ROLE OF NON- SURGICAL TREATMENT IN ABDOMINAL OBESITY

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Objective: Obesity is a multi-factorial disease with excess of fat storage & leads to ailments like hypertension, diabetes, stroke and Cancer. Excess abdominal fat is associated with an increased risk of cardiometabolic disease.

Methods: Various non - invasive procedures like High Focalized Intensity Ultrasound (HIFU), Endermology, Mesotherapy and laser were used for lipolysis and lipo-mobilization. Randomized controlled, multicenter, multiracial study comparing effects of lipolysis with lymphatic drainage of fat, on fat percentage and waist circumference was carried out in men and women with BMI 28 to 30.

Result:

NATIONALITY	AVERAGE LOSS in Cm at waist line per session	AVERAGE Reduction in total body fat percentage
ARABIC	1.50	1.00%
AMERICAN	2.80	1.25%
CANADIAN	2.00	0.80%
FRENCH	2.30	1.00%
INDIAN	2.00	0.80%
ITALIAN	1.90	1.00%
LEBANESE	2.00	0.90%
SYRIAN	2.00	1.60%
SPANISH	1.30	1.10%

[Results]

Average reduction in the waist circumference after one session of lipolysis was 2.029 cm and reduction in total body fat percentages by 1.1375.

Conclusion: Combination of non invasive fat loss treatments resulted in reduction of resistant fat & Body fat %.

Limitations: Relation between reduction of waist circumference with non-invasive subcutaneous fat loss and health risk was not studied.

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WAIST-TO-HEIGHT RATIO ASSESS ABDOMINAL ADIPOSITY WITH HIGH ACCURACY AND IS ASSOCIATED WITH INSULIN RESISTANCE

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Objectives: Assess the specificity of anthropometric parameters, to estimate abdominal adiposity (AbAdiposity) and its association with insulin resistance, in patients with chronic kidney disease (CKD).

Methods: Cross-sectional study, 134 CKD patients under multidisciplinary treatment. Nutritional status: body mass index (BMI) and serum albumin. AbAdiposity: waist circumference (WC), waist-to-hip ratio (WHR), conicity index (ConIndex), waist-to-height ratio (WheIR=WC/height) and trunk fat mass estimated by dual-energy X-ray absorptiometry (DXA; reference method). Glomerular filtration rate was estimated (eGFR) by MDRD equation. Serum measurements: insulin, glucose, triglycerides. Homeostasis model assessment of insulin resistance (HOMA-IR) was calculated.

Results: Treatment period: 3 ± 2 years (mean \pm SD), eGFR: 29 ± 13 ml/min., age: 65 ± 12 years, men: 56%, BMI: 26 ± 4 kg/m², albumin: 4.2 ± 0.3 g/dL, glucose: 96.7 ± 19.0 mg/dL, triglycerides: 136.7 ± 67.0 mg/dL, HOMA-IR: 1.5 ± 0.95 . WheIR (men: 0.56 ± 0.07 vs women: 0.57 ± 0.08) and ConIndex (men: 1.3 ± 0.07 vs women: 1.3 ± 0.09), were similar ($p > 0.05$) in both gender, but WC (men: 92.5 ± 11 vs women: 87.3 ± 12 cm) and WHR (0.97 ± 0.07 vs 0.9 ± 0.09) were different ($p < 0.05$). The correlation between DXA and WheIR ($r=0.76$) was higher than between DXA with WC ($r=0.65$), ConIndex ($r=0.56$) and WHR ($r=0.53$); $p < 0.0001$. After adjusting for BMI, age, eGFR only WheIR ($r=0.50$) and ConIndex ($r=0.36$) maintained a significant ($p < 0.0001$) correlation with DXA. The association between WheIR with insulin ($r=0.39$), HOMA-IR ($r=0.37$), triglycerides ($r=0.37$) was significant ($p < 0.05$) after adjusting for confounders, and similar to those between DXA and these parameters.

Conclusions: WheIR presented the highest correlation with DXA, with no difference between genders, being useful to evaluate AbAdiposity in clinical settings independently of BMI. WheIR was associated independently with insulin resistance in CKD patients.

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PREVALENCE OF LARGE WAIST CIRCUMFERENCE IN ADOLESCENTS WITH NORMAL BODY MASS INDEX: RESULTS OF A POPULATION-BASED SURVEY

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Objective: To evaluate the association of normal body mass index (BMI) with abdominal obesity by sex in adolescents from a population-based sampling from southern Brazil.

Methods: A cross-sectional study was carried out among adolescent boys and girls, aged 12 to 19 years, who were interviewed at home using standardized questionnaires. Weight and height were measured, and BMI (kg/m²) for age and sex was calculated. Waist circumference (WC, cm) was used to identify abdominal obesity, and the average was categorized in tertiles, separately for boys and girls. Data were expressed as mean \pm SD or percentages. The 2x2 tables and chi-square test were used to verify the association of BMI with abdominal obesity. Modified Poisson Regression was used for multivariate analysis.

Results: Participants (n=612) aged 15.1 ± 1.8 years were enrolled, 52% women, with 7.0 ± 2.2 years of schooling, BMI of 21.4 ± 4.0 , and WC of 73.6 ± 9.3 for boys and 71.1 ± 10.1 for girls ($P=0.008$). Among boys with normal BMI 19% were in the upper WC tertile, 40% in the second, and 41% at the lowest ($P <$

0.0001). Among girls, these figures were 16%, 42%, and 42%, respectively ($P < 0.0001$). Multivariate analysis showed that the BMI was associated with central obesity, independently of age and sex.

Conclusions: Large proportion of adolescents with normal BMI has large waist circumference. The implication of this finding for the fat distribution in the adult life and as risk for cardiovascular disease needs to be investigated in longitudinal studies.

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WAIST CIRCUMFERENCE - A MORE SENSITIVE MARKER THAN BMI IN PREDICTING CARDIOVASCULAR DISEASE

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Purpose: To determine by Pulse Wave Velocity (PWV) determination which is more sensitive as a marker for predicting cardiovascular disease (CVD)-BMI or waist circumference (WC).

Method: PWV determined with BPULS apparatus using left external carotid and left dorsalis pedis arteries as "central" and "peripheral" points respectively. Pulses picked up by infrared sensors and recorded simultaneously with single lead ECG. Time difference between pulses measured. Shorter time delay or faster PWV indicates decreased arterial elasticity.

Materials: 957 asymptomatic Filipinos studied. Males-447, Females-500. Age 17-84 years. 327 Hypertensives. Classified into groups according to BMI and WC. Average PWV Time (adjusted for height) for each group noted. Relationship of increased BMI and WC to variations in PWV Time determined.

Results: Elevated BMI does not significantly influence PWV Time in: All subjects- ($p < 0.1397$); Females- ($p < 0.2372$); Normotensives- ($p < 0.0866$); and, Hypertensives- ($p < 0.1548$). However, for every centimeter increase of WC there is a corresponding decrease of PWV Time by: 0.000743 sec. ($p < 0.0001$) in All Subjects; 0.00063 sec. ($p < 0.0001$) in Females; 0.000759 sec ($p < 0.0001$) in Normotensives; and, 0.00035 sec. ($p < 0.0001$) in Hypertensives.

Discussion: Abnormal PWV is a high CVD risk factor. In four groups above, elevated BMI does not significantly influence PWV Time. However, in the very same groups, increased WC significantly affects PWV Time. This indicates that if we rely solely on BMI to predict CVD we will miss cases which are at high risk as shown by abnormal WC.

Conclusion: WC is a more sensitive marker than BMI for predicting CVD.

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MULTIPLE-SLICE MAGNETIC RESONANCE IMAGING CAN MORE ACCURATELY DETECT VISCERAL ADIPOSE TISSUE REDUCTION THAN SINGLE-SLICE IMAGING

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Objective: The use of imaging methods is increasing in quantifying abdominal adipose tissue (VAT). However, there is no clear consensus as to a standardized protocol for detection of VAT and its changes. We compared the ability of two commonly-used imaging protocols (multiple-slice vs. single-slice) to detect change in abdominal adipose tissue with diet or exercise in Japanese obese men.

Methods: We utilized data from participants who completed our diet ($n = 22$) or

exercise ($n = 35$) weight-loss interventions. Multiple-slice image obtained from T9 to S1 and single slice at the L4-L5 were compared by using an effect size (the higher, the better) of the VAT change. In addition, the needed sample-size was calculated to compare abilities of the two imaging protocols to detect significant changes in abdominal adipose tissue.

Results: In VAT, single-slice image had lower effect size (diet: 1.23; exercise: 0.49) than multiple-slice image (diet: 1.81; exercise: 0.90). In contrast, this was practically the same in SAT (single-slice image, diet: 1.60, exercise: 0.50; multiple-slice image, diet: 1.52, exercise: 0.74). When the groups were combined, required sample size in multiple-slice image was substantially fewer than that derived from single-slice image.

Conclusions: The different image protocols may lead to different results in relative VAT changes. Furthermore, single-slice image required substantially larger sample size than multiple-slice image and if researchers try to detect smaller changes in VAT, a larger sample size will be needed. Thus, multiple-slice image will be advantageous to assess VAT change in future clinical research.

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COMBINED USE OF WAIST AND THIGH CIRCUMFERENCE TO IDENTIFY HIGH-RISK, ABDOMINALLY OBESE HIV+ PATIENTS

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Introduction: The lipodystrophy often associated with HIV-infected individuals is characterized by lipoatrophy of subcutaneous adipose tissue and lipohypertrophy of abdominal adipose tissues; in particular visceral adipose tissue (VAT). Identification of HIV-infected individuals with expanded VAT is important given the established association between VAT and cardiometabolic risk. We reasoned that the combination of waist circumference (WC) and thigh circumference (ThC) might help identify the high-risk, visceraally obese HIV+ phenotype.

Methods: Participants included 1470 HIV-infected men ($BMI = 24.1 \pm 3.8 \text{ kg/m}^2$) and 836 HIV-infected women ($BMI = 22.5 \pm 4.0 \text{ kg/m}^2$) followed within HIV clinics at the University of Modena and Reggio Emilia in Italy. WC was measured at the narrowest point midway between the lowest rib and the iliac crest. ThC was measured midway between the hip and knee. Abdominal adipose tissue was measured using computed tomography.

Results: ThC and BMI were both positively correlated with VAT ($p < 0.05$). After statistical control for WC, ThC was negatively correlated with VAT in women ($p = 0.06$) and men ($p < 0.05$). When further controlled for WC, age and BMI, ThC remained significantly correlated with VAT in men only ($p < 0.05$).

Conclusion: ThC is negatively associated with VAT after control for WC in women and men. However, further control for age and BMI revealed that ThC remained negatively associated with VAT in men alone. The combination of waist and thigh circumference may be useful for identifying high-risk, visceraally obese HIV+ adults.

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INTRA-PERTIONEAL AND RETRO-PERTIONEAL ADIPOSE TISSUE IN PREDICTION OF METABOLIC RISK IN ASIAN MENS. Chan¹, D. Wai², A. Ng², K.M. Ng¹, E.S. Tai³, L.L. Chan¹¹Diagnostic Radiology, ²Endocrinology, Singapore General Hospital, ³Medicine, Yong Loo Lin School of Medicine, Singapore, Singapore

Objective: Obesity is central to the metabolic syndrome (MS), a major public healthcare issue, and widely linked with visceral adipose tissue (VAT). Radiologically, VAT can be further divided into intraperitoneal (IP) and retroperitoneal (RP) compartments. We evaluated for the correlation of IPAT, RPAT and VAT at L2/3 level with the parameters of metabolic risk.

Methods: All subjects gave informed consent prior to medical examination, venepuncture and abdominal CT scan. 5-mm section centered at L2/3 disk level were segmented into subcutaneous and VAT compartments after applying predefined window settings of -195 to -45 HU for fat, on Analyze 8.1. The VAT was segmented radiologically into IPAT and RPAT volumes and correlation made with metabolic risk markers.

Results: In 61 Chinese and 59 Indian men (mean ages: 66.3 and 65.8 years), the VAT volumes at L2/3 level was 78022.0 ± 36323.7 and 89148.1 ± 42238.5 mm³, and significantly correlated with BMI ($p < 0.0005$), waist ($p < 0.0005$) and hip ($p < 0.0005$) circumferences, fasting glucose ($p = 0.009$) and HDL ($p = 0.008$). Both IPAT and RPAT correlated well with L2/L3 VAT, with Pearson's coefficient $r=0.958$ ($p < 0.001$) and $r = 0.820$ ($p < 0.001$) respectively. IPAT correlated with almost all parameters of MS and fared better than VAT. However, RPAT correlated with fewer parameters of MS.

Conclusion: IPAT correlated better than VAT and RPAT with clinical and biochemical parameters of MS, and may be a better measure of abdominal obesity and predictor of insulin resistance in Asian men.

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ABDOMINAL OBESITY PREVALENCE IN A CARIBBEAN COMMUNITY

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Aim: To determine the prevalence of obesity in adults in the municipality of Soledad, according to different classification consensus.

Methods: Cross-sectional study. There were calculated a sample of 790 individuals ($N = 103,731$; expected prevalence: 22%; error: 3% confidence level: 95%). Previously filled Informed consent, a survey about cardiovascular on risk factors was applied, and weight, height and waist circumference were taken from individuals too. As obesity criteria were considered: body mass index > 29.9 kg/m², waist circumference > 102 cm and 90 cm for men, and 88 cm and 80 cm in women, according to international consensus.

Results: Prevalence of obesity: self-referred: 53.2%, for body mass index: 24.6%, abdominal: 72.3% (International Diabetes Federation) and 45.2% (Adult Treatment Panel III). Significantly higher rates of obesity in women ($p < 0.05$). Statistical association was found between obesity and hypertension, in men and women.

Conclusions: The prevalence of obesity was higher using the criteria of the International Diabetes Federation. The study population is exposed to risk factors that may enhance the negative effect of obesity on health.

References:

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TOTAL AND ABDOMINAL ADIPOSITY CHANGES IN RESPONSE TO UPPER BODY RESISTANCE TRAININGI. Shaw¹, B. Shaw², D.T. Goon³¹Tshwane University of Technology, Vanderbijlpark, ²Tshwane University of Technology, Pretoria, ³University of Venda, X5050, Thohoyandou, Limpopo, 0590, Republic of South Africa, Limpopo, South Africa

Aim: The aim of this study was to assess the effects of upper body resistance training on anthropometric measures in sedentary males.

Methods: Thirty-six men (mean age of 33 years) on an *Ad Libitum* diet, participated in an eight-week upper body resistance training (URT) group ($n = 18$) and compared to a non-exercising control (CO) group ($n = 18$). The URT group trained three times weekly at 50% of one repetition maximum (1-RM) for week one, at 60% 1-RM for weeks two and three and at 70% 1-RM for weeks seven to eight. Using seven upper body resistance exercises, each exercise was performed for three sets of 20 repetitions at weeks one and five, 15 repetitions for weeks two, three, six and seven and 12 repetitions for weeks four and eight.

Results: URT significantly ($p \leq 0.05$) improved total fatness by significantly decreasing fat mass ($p = 0.000$), sum of skinfolds ($p = 0.034$), percentage body fat ($p = 0.000$) and body mass index ($p = 0.012$). Abdominal fat mass was also altered following URT as indicated by significant decreases in waist circumference ($p = 0.001$) and waist-to-stature ratio ($p = 0.000$). The study indicated that eight weeks of URT improved four out of the six total fatness variables and two of the four abdominal fat mass measures.

Conclusion: URT should become an integral component to maintain or improve an individuals' physical profile in terms of weight management and/or overweight or obesity prevention.

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TOTAL AND ABDOMINAL OBESITY IN RURAL SOUTH AFRICAN CHILDRENA.L. Toriola¹, V. Moselakgomo¹, B. Shaw¹, D.T. Goon²¹Tshwane University of Technology, Pretoria, ²University of Venda, X5050, Thohoyandou, Limpopo, 0590, Republic of South Africa, Limpopo, South Africa

Background: The importance of total body fat and distribution has been stressed as a major risk factor for both adults and children. This study assesses total and abdominal obesity in rural South African children.

Methods: A stratified random sampling of 1172 (541 boys and 631 girls) children aged 10-16 years, attending seven primary schools in Mankweng District, Limpopo province, South Africa, participated in the study. Stature, body mass, waist and hip circumferences were measured using standard techniques. Body mass index (BMI) was calculated by dividing body mass by stature in meters squared. Centre for Disease Control and Prevention body mass index for age charts was used to determine total obesity, while waist-to-stature (WSR) was calculated by dividing waist circumference (in cm) by stature (in cm). A $WSR \leq 0.50$ was used to determine abdominal obesity. Results were analysed using student t-test and Chi-squared statistics, with a p-value of < 0.05 .

Results: The percentage of children who were at risk of overweight were higher in girls (11.0%) than boys (9.1%), whereas obesity occurred more among the boys (5.5%) compared with the girls (4.4%). A total of 161 children (27.4%) had central obesity as measured by WSR. The proportion of boys with a $WSR \geq 0.5$ was 69 (12.8%), while girls were 92 (14.6%).

Conclusions: Total and abdominal fatness are prevalent among South African children. This is worrisome, given the health consequences of excessive body fatness.

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CAN WEIGHT LOSS AFTER ROUX-EN-Y GASTRIC BYPASS BE PREDICTED BY BASELINE VISCERAL FAT?

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Objective: In women but not in men, body fat distribution poses a significant prognostic factor for the ability to lose weight by dieting. In this study, we examined whether the amount of visceral adipose tissue (VAT) or the ratio visceral versus subcutaneous adipose tissue (VAT/SAT) is predictive for postoperative weight loss after Roux-en-Y gastric bypass (RYGB).

Methods: This retrospective analysis included 198 subjects who underwent RYGB and were evaluated 6 months and/or 1 year after surgery (140 F/58 M; mean age 42.6 ± 12.7 years, body weight 118.7 ± 19.1 kg, BMI 42.1 ± 5.6 kg/m², VAT 222 ± 97 cm², SAT 673 ± 151 cm²). In 92 patients, complete data were available for analysis.

Results: Correlation analysis showed a negative association between VAT at baseline and weight loss after 6 months ($r = -0.24$; $p = 0.021$, $n = 92$) but not after 12 months ($n = 67$), and only in the whole population. Gender specific analysis showed no correlation between VAT and weight loss.

Stepwise linear regression analysis showed VAT at baseline as independent negative determinant of weight loss at 6 months ($R^2 = 0.047$; $B = -0.021$; $SEB = 0.009$, $p = 0.021$). When gender was entered in the model, only gender remained as independent determinant of weight loss ($R^2 = 0.10$; $B = -6.387$; $SEB = 1.873$; $p = 0.001$).

No significant associations were found at 1 year.

No correlations or associations could be demonstrated with VAT/SAT ratio.

Conclusion: Low VAT before surgery is a weak but significant predictor of diminished weight loss 6 months after RYGB. The association is lost when gender is taken into account.

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REDUCTION IN VISCERAL ADIPOSE TISSUE AFTER ROUX-EN-Y GASTRIC BYPASS CORRELATES WITH GLUCOSE CHANGE BUT NOT WITH INSULIN RESISTANCE

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Objective: Bariatric surgery improves glucose metabolism and decreases insulin resistance. The purpose of this study was to evaluate glucose and insulin resistance 1 year after Roux-en-Y gastric bypass (RYGB).

Methods: This retrospective analysis included 67 subjects who underwent RYGB and were evaluated 1 year after surgery (45 women, 22 men; mean age 43.5 ± 11.5 years, BMI 41.3 ± 4.5 kg/m², visceral adipose tissue (VAT) 236 ± 103 cm²).

Results: With an increasing degree of total weight loss, we found significant higher decreases in %VAT (ANOVA, $p < 0.001$).

total weight loss	<10% n=2	10-19.9% n=1	20-29.9% n=8	30-39.9% n=16	40-49.9% n=18	≥50% n=18	ANOVA p-value
ΔVAT	-81±83	11	-112±38	-152±86	-136±67	-163±83	0.144
%ΔVAT	-31.6±25.7	5.9	-47.2±10.5	-56.2±10.7	-58.7±9.9	-70.5±10.5	<0.001
ΔVAT/ΔSAT	1.20±1.12	-0.06	0.61±0.23	0.72±0.51	0.72±1.39	0.47±0.27	0.754

[%VAT change to total weight reduction]

After exclusion of insulin treated diabetic patients, ΔVAT ($r = 0.30$; $p = 0.023$; $n = 59$) and ΔVAT/ΔSAT ($r = -0.56$; $p < 0.001$; $n = 59$) correlated significantly with Δ fasting glycemia. However, we found no associations between ΔVAT or ΔVAT/ΔSAT and changes in fasting insulin or HOMA-IR.

Conclusion: After RYGB, patients significantly lost more % VAT compared to Δ% total body weight. No correlations could be found between loss of VAT or VAT/SAT ratio and changes in insulin or HOMA-IR. In this cohort, loss of VAT or VAT/SAT correlated with decreases in fasting glucose levels.

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APPLICABILITY OF BODY ADIPOSITY INDEX (BAI) IN YOUNG JAPANESE FEMALES

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Objectives: Body Adiposity Index (BAI) is a newly proposed anthropometric index to estimate percent body fat (%BF). The index has been identified as a useful measure in various racial groups however data in Asians is limited. The objective of the present study was to compare BAI-derived %BF with estimations from dual energy x-ray absorptiometry (DXA), multi-frequency bioelectrical impedance analysis (MFBIA) and anthropometry in young Japanese females.

Methods: A sample of 139 Japanese females (mean age ± SD: 20.4±1.3) underwent detailed anthropometry (including eight skinfold and five circumference measurements) and body composition assessments using DXA (Lunar DPX-LIQ) and MFBIA (InBody). %BF was estimated from anthropometry using the Durnin and Womersley and Japanese-specific Nagamine and Suzuki equations as well as BAI. In addition, sum of eight skinfolds (Σ8SF), body mass index (BMI: kg/m²) and waist-to-height ratio (WtHR) were calculated.

Results: Using %BF from DXA as a reference (27.6±5.9), %BF from the Durnin and Womersley equation and BAI were comparable (27.8±4.6 and 28.1±2.5, respectively). In contrast, the other two measures resulted in significantly ($p < 0.01$) lower %BF values. The Durnin and Womersley equation, BAI and MFBIA underestimated %BF among individuals with high %BF with the former showing the narrowest limits of agreement. The highest correlation with %BF from DXA was Σ8SF ($r = 0.915$) with BAI only moderately correlated ($r = 0.636$).

Conclusion: Although BAI calculation is straightforward and estimated %BF comparable to DXA, it may not be sufficiently precise for individual screening in young Japanese females.

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OMENTAL ADIPOCYTE SIZE MEDIATES THE ASSOCIATION BETWEEN SAGITTAL DIAMETER AND BLOOD LIPID ALTERATIONSJ.A. Cote^{1,2}, A. Veilleux³, S. Noël⁴, A. Tchermof^{1,2}¹Nutrition, Laval University, ²Endocrinology and Genomics, Laval University Medical Center, ³Lipidology, Nutrition and Metabolism, Montreal University, ⁴Gynecology Unit, Laval University Medical Center, Quebec, QC, Canada

Objectives: Several studies have shown that sagittal diameter is a significant predictor of abdominal and visceral fat accumulation. We tested the hypothesis that omental adipocyte size mediates the association between sagittal diameter and abdominal-obesity related blood lipid-lipoprotein alterations.

Methods: Omental and subcutaneous fat samples were obtained surgically in 199 women (age: 47.3±5.1, BMI: 26.7 ± 5.0 kg/m²). Body composition and fat distribution were assessed by dual energy x-ray absorptiometry and computed tomography respectively. Sagittal diameter was determined from 4 computed tomography images obtained at the L4-L5 vertebrae. Adipocyte diameter was measured in suspensions of isolated mature fat cells.

Results: Box and whisker plots indicated that progressively higher median adipocyte size values were associated with each increasing sagittal diameter quintile in both fat compartments. For a given quintile of sagittal diameter, the variation in adipocyte size was considerable, with a mean adipocyte size range of 19µm and 15µm between the 25th and 75th percentile in the omental and subcutaneous fat compartment respectively. Positive correlations were observed between sagittal diameter and adipocyte size in both the subcutaneous and the omental fat depots ($r=0.43$, $p<0.0001$ and $r=0.58$, $p<0.0001$, respectively). In models including sagittal diameter, omental adipocyte size was the best correlate of triglyceride, VLDL-triglyceride, VLDL-cholesterol and LDL-triglyceride levels, as well as the total cholesterol-to-HDL-cholesterol ratio, explaining, respectively 25%, 26%, 23%, 14% and 18% of the variance ($p\leq0.0001$ for all).

Conclusion: The relationship between sagittal diameter and blood lipid alterations is mostly mediated by omental adipocyte size.

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RELATIONSHIP BETWEEN FAT STORAGE CAPACITY AND INEFFICIENCY IN DIETARY FAT STORAGE IN TYPE 2 DIABETES: EFFECT OF WEIGHT LOSS

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Spillover of lipoprotein lipase-generated fatty acids from chylomicrons into the plasma free fatty acid (FFA) pool is an important source of FFA and reflects inefficiency in dietary fat storage, but the regulation of spillover is poorly understood. We measured spillover in 13 people with type 2 diabetes (T2DM, age 52±2 y, BMI 33.4±1.0 kg/m², HbA1c 7.9±0.3%) with infusions of a [³H] triolein-labeled lipid emulsion and [¹⁴C] oleate during continuous (q 15 min) ingestion of a liquid mixed meal, before and after a 5m weight loss program. Body fat was measured with DXA and CT. At baseline, there was a strong negative correlation between spillover and total body fat ($r=-0.78$, $P=0.002$), leg fat ($r=-0.79$, $P=0.001$), and trunk fat ($r=-0.66$, $P=0.01$). Spillover correlated positively with trunk:leg fat ratio ($R=0.56$, $P=0.047$), but did not correlate with visceral fat area. Baseline leg fat ($R=0.61$, $P=0.027$) but not trunk fat ($R=0.27$, $P=0.38$), negatively predicted decreases in spillover with weight loss. Participants lost >13% of body weight, lowering BMI to 29.2±1.1 kg/m² and HbA1c to 6.3±0.2% (both $P<0.0001$). There was a decrease in both meal-suppressed FFA concentration (186±17 to 115±10 µmol/L, $P<0.0001$) and oleate flux (65±9 to 50±7 µmol/min, $P=0.007$). Fractional spillover did not change (28±3% to 31±4%, $P=0.23$). These results indicate that in T2DM spillover relates negatively to fat storage capacity, and specifically that there is an inverse association between spillover and lower body fat. Weight loss results in marked improvement in meal-suppressed lipolysis, but not in spillover.

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ABDOMINAL OBESITY AND METABOLIC SYNDROME IN NURSE IN COTE D'IVOIRE

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Introduction: The metabolic syndrome is a particular state of morbidity characterized by the association of several factors contributing to the increase in the cardiovascular risk. This constellation of factors associates the glucose intolerance and its corollary the hyperglycemia, the overweight, the hypertriglyceridemia, the fall of the HDL-cholesterol and arterial hypertension. In Africa, it is difficult to evaluate in the actual prevalence of the metabolic syndrome. The present study aims was to determine the prediction and prevalence of the metabolic syndrome in a group of nurse-lactating mothers- in Abidjan (Ivory Coast), who were submitted at a particularly rich food lipids.

Material and method: Our populations were composed to 100 lactating women, which belong to the Ethnie Ebre where the habit are to eat, after after giving birth, high foods lipids for 6 months. We used the definition of « National Cholesterol Education Program-Adult Treatment Panel III » to determine the prevalence of metabolic syndrom in this population and see if the diet has a negative influence.

Result: The results obtained showed that the prevalence of the metabolic syndrome is 7 %, and 30% of them are presented an abdominal obesity.

Conclusion: The risk to develop a metabolic syndrome in this specific population of nurse is particularly big and it's linked to their eating habits.

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BODY COMPOSITION AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRACTURES

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The aim of this study is evaluating body composition in postmenopausal women depending on presence of vertebral fractures in their anamnesis.

Materials and methods: We've examined 144 postmenopausal women aged 50-83 years (mean age - 62,9±0,7 yrs; mean height - 160,6±0,5 cm; mean weight - 71,9±1,2 kg). The patients were divided into two groups: group A- women without vertebral fractures (n=82), group B- women with vertebral fractures (n=62) in their anamnesis. We also divided the patients into the following age-dependent groups: 50-59yrs, 60-69yrs, 70yrs and older. Total body, lumbar spine, femoral neck bone mineral density (BMD), lean and fat masses were measured by DXA using a densitometer Prodigy, GE.

Results: Fat mass significantly decreased with age (50-59yrs - 31906,9±1508,0 g; 60-69yrs - 30876±1186,5 g; 70yrs and older - 25257,4±1398,6 g; $F=5,0$; $p=0,008$). Fat and lean masses in postmenopausal women with vertebral fractures were significantly lower compared with the data of women without vertebral fractures (fat mass: group A- 42089±583,4 g, group B- 38421,4±652,4 g, $F=17,4$, $p=0,00005$; lean mass: group A - 31783,7±1212,1 g, group B - 27831,4±1048,5 g, $F=5,6$, $p=0,02$). We have founded the positive significant correlation between fat mass and BMD of spine and femoral neck depending on the presence of vertebral fractures in patient's anamnesis ($p<0,05$).

Conclusion: Fat mass was significantly decreased with age. Fat and lean masses significantly differ in postmenopausal women depending on the presence of vertebral fractures in their anamnesis. The positive significant correlation was found between fat mass and BMD of spine and femoral neck.

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ANATOMICAL STUDY OF SUPERFICIAL FASCIA AND LOCALIZED FAT DEPOSITS OF ABDOMENP. Kumar¹, A.K. Pandey², B. Kumar², S.K. Aithal³¹Plastic Surgery, ²Department of Anatomy, Kasturba Medical College, Manipal University, ³Department of Physics, Manipal Institute of Technology, Manipal University, Manipal, India**Background:** This study aims at ascertaining the gross anatomy of superficial fascia and the localized fat deposits of abdomen.**Materials and methods:** Eight adult cadavers (four males and four females) were dissected. Attachments, number of layers of fascia and colour, shape and maximum size of the fat lobules in loin, and upper and lower abdomen were noted. Thickness of deep membranous layer of superficial fascia of upper abdomen and lower abdomen were measured by metal casing electronic digital calipers, with resolution being 10 µm. The independent sample t-test, ANOVA for comparison and Pearson coefficient for correlation were used.**Results:** Superficial fascia of the abdomen was multilayered in the midline and number of layers reduced laterally. The shape, size, color, and arrangement of fat lobules were different in different locations. The thickness of the fascia of the lower abdomen in males (mean 528.336 ± SE38.48) was significantly ($P < 0.041$) more than that in females. (Mean 390.822 ± SE36.24). Pearson correlation between thickness of the membranous layer of the upper and lower abdomen revealed moderately positive correlation ($r=0.718$; $P<0.045$).**Conclusions:** The LFD in the central region of the abdomen corresponds to the area of multilayered fascia with smaller fat lobules. The relatively thinner supporting fascia of the lower abdomen in females may be responsible for excessive bulges of the lower abdomen. The fat lobule anatomy at different sites under study was different.

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ADIPOSY INDEXES AND THE BONE METABOLISM MARKER: OSTEOCALCINE. Halley¹, V. Delgado-Sánchez², L. Basurto³, M. Hiriart-Legorreta⁴, S. Camacho⁴, J. Salmerón⁵¹Instituto Mexicano del Seguro Social, Centro Medico 'Lic. Adolfo López Mateos', ²Instituto Nacional de Salud Publica, Toluca, ³Centro Medico Nacional Siglo XXI, Mexico, ⁴Universidad del Valle de México, Toluca, ⁵IMSS Epidemiology and Health Services Research Unit, Morelos, Mexico**Introduction:** Bone tissue has been recognized as an endocrine organ. Recently it's been found that levels of osteocalcin, a protein produced by osteoblast, is associated with glucose metabolism and lipids in human being. Experimental studies showed associations between adiposity and levels of osteocalcin, however in the adolescent population is not quite elucidated.**Objective:** To establish the association between adiposity indexes and serum levels of osteocalcin in children and adolescents.**Material and methods:** In this study we included 276 children and adolescents participants of the project "Health Worker Cohort Study". Adiposity index were established through BMI, waist circumference and DEXA. The total concentration of osteocalcin was determined by chemiluminescence. Through multiple lineal regression we evaluated the association between osteocalcin levels and the adiposity index.**Results:** Prevalence of overweight and obesity was 33.4%. abdominal obesity 23.5%. It was observed a negative correlation between BMI, percentage of fat mass, waist circumference ($p < 0.05$). Independently of the adiposity index included in the model, have obesity increases the risk of presenting low levels of osteocalcin, (OR: 2.09; 95%CI:1.39-4.70, $p < 0.05$) and adolescents with higherpercentage of fat mass have five times more risk than adolescents with less fat mass of present low levels of osteocalcin. (OR:5.12;95%CI:1.89-13.84, $p < 0.05$).**Conclusions:** Adolescents with higher adiposity have more probability of have low levels of osteocalcin.

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OSTEOCALCIN AND PHENOTYPIC CHARACTERISTICS OF METABOLIC SYNDROMEE. Halley¹, V. Delgado-Sánchez², L. Basurto³, M. Hiriart-Legorreta⁴, S. Camacho⁴, J. Salmerón⁵¹Instituto Mexicano del Seguro Social, Centro Medico 'Lic. Adolfo López Mateos', Toluca, ²Instituto Nacional de Salud Publica, Cuernavaca, ³Centro Medico Nacional Siglo XXI, Mexico, ⁴Universidad del Valle de México, Toluca, ⁵IMSS Epidemiology and Health Services Research Unit, Morelos, Mexico., Cuernavaca, Mexico**Background:** Cross-sectional studies have demonstrated that serum levels of osteocalcin have a negative correlation with serum levels of glucose and visceral fat mass in diabetic adults. However, the relationship between osteocalcin levels and phenotypic characteristics of metabolic syndrome in adolescents is not quite elucidated.**Aim:** To evaluate the association between osteocalcin and phenotypic characteristics of metabolic syndrome.**Material and methods:** Data of 276 children and adolescents participants of the project "Health Worker Cohort Study" was analyzed. To each participant we determined: insulin, glucose, triglycerides, HDL, waist circumference and blood pressure. Glucose and insulin were evaluated by glucose-oxidase method and HOMA. Total osteocalcin concentration was determined by chemiluminescence. Body mass index (BMI) was evaluated according to CDC chart's for children and adolescents according to age and sex. Using multiple lineal regression and logistic regression we evaluated the association between osteocalcin values and components of metabolic syndrome.**Results:** The proportion of male in the study population was 51.5%. The prevalence of overweight and obesity was 33.4% and abdominal obesity was 26.4%. The proportion of elevated glucose, hypertriglyceridemia, low levels of HDL, hypertension and metabolic syndrome were 4.4%, 17.5%, 50.6%, 2.2% and 7.0% respectively. Difference of medians according to ages groups, was observed for glucose, insulin, HOMA and osteocalcin ($p < 0.05$). The study showed a negative correlation between BMI, fat percentage, waist circumference, glucose levels and CRP with osteocalcin levels ($p < 0.05$).**Conclusions:** Serum osteocalcin levels were associated with some phenotypic characteristics of metabolic syndrome and measures of adiposity.

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IS OBESITY RELATED TO THE ABORTION AND STILLBIRTH OCCURRENCE? CROSS-SECTIONAL STUDY IN A REPRESENTATIVE SAMPLE OF THE BRAZILIAN POPULATION

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Background: Obesity is highly related to the reproductive health of women and thus the occurrence of a plethora of problems such as abortion and stillbirths. Studies have shown a higher chance of miscarriage and fetal deaths in the presence of excess of weight. Most of them use Body Mass Index (BMI) as a marker of obesity.**Objective:** This study aimed to investigate the relationship between obesity and fetal deaths occurrence (spontaneous abortion and stillbirths) in a representative sample of the Brazilian population.

Methods: Cross-sectional design study which used secondary data of 6,291 women in reproductive age (15-45 years-old) from the National Demographic Health Survey of 2006, whose reproductive behavior was assessed. Obesity was measured by BMI, Waist Circumference (WC) and waist-to-height ratio (WHtR). Logistic regression was used to evaluate relations between obesity and fetal deaths.

Results: Obesity markers used were found associated to the spontaneous abortion and stillbirth occurrence. The chance of fetal deaths increases when BMI, WC and WHtR increases (OR=1.035, 95%CI 1.034-1.035; OR=1.016, 95%CI 1.002-1.029; OR=15.980, 95%CI 1.936-131.898, respectively). The chance of fetal deaths increases double for each 1-Kg/m² increase in maternal BMI (3.5%) when compared to a 1-cm increase in maternal WC (1.6%). Characteristics of the mother such as age, marital status, occupation, race and income were factors of adjustment.

Conclusion: Obesity was shown associate to an increased occurrence of spontaneous abortion and stillbirths among women in reproductive age in a representative sample of the Brazilian population.

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SUPERFICIAL ABDOMINAL SUBCUTANEOUS FAT - A PROTECTIVE FAT DEPOT?

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Introduction: While increased visceral fat is frequently found to be correlated with cardio-metabolic risk, results are less consistent for subcutaneous abdominal fat.

Objective: We thought to investigate if this inconsistency can be attributed to variations in superficial and deep abdominal subcutaneous (SSAT and DSAT, respectively) fat content and distribution, and to the molecular characteristics of these two sub-depots.

Methods: MRI-based quantification of SSAT and DSAT in 74 type 2 diabetes patients, and protein expression of molecules representing adipose tissue stress in obesity in SSAT, DSAT and omental fat biopsies during elective abdominal surgery.

Results: Both the absolute and relative abundance of DSAT correlated with more negative cardio-metabolic parameters (higher fasting plasma glucose, HbA1C, triglycerides and blood pressure, and lower heart-rate variability, all $p < 0.05$). In contrast, SSAT absolute and relative distribution correlated with lower fasting glucose and HbA1c, triglycerides, blood pressure and higher heart-rate variability. Molecularly, we have previously demonstrated increased activation of an ASK1/MKK4,3/6/p38MAPK/JNK pathway and increased autophagy in obesity, which correlated with obesity-associate morbidity (JCEM2011,96:E268 and JCEM2009,94:2507). Here we saw that DSAT had a variable expression of p-JNK, LC3II and Atg5, tending to have an intermediate expression of these proteins between the amount observed in SSAT and omental fat. Moreover, although omentin protein expression was at least 5-fold higher in omental fat than in the other depots, DSAT tended to express higher omentin levels than SSAT.

Conclusions: DSAT amount and "quality" may contribute to variability in the clinical consequences of SC adiposity.

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FIXING OF BMI CUT-OFF LEVELS BASED ON BODY FAT PERCENTAGE IN THE ADULTS OF SOUTHERN INDIA

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The prevention and control of obesity is one of the major public health issues in India. The BMI is convenient and high specificity in detecting subjects with a high body-fat, it is easy to use in community studies. The WHO cut-off levels of BMI may not be addressing all ethnic groups, where body composition is distinctively different. Accurate and ethnic specific BMI cut-off levels are important to predict risk. **Objectives:** The present study was carried out to derive BMI cut-off levels based on percent body fat among adults of South India.

Methodology: A total of 1032 adult men and women of 20-60 years were covered randomly irrespective of their socio-economic status from the municipal wards of Hyderabad.

Results: Statistically significant correlation was observed between BMI with percent body fat, waist circumference (WC), and waist-hip ratio (WHR) in both the gender. Similarly, these indices were also significantly correlated with fasting blood glucose, total cholesterol and triglycerides. Using ROC analysis, the optimal levels of BMI and WC for both men and women were derived based on 25% and 30% body fat for men and women. The cut-off levels of WC were 85cm for men and 71cm for women, which were lower than the WHO Consultative group for Asian Indians, where as BMI cut-off levels were 22 and 23 kg/m² for men and women.

Conclusions: The study results concluded that the BMI cut-off levels for men and women were 23 and 23 kg/m², while waist circumference was 85cm and 71 cm respectively.

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EVALUATION OF ANTHROPOMETRIC MEASUREMENTS THAT AFFECTS RESPIRATORY MUSCLE STRENGTH IN OBESE WOMEN

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Introduction: It is well known that measures of weight, body mass index (BMI), waist circumference and waist / hip ratio (W / H) are negatively related to lung volumes in obese patients. However, it is still unclear the influence of these measures in respiratory muscle strength.

Objective: To evaluate the anthropometric measurements and correlate them with respiratory muscle strength in obese women.

Methods: It was evaluated 166 women with class II and III obesity (BMI: 41.09 ± 3.71 kg/m²), aged 36.93 ± 10.03 years. The anthropometric measurements of weight, height, and waist and hip circumference were recorded. The respiratory muscle strength was evaluated by using measurement the maximal static respiratory pressures - MIP and MEP (±300 cm H₂O).

Results: The MIP was negatively correlated with age ($r = -0.21$, $p < 0.01$) and with the W/H ratio ($r = -0.29$, $p < 0.01$). There was no significant correlation of MIP with waist circumference, weight and BMI. The MEP did not correlate significantly with any anthropometric measurements.

Conclusion: Through the results, we can conclude that general measures of obesity such as weight and BMI, as well as the waist circumference alone, did not affect MIP. However, the W / H ratio was the variable that most influencing the inspiratory muscle strength (MIP). The MEP does not seem to be influenced

by obesity, since there was no significant correlation between this variable and any of the anthropometric measurements evaluated.

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PROINFLAMMATORY STATUS WAS ASSOCIATED TO OBESITY IN ADULT WOMEN WITH DOWN SYNDROME

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Objectives: It is widely accepted abdominal obesity is strongly associated to proinflammatory cytokines. However, to the best of our knowledge, this issue has received no attention in people with intellectual disability in general and Down syndrome in particular. For the reasons already mentioned, the present study was designed to determine potential associations between a proinflammatory biomarker and anthropometric measurements in obese young women with Down syndrome.

Methods: Thirteen obese women with Down syndrome (25.2±4.4 years) volunteered for this study. Plasmatic levels of TNF-α were assessed by commercial ELISA kits (Immunotech, MA, USA). Fat mass percentage was assessed by bioelectrical impedance analysis BIA (Tanita TBF521). To determine waist to hip ratio, waist and hip circumferences were measured with an anthropometric tape (Holtain Ltd). Pearson's "r" coefficient was used to determine potential associations among tested parameters. Results were expressed as mean ± sd. Further our protocol was approved by an institutional Ethics Committee.

Results: Plasmatic level of TNF-α was 11.7±2.6 pg/ml. With respect to anthropometric parameters, fat mass percentage was 27.4 ± 3.6% and waist to hip ratio was 1.09 ± 0.002 cm. We also found significant associations between plasmatic TNF-α and fat mass (r=0.39; p=0.026) as well as between TNF-α and waist to hip ratio (r=0.44; p< 0.001).

Conclusion: Obesity was associated to proinflammatory status in women with Down syndrome. Further well-conducted studies are required to reduce proinflammatory status in this population group.

Acute Coronary Syndromes

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PREDICTING HIGH ON-TREATMENT PLATELET REACTIVITY IN PATIENTS WITH ACUTE CORONARY SYNDROMES: ROLE OF BODY MASS INDEX AND WAIST CIRCUMFERENCE

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Objectives: High on-clopidogrel treatment platelet reactivity (HPR) has been associated with adverse outcomes in patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI). Several studies have highlighted the association between body mass index (BMI) and HPR. We sought to evaluate the role of various clinical characteristics and biomarkers associated with HPR in patients receiving clopidogrel therapy following an ACS.

Methods: We enrolled 199 ACS patients who received clopidogrel (75mg/daily) after PCI. Maximal platelet aggregation (MPA) was evaluated 6 months after PCI with light transmittance aggregometry (LTA) after stimulation with 10μM ADP.

Results: Compared to patients without HPR, patients with HPR (MPA≥50%) had higher BMI (28.6 vs 26.7kg/m²; p=0.003), higher WC (100.0 vs 95.0cm; p=0.002) and had higher triglyceride levels (1.5 vs 1.3mmol/l; p=0.05). MPA was higher in patients with a BMI>30kg/m² (50.9 vs 42.6%; p=0.003) and in patients with elevated WC (49.3 vs 41.3%; p< 0.0001). HPR was present in 53% of patient with elevated WC and in 23% of patients without elevated WC. Elevated WC (stratified by gender, males: >100cm, females: >90cm) was a stronger predictor of HPR (OR 2.9 95%CI[1.4-6.0]; p=0.005) than BMI (OR 2.2 95%CI[0.93-5.2]; p=0.07). WC had a sensitivity of 62% and a specificity of 70% to predict HPR in this population (c-statistic=0.66).

Conclusions: These findings suggest that elevated WC is a stronger predictor of HPR than BMI in ACS patients treated with clopidogrel. Further studies are needed to investigate strategies to overcome HPR in patients with visceral obesity.

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OBESITY AND INTIMA MEDIA THICKNESS INCREASE THE INCIDENCE OF ACUTE CORONARY SYNDROME IN PATIENTS WITH AORTIC STENOSIS. PROSPECTIVE CLINICAL STUDY

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Objective: Obesity is one of the most frequent risk factor for coronary artery disease (CAD). The present study evaluates the probability of an increased risk of developing ACS with the incidence of obesity associated with intima media thickness (IMT) in patients with degenerative aortic stenosis (AS).

Method: The study cohort consisted of 196 patients of Caucasian race, admitted in Emergency County Hospital, Baia Mare, with AS. The incidence of ACS was followed prospectively.

Results: During a follow up period of 4 years, 54 patients (27.6%) have developed ACS. Obesity was present in a similar percentage in patients who developed ACS and those who did not have ACS: 22.2% (12 patients) in the group with ACS, respectively 20.4% (29 patients) in the group without ACS. The prevalence of IMT was higher in the group that developed ACS, 47 patients (87%), compared with 96 patients in the group without ACS (67.7%). Obesity is associated with an increase by 1.11 times of the risk of developing ACS (p=0.78) while the presence of IMT leads to a 3.2 times (p=0.0084) increase of ACS. The association of the two parameters has as consequence the increased

risk of developing ACS (p=0.0145), but it has no higher predictive value than determining the increase in IMT as a marker of severe coronary artery disease.

Conclusion: Patients with degenerative AS presenting concomitantly obesity and IMT have a higher risk of developing ACS, they need a very close medical surveillance and a more aggressive treatment of the risk factors.

Adipose Tissue

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ANGIOTENSIN TYPE 2 RECEPTOR (AT2R) ACTIVATION PREVENT INSULIN RESISTANCE BY MODULATING ADIPOCYTE PHYSIOLOGY

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Introduction: Several studies have shown that angiotensin II (Ang II) can modulate adipocyte function. Previous studies used Ang II type 1 receptor (AT1R) blockers (ARBs) or PD123319 as tools to study AT2R in adipocyte physiology and insulin resistance.

Objective: A non-peptide and highly selective AT2R agonist, M24 (formerly called Compound C21), was used to test our hypothesis that activation of AT2R increases insulin sensitivity by enhancing adipocyte differentiation and functionality.

Design: In vivo studies were conducted using Wistar rats fed for 6-week with high-fat/high-fructose diet (HFHF) or chow diet and treated with saline, M24 (0.1mg/kg/day), losartan (1mg/kg/day). At the end of the treatment, 2 h of euglycemic-hyperinsulinemic clamps was performed to measure insulin sensitivity. To understand the role of AT2R in adipocyte physiology, primary cultures of subcutaneous (SC) and retroperitoneal (RET) preadipocytes were performed.

Results indicate that treatment with M24 or losartan prevented insulin resistance induced by the HFHF diet. Moreover AT2R activation reduced adipocyte size without changing adipose mass. AT2R activation by M24 increased PPARγ expression and lipid accumulation only in SC preadipocytes. When infected with shRNA to abolish the expression of AT2R, cells exhibited a fibroblast-like morphology without evidence of adipocyte differentiation. Under these conditions, AT2R was absent and the expression of aP2 and PPARγ was very low, suggesting a crucial role of AT2R in adipocyte differentiation.

Conclusion: These results indicate that AT2R may improve insulin resistance by modulating adipocyte physiology.

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BOTH THE ATTENUATION AND CROSS-SECTIONAL AREA OF VISCERAL ADIPOSE TISSUE MEASURED BY COMPUTED TOMOGRAPHY ARE INDEPENDENTLY RELATED TO CARDIOMETABOLIC RISK

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Objectives: To examine the relationships between the cross-sectional area and the attenuation of visceral adipose tissue (VAT) measured by computed tomography (CT), and to explore the potential additive value of VAT attenuation in modulating the cardiometabolic risk (CMR) profile beyond VAT.

Methods: 2061 men and 1842 women from the International Study of Prediction of Intra-abdominal adiposity and its Relationship with cardioMetabolic risk/Intra-Abdominal Adiposity (INSPIRE ME IAA) underwent CT scans to assess VAT area (cm²) and attenuation (Hounsfield) at L4-L5 level. Measured CMR factors included triglycerides, HDL-C, ApoB, HOMA-IR and CRP. Subjects

were classified according to sex-specific quintiles of VAT and median of VAT attenuation (Low-VAT-Att or High-VAT-Att).

Results: VAT area and attenuation were significantly correlated (curvilinear relationship, $r^2=0.46$ in men and $r^2=0.49$ in women, $p<0.0001$). All CMR factors worsened with increasing VAT quintiles. Within each VAT quintile, TG, HDL-c, HOMA-IR, ApoB and CRP (women) were further increased in Low-VAT-Att versus High-VAT-Att ($p<0.05$). Multiple regression analysis (Table 1) showed that both VAT attenuation and area explained the variance of CMR factors. However, only VAT attenuation was an independent correlate of ApoB.

	Men			Women		
	Total model† % of explained variance (r ² *100)	% of explained variance for VAT area (partial r ² *100)	% of explained variance for VAT attenuation (partial r ² *100)	Total model† % of explained variance (r ² *100)	% of explained variance for VAT area (partial r ² *100)	% of explained variance for VAT attenuation (partial r ² *100)
Log Triglycerides (mmol/L)	15.7 ***	2.1 ***	8.8 ***	16.1 ***	13.2 ***	2.2 ***
HDL chol (mmol/L)	15.4 ***	6.7 ***	1.8 ***	24.2 ***	15.4 ***	3.3 ***
Apolipoprotein B (g/L)	12.1 ***	0.2	3.4 ***	7.3 ***	0.1	3.8 ***
Log HOMA-IR	34.2 ***	22.7 ***	3.0 ***	37.6 ***	30.4 ***	0.9 ***
Log CRP (mg/L)	16.0 ***	14.0 ***	0.5 **	26.8 ***	18.1 ***	1.3 ***

Each CMR factor was analyzed separately. †The presented model was adjusted for age, region, physician's specialty, smoking status, type 2 diabetes, dyslipidemic medications. Statistical significance level : ** $p<0.01$, *** $p<0.0001$.

[Table 1: Multiple regression analysis]

Conclusion: A lower CT-measured VAT attenuation is independently associated with a more deleterious CMR profile beyond visceral adiposity.

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BROWNING OF HUMAN EPICARDIAL ADIPOSE TISSUE IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING

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Objectives: Recent evidence points to the presence of brown adipocytes in human epicardial adipose tissue (EAT). Considering that brown adipocytes undergo significant lipid metabolism to mediate thermogenesis, we investigated i) whether human EAT expresses uncoupling protein-1 (UCP-1) at mRNA and protein level, ii) whether UCP-1 expression in EAT associates with circulating lipid levels in humans.

Methods: Epicardial-, mediastinal- and subcutaneous-adipose tissues (i.e. EAT, MAT and SAT) were collected from a patient cohort (n=33) undergoing coronary artery bypass grafting (CABG) at the Quebec heart and Lung Institute. UCP-1 mRNA expression was assessed using q-PCR in all fat depots. Correlation analyses between plasma lipids and mRNA expression of UCP-1 in various depots were performed. Immunohistochemical analysis of UCP-1 was also performed in the EAT collected from a separate cohort of (n = 10) patients undergoing CABG.

Results: EAT exhibited significantly higher mRNA expression of UCP-1 compared to both MAT and SAT depots ($P \leq 0.05$). EAT expression of UCP-1 mRNA correlated positively with circulating HDL-cholesterol levels in this cohort

($P \leq 0.05$), which was not observed for MAT and SAT. Immunohistochemical analysis further identified the presence of UCP-1 protein in human EAT.

Conclusion: UCP-1 expression at both mRNA and protein levels confirms the presence of brown adipocytes in human EAT. Furthermore, we provide evidence to support the hypothesis that EAT as an active BAT depot shares a functional association with circulating lipids in humans.

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INCREASED IN VITRO ADIPOGENESIS IN THE JUVENILE HYPOTHALAMIC OBESE MALE RAT

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Objective: To evaluate the *in vitro* adipogenic capacity of stromal vascular fraction (SVF) cells from 30 day-old normal (CTR) and neonatally L-monosodium glutamate (MSG) treated male rats.

Methods: At experimental day peripheral blood was collected and the levels of leptin (LEP), insulin (INS) and corticosterone (B) were determined. Retroperitoneal adipose tissue (RPAT) pad was dissected and weighted, and cells from the SVF were isolated. SVF cells in culture were allowed to proliferate up to reach confluence and pre-adipocyte differentiation was induced (day 0), then cells were cultured up to day 10 post-differentiation. Between days 0 and 10 of the differentiation period, media LEP concentrations were monitored. Intracellular lipid content (Oil-Red O) and cell gene expression (LEP, adiponectin and PPAR- γ mRNA levels) were also examined at the end of the differentiation period (day 10).

Results: MSG rats displayed high plasma LEP levels and RPAT mass, whereas peripheral INS and B levels remained normal. On day 10 post-differentiation, MSG cells showed an increased ($p < 0.05$ vs. CTR) LEP release into the medium and lipid content. Finally, mature MSG adipocytes displayed higher LEP ($p < 0.05$ vs. CTR) and PPAR- γ (albeit not significant) mRNA levels, although similar adiponectin gene abundance.

Conclusions: Our study indicates that in the juvenile MSG male rat, the *in vitro* adipogenic capacity seems to be enhanced. It is suggested that the increased RPAT mass found in MSG animals could be due, at least in part, to hyperplastic expansion before the development of an endogenous glucocorticoid-rich milieu. (PICT 2007-1051).

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PYROGLUTAMYLATED RF-AMIDE PEPTIDE GENE IS REGULATED BY LIPOPOLYSACCHARIDE AND INTERFERONS IN A CELLULAR MODEL OF METABOLIC ENDOTOXEMIA

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The orexigenic QRFP has been shown to increase adipogenesis and to inhibit lipolysis. In diet-induced obesity featuring slightly elevated plasma concentrations of endotoxin, QRFP expression was decreased compared to lean animals. This metabolic endotoxemia (ME) seems to play a crucial role in the development of obesity.

Objectives:

- 1) To document the mechanisms of regulation of QRFP gene.
- 2) To assess the effect of ME on QRFP expression in adipocyte and macrophage cells.

Methods: QRFP expression was monitored by quantitative PCR following treatments with low dose of lipopolysaccharide (LPS) (1 ng/mL) corresponding to plasma concentration found in ME, TNF- α (10 ng/mL), palmitate (500 μ M),

IFN- β , (100 U/mL). Signaling pathways have been investigated with shRNA knockdowns and pharmacological inhibitors.

Results: Low doses of LPS downregulated QRFP by 50% in macrophages but not in adipocytes. A direct, but transient, effect of LPS on QRFP expression in macrophages could be reversed with IKK-2 inhibitor IV or by TRIF knockdown. Interferons are induced by LPS in macrophages. IFN- β reduced QRFP expression in both macrophages and adipocytes as LPS but in a more sustained manner. Macrophage-conditioned medium reduced QRFP expression in adipocytes; this effect was blocked with an IFN- β neutralizing antibody. The effect of IFN- β on QRFP expression was blocked by PI3K inhibitor (LY294002) and by p38 MAPK inhibitor (SB203580).

Conclusions: LPS induces IFN- β release from macrophages which reduces QRFP expression in both macrophages and adipocytes in an autocrine/paracrine manner, suggesting QRFP as a potential biomarker in ME.

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C5L2 AND C5AR RECEPTORS EXPRESSION, INTERACTION AND SIGNALING PATHWAYS IN ADIPOCYTES AND MACROPHAGES

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Objectives: Obesity is associated with inflammation characterized by increased infiltration of macrophages. C5L2 has been identified as a receptor for acylation stimulating protein (ASP) and the inflammatory factor C5a, which also binds C5aR. While ASP is known to stimulate triglyceride synthesis, the potential role of C5L2 (and ASP) in adipose immune response is unknown. The present study examines the effects of ASP and C5a on C5L2 and C5aR interactions in 3T3-L1 adipocytes and J774 macrophages.

Methods: Flow cytometry and immunofluorescence used to visualize receptor localization, coupled to bioluminescence resonance energy transfer (BRET) to evaluate receptor dimerization and signalling analyzed via Akt phosphorylation.

Results: Cell surface receptor levels of C5L2 and C5aR increased during 3T3-L1 adipocyte differentiation. Both receptors are also highly expressed in J774 macrophages. Using confocal microscopy, in non-stimulated adipocytes, both receptors were distributed diffusely. Following ASP stimulation (30 mins), C5L2 is internalized with increasing co-localization with C5aR. In resting macrophages diffuse co-localization of C5L2 and C5aR was present. Post-ligand stimulation with ASP or C5a, a portion of C5aR receptors migrated to the cell surface, a portion co-localized with intracellular C5L2. BRET results indicated that C5L2 and C5aR form homo- and heterodimers. Moreover, ASP stimulated Akt phosphorylation in both cell types.

Conclusions: C5L2-C5aR dimerization may influence cell response to ASP and C5a, providing new insights into the complex interaction between adipocytes and macrophages within adipose tissue. Understanding the mechanisms involved in the differential responses of C5L2-C5aR activation based on cell types and ligands is relevant to inflammation and obesity.

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OPPOSITE REGULATION OF AUTOPHAGY GENES IN ADIPOSE TISSUE AND LIVER IN OBESITY

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Introduction: Autophagy (flux and gene expression) has been recently reported to be elevated in adipose tissue in human obesity (JCEM2011;96:E268), and attenuated in obese mice' livers (Cell Metab2010;11:467), raising the question of whether this is a human-mouse or a liver-fat tissue difference in response to obesity.

Methods: Autophagy genes mRNA and protein expression were determined in adipose tissue and livers of high fat-fed versus normal chow fed mice.

Results: Sixteen weeks of high-fat diet increased adipose tissue mRNA levels of Atg5 (+70%), Atg7 (+40%), Atg12 (+65%) and beclin 1 (+38%), while mRNA of these genes in the livers decrease (-12%, -40%, -10% and -35%, respectively). There was no significant change in the expression of LC3B. Protein levels of Atg5 and Atg12-5 complex increased 2- and 1.8-fold in adipose tissue of high fat-fed mice compared to controls, and decreased by approximately 40% in the livers, respectively.

Conclusions: Autophagy is regulated reciprocally in liver and adipose tissue in obesity, highlighting tissue/organ-specificity in the regulation of this process, and/or differences in the local environment induced in both tissues in obesity. Thus, tissue-specific regulation of autophagy must be considered when attempting to manipulate autophagy for therapeutic purposes.

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PHOSPHOLIPID TRANSFER PROTEIN DEFICIENCY INHIBITS HIGH FAT DIET-INDUCED INCREASE IN ADIPOSE TISSUE IN MICE

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Objectives: To determine the effects of phospholipid transfer protein (PLTP) deficiency on the distribution and mass of adipose tissue (AT) and whole body weight in high fat diet (HFD)-fed mice.

Methods: 8-week-old female PLTP^{-/-} and wild-type littermates were fed with HFD (Research Diets, Inc., New Brunswick, NJ, USA) for 3 months. The body weight and food intake of animals were monitored weekly. The distribution and mass of white AT and brown AT, the total cholesterol (TC) and triglyceride (TG) in serum and adipose tissue were determined. Besides, white adipocyte size and the expression of uncoupling protein (UCP) in brown adipose tissue were measured.

Results: Compared with wild-type group, PLTP deficiency

- ① significantly reduce body weight and white fat mass;
- ② reduce serum TC, TG, HDL-C and LDL-C levels;
- ③ decrease TG levels without affecting TC in white AT
- ④ has no effect on the expression of UCP in brown AT.

Conclusions: PLTP deficiency could decrease the mass and TG levels in AT in the mouse and such effect is possibly mediated by downregulating TG-rich lipoproteins.

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MORPHOLOGIC AND HISTOLOGICAL CHARACTERISTICS OF THE ADIPOSE TISSUE IN THE SOMATIC PATIENTS WITH ABDOMINAL OBESITY

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The research includes 82 autopsies of patients of different sexes who had obesity at the age of 69.4 ± 12.31 whose cause of death were: a stroke (17,0%), postinfarction cardiosclerosis - 12,1%, vascular encephalopathy - 8,5 %, chronic obstructive pulmonary disease - 10,9%, hepatic cirrhosis - 9,7% etc.

The diagnosis criterion was the coefficient of obesity (CO) in males $\geq 1,0$; in females $\geq 0,85$. The first group consisted of 46 deceased with abdominal obesity (56,09%), 30 of whom (65,2%) were females and 16 (34,7%) were males. The second group consisted of 36 deceased without abdominal obesity (43,9%), 27(75%) of females and 9 (25%) of males.

Morphometric measurements of the adipose tissue of pericardial sac, paranephria, frontal abdominal wall were carried out in no less than 10 visual fields at the same microscope magnification (x200), the results were expressed in conditional and relative units.

In case of the abdominal obesity absence, apart from the sex, the adipose tissue was represented by different groups of lipocytes of oval round or prolate shape regardless of the type of the adipose tissue. Their average diameter came to: of pericardium - 0,3 conditional units, (some groups - up to 2,5 conditional units); of paranephric fat - 1,6 conditional units, (some groups - up to 3,2 conditional units); of frontal abdominal wall - 1,8 conditional units, (some groups - up to 2,9 conditional units). Thereat, the extracellular matrix and microvasculature were well developed. The average distance between the vessels of microvasculature was the following: of pericardium - 0,7 conditional units; of paranephria - 2,6 conditional units; of frontal abdominal wall - 3,1 conditional units.

In case of the abdominal obesity presence, as a result of the heavy increase of lipocytes, they took polygonal shape due to pressing each other. Practically no lipocytes of a small dimension are left. The principal differences from the comparative group were monomorph and polygonal form of the cells of increased volume. The average diameter of lipocytes: of pericardium - 2,1 conditional units (sometimes up to 3,3 conditional units); of paranephric fat - 2,1 conditional units, (some groups up to 7 conditional units); of the frontal abdominal wall - 3,3 conditional units (some groups up to 4,1 conditional units).

The extracellular matrix was increased proportionally to the growth of the lipocyte volume, and in many cases was developed lop-sided. The microvasculature develops in the same way, but to a lesser degree than the increase of the adipose tissue volume. In connection with that there happened to be the increase of the average distance between the vessels of the microvasculature: paranephric fat - 2,8 conditional units; pericardium - 1,9 conditional units; the frontal abdominal wall - 4,2 conditional units.

Thus, it can be supposed, that in case of abdominal obesity there forms a different, from the point of its physiological characteristics, adipose tissue. In addition, its participation in the hormonal homeokinesis changes. As a result the processes of metabolism in the adipose tissue inevitably suffer, the tissue trophism breaks, the extracellular matrix collagenases activates in connection with hypoxia.

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WHICH ADIPOSITY INDEX IS THE BEST INDICATOR FOR UNDIAGNOSED TYPE 2 DIABETES?**X. Qi¹, Z. Xu¹, A. Dahl^{2,3}, X. Wei^{4,5}**

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Objective: Early detection of diabetes is important for the prevention of diabetic complications. The best adiposity index for indicating type 2 diabetes mellitus (T2DM) remains unclear. We aimed to identify the optimal adiposity measure among body mass index (BMI), waist circumference (WC), waist to hip ratio (WHR) and waist to height ratio (WHtR) to indicate undiagnosed T2DM and impaired fasting glucose (IFG) in Chinese adults.

Design: Population-based cross-sectional study.

Methods: A total of 7 567 participants aged 20-79 were included in this study. IFG was defined as fasting plasma glucose level of 6.1-6.9mmol/l in diabetes-free participants. Undiagnosed T2DM was identified as fasting plasma glucose ≥ 7.0 mmol/l when neither a history of diabetes nor hypoglycemic drugs use was present. Body weight, height, waist and hip circumferences were measured following standard procedure. Data were analyzed using logistic regression and areas under the receiver operating characteristic (ROC) curves.

Results: Of all participants, 536 were defined as having IFG, and 690 were patients with T2DM, including 290 (3.8%) undiagnosed diabetes. In multivariate logistic regression, the odds ratios of WHtR (≥ 0.5) were stronger than that of BMI (≥ 24 kg/m²), WC (≥ 85 cm in men and ≥ 80 cm in women), WHR (≥ 0.85) for undiagnosed T2DM and IFG. Among the four indices, WHtR ≥ 0.5 showed the largest area under the curve for identification of undiagnosed T2DM (0.725, 95% CI 0.693-0.756) and IFG (0.662, 95% CI 0.638-0.687).

Conclusions: Comparing with BMI, WC, and WHR, WHtR ≥ 0.5 may be the best indicator for undiagnosed T2DM and IFG. Our findings highlight the need to monitor WHtR for early detection of T2DM and IFG in order to prevent diabetic complications.

Cardiometabolic Risk

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CARDIOMETABOLIC RISK FACTORS IN PRIMARY CARE PATIENTS

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Objectives: To evaluate cardiometabolic risk of patients followed in primary care.

Methods: 310 patients with regular follow-up were recruited in 9 practices. Patients were divided in 2 groups: chronic diseases (CD) - if they had hypertension or dysglycemia in addition to a BMI>25 - and controls. Anthropometric data, vital signs, lifestyle, 6 minute walk-test and HbA1c were evaluated.

Results: Mean age is 57.4±15.1 years and 67.4% are women. Mean BMI is 29.2±6.5 Kg/m² and 78% of the sample has a BMI over 25 Kg/m² (100% in CD and 63% in controls). Mean waist circumference for women is 92.5±16.4 cm and 101.5±14.3 cm for men. In the CD group, 99% have a waist circumference higher than the IDF cut-off vs 58% in controls (p< 0.001). Systolic blood pressure is 132.6±14.5 and diastolic blood pressure 79.8±10.3 in the CD group vs 121.8±17.7 and 77.6±10.7 in controls (p< 0.001 and < 0.05). HbA1c is 6.4%±1.0 in the CD group vs 5.7%±0.5 in controls (p< 0.001). Patients from the CD group have lower results at the 6 minutes walk test (430.0 vs 531.0 m, p< 0.001). Fruit and vegetable consumption is 4.4 ± 2.2 times a day and 80.6% have breakfast everyday. More patients in the CD group watch more than 20 hours of television a week (26.2 vs 10.0 %, p< 0.001) but they smoke less (9.2 vs 22.2%, p< 0.01).

Conclusions: Patients followed in primary care have several cardiometabolic risk factors even when they are not diagnosed with lifestyle-related chronic diseases.

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SIGNIFICANT DIFFERENTIAL EFFECTS OF OMEGA-3 FATTY ACIDS AND FENOFIBRATE IN PATIENTS WITH HYPERTRIGLYCERIDEMIA

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Objects: Omega-3 fatty acids and fenofibrate are both used to treat patients with hypertriglyceridemia. However, a head-to-head comparison of the lipoprotein and metabolic effects of these two medicines has not been published.

Methods: This was a randomized, single-blind, placebo-controlled, parallel study. Age, sex, and body mass index were matched among groups. All patients were recommended to maintain a low fat diet. Fifty patients in each group were given placebo, omega-3 fatty acids 2 g (most commonly used dosage in Korean patients), or fenofibrate 160 mg, respectively daily for 2 months.

Results: Omega-3 fatty acids therapy decreased triglycerides by 21% and triglycerides/HDL cholesterol and improved flow-mediated dilation (P< 0.01), however, did not significantly change insulin, plasma adiponectin levels, and insulin sensitivity (determined by QUICKI) relative to baseline measurements. Fenofibrate therapy decreased total cholesterol, triglycerides by 29%, and triglycerides/HDL-cholesterol (all P< 0.01) and improved flow-mediated dilation when compared with baseline. When compared with placebo and omega-3 fatty acids, fenofibrate therapy decreased non-HDL cholesterol (P< 0.001) and triglycerides/HDL cholesterol (P=0.016) while increasing HDL cholesterol (P< 0.001) and apolipoprotein AI (P=0.001). Of note, when compared with omega-3

fatty acids, fenofibrate therapy decreased fasting insulin (P=0.023) and increased plasma adiponectin (P=0.002) and insulin sensitivity (P=0.015).

Conclusions: Omega-3 fatty acids and fenofibrate therapy promoted similar changes in triglycerides and endothelium-dependent dilation. However, fenofibrate therapy had substantially better effects on lipoprotein and metabolic profiles in patients with hypertriglyceridemia.

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INFLUENCE OF MATERNAL OBESITY ON METHYLATION PROFILES OF GLUCO-REGULATORY GENES IN THE OFFSPRING

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Objectives: Pediatric obesity is increasing worldwide. Parental obesity contributes substantially through genetic and environmental influences. Gestational obesity predisposes offspring to lifelong obesity and its comorbidities via fetal programming. Children born after maternal bariatric surgery (AMS) are less obese and exhibit improved cardiometabolic risk profiles compared to siblings born before maternal surgery (BMS).

Methods: In 25 BMS and 25 AMS children born to 20 mothers we compare methylation levels of glucoregulatory genes in peripheral blood mononuclear cells (PBMCs) using the Infinium HumanMethylation450 BeadChip with GenomeStudio software and the Methylation Module. Group differences were assessed using Illumina's algorithm calculating False Discovery Rate (FDR) - adjusted Difference Scores (DiffScores). We visualized potentially altered biological function pathways with the Ingenuity Pathway Analysis System.

Results: Whole-genome methylation analysis identified more than 14000 probes with significant differences in methylation levels between BMS and AMS children (FDR adjusted DiffScore ≥ |13| ~ p ≤ 0.05), thus representing more than 5500 different annotated genes. Biological function analyses revealed differential methylation of more than 600 genes related to impaired glucose metabolism and significant differences in diabetes mellitus signaling between BMS and AMS children.

Conclusions: The findings suggest a significant beneficial impact of maternal bariatric surgery on methylation in AMS offspring associated with lower prevalence of obesity and improved cardiometabolic risk profiles.

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FOUR-YEAR TRENDS IN CARDIOMETABOLIC RISK FACTORS ACCORDING TO BASELINE ABDOMINAL OBESITY STATUS IN BENIN ADULTS (WEST-AFRICA)

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Objective: To examine whether abdominal obesity according to waist circumference (WC) exacerbates other cardiometabolic risk (CMR) factors over four years of follow-up in Benin adults.

Methods: The study included 541 apparently healthy subjects (50% women) aged 25-60 years and randomly selected in the largest city (n=200), a small-size city (n=171) and a rural area (n=170). International Diabetes Federation (IDF)

cut-offs for high WC were used. CMR factors considered along with abdominal obesity were high blood pressure, high fasting glycemia, insulin resistance (Homeostasis Model Assessment) and dyslipidemia. Complete data at baseline and 24 and 48 months later was available in 366 subjects.

Results: At baseline, 33.6% of subjects had abdominal obesity. Abdominal obesity was associated with higher CMR at baseline and over the follow-up period, except for high blood pressure. A significantly higher incidence of high ratio of total cholesterol/HDL-Cholesterol (TC/HDL-C) was associated with abdominal obesity. Controlling for confounding factors and WC change, the relative risk (RR) of low HDL-C and high TC/HDL-C was respectively 3.2 (95% CI 1.06-9.61) and 7.4 (95% CI 2.01-25.79) in men with abdominal obesity. The RR was not significant in women.

Conclusion: Over a four-year period, abdominal obesity according to IDF cut-offs for WC was associated with an adverse evolution of cholesterol fractions but only significantly in men. Abdominal obesity may not be a risk factor for high blood pressure in the study population. Further longitudinal studies are needed in sub-Saharan Africa to validate abdominal obesity cut-offs against associated CMR.

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ELEVATED APOB/APOA-I RATIO PREDICTS BIOPROSTHETIC VALVE DEGENERATION

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Background: With conventional bioprostheses, the freedom of structural valve deterioration (SVD) is 70% to 90% at 10 years and 50% to 80% at 15 years. Recent retrospective studies have reported an association between atherosclerotic risk factors and SVD. The objective of this prospective study was to identify the clinical and metabolic determinants of bioprosthetic SVD identified by Doppler-echocardiography.

Methods and results: Two hundred and three (203) consecutive patients with an aortic bioprosthetic valve were recruited and underwent a Doppler-echocardiographic exam, a multi-detector computed tomography (CT) for bioprosthesis calcification assessment and adipose tissue measurement, a complete plasma glycemic and lipid profile. SVD was defined as an increase in mean transprosthetic gradient $\geq +10$ mmHg and/or a worsening of transprosthetic regurgitation $\geq +1/3$ degree between 1-year post-operative echo and last follow-up echo (mean follow-up time: 8 ± 3 years). Forty-two (42) pts (20%) were identified with SVD. Patients with SVD also had significantly higher plasma levels of total cholesterol (4.6 ± 1.1 mmol/l vs. 4.1 ± 0.9 mmol/l, $p=0.05$), LDL-cholesterol (2.5 ± 1.0 mmol/l vs. 2.2 ± 0.7 mmol/l, $p=0.02$), Apolipoprotein-B (0.71 ± 0.22 vs. 0.64 ± 0.17 g/l, $p=0.02$) and higher ApoB/ApoA-I ratio (0.48 ± 0.17 vs. 0.41 ± 0.11 , $p=0.004$). On multivariate analysis, increased ApoB/ApoA-I ratio (OR=1.41, 95%CI: 1.10-1.82 $p=0.007$) and the use of bisphosphonates (OR=3.57, 95%CI: 1.14-10.8 $p=0.02$) were the strongest independent predictors of SVD.

Conclusion: This study demonstrates a strong independent association between elevated ApoB/ApoA-I ratio and increased risk of SVD in patients with aortic bioprosthetic valves. Further studies are needed to determine if elevated ApoB/ApoA-I ratio is a risk marker or a risk factor for SVD.

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SARCOPENIC OBESITY IS INDEPENDENTLY ASSOCIATED WITH CARDIOVASCULAR DISEASE IN KOREAN ADULTS

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Objective: We determined whether or not sarcopenic obesity (SO) is associated with CVD independent of other well-established cardiovascular risk factors using representative Korean population data from the Korea National Health and Nutrition Examination Survey (KNHANES) IV, which was conducted in 2009.

Research design and methods: Based upon the data from KNHANES IV, we determined the prevalence of SO, defined as the combination of sarcopenia and obesity, in 7,065 adults. The presence of risk factors of CVD was assessed by the results of blood testing or the answers that each subject provided in the health interview from KNHANES. Multiple logistic regression analysis was conducted to examine the association between SO and the risk factors for CVD.

Results: The overall prevalence of SO was 24.3% and 26.0% in males and females, respectively. All of the risk factors for CVD in males and females had statistically significant positive or negative correlations. SO had an independent association with the development of CVD in males (OR, 1.459; 95% CI, 1.005-2.118, $p=0.047$), but not females.

Conclusions: SO was associated with CVD and was independent of other well-documented CVD risk factors, including age, male gender, current smoking, hypertension, hyperlipidemia, and DM, in Korean adults.

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CARDIOMETABOLIC RISK FACTORS ARE ASSOCIATED WITH ABDOMINAL ADIPOSITY IN NONDIALYZED CHRONIC KIDNEY DISEASE PATIENTS

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Objective: Evaluate the association between cardiometabolic risk factors with abdominal adiposity measured by anthropometry and by trunk fat mass estimated by dual-energy X-ray absorptiometry (DXA), in patients with chronic kidney disease (CKD).

Methods: Cross-sectional study. CKD patients under treatment with multidisciplinary team. Nutritional status: body mass index (BMI) and serum albumin. Abdominal adiposity: waist-to-height ratio (WheIR= WC/ height), an index recently associated with CKD prevalence. Glomerular filtration rate was estimated (eGFR) by MDRD. Metabolic and inflammatory parameters: multiplexed analysis of leptin, high molecular weight adiponectin (HMWAdipo), insulin (for homeostasis model assessment: HOMA-IR estimates), tumor necrosis factor- α (TNF α), monocyte chemotactic protein (MCP-1), interferon- γ (IFN- γ), high sensitive C reactive protein (CRP), intercellular adhesion molecule-1 (ICAM-1).

Results: Clinical and demographic characteristics (mean \pm SD): n=134; men=56%; treatment period=3 \pm 2 years; eGFR=29 \pm 13 ml/min., age=65 \pm 12 years, BMI=26 \pm 4 kg/m², albumin=4.2 \pm 0.3 g/dL. The WheIR was similar between both genders: male= 0.56 \pm 0.07 vs female= 0.57 \pm 0.08 ($p=0.2$) and showed a high ($r=0.80$; $p<0.0001$) correlation with DXA, after adjusting for gender, age, eGFR. The association between WheIR and cardiometabolic risk factors was significant ($p<0.05$) and similar to that observed between DXA and these factors: WheIR vs insulin ($r=0.39$), HOMA-IR ($r=0.43$), leptin ($r=0.65$), HMWAdipo ($r=-0.53$), TNF α ($r=0.39$); MCP1 ($r=0.36$), IFN γ ($r=0.41$), CRP ($r=0.26$), ICAM-1 ($r=0.2$), after adjusting for gender, age, eGFR.

Conclusions: The association between abdominal adiposity and cardiometabolic risk factors in nondialyzed CKD patients is independent of age, gender and eGFR. Because of the strong correlation of WheiR with DXA, this is an easy and low cost alternative parameter to evaluate abdominal adiposity in clinical routine.

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CARDIOVASCULAR DISEASE PREVENTION AND INCREASED AWARENESS FOR METABOLIC RISK IN AN INTERVENTION PROGRAM FOR WORKING ALBERTAN WOMEN

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Introduction: Onsite work-based primary prevention programs may provide an effective environment for cardiovascular disease (CVD) and metabolic syndrome risk reduction since both of these contribute to over 50% of all deaths in Canadian women.

Aims: The Heart Smarts for Women program aimed to:

- 1) raise awareness about the severity and prevalence of CVD among working women,
- 2) assist women in understanding their risk towards metabolic syndrome, and
- 3) identify the feasibility and impact of a lunch time intervention within the workplace.

Design: The study employed a 2-group (X-intervention and O-standard of care randomized crossover design with an 8-week lunch time intervention. Each group received both treatments in either of the sequences X, O or O, X. Participants (N=47) received free risk factor screening and monitoring of their biometrics over 7-months at 3-time-points. Baseline values reported as mean and ranges included: body fat 39.8%, 25.0-52.7; WC 88.53cm, 61.5-131.4; HbA1C 5.54, 4.9-7.8; and cholesterol 4.59mmol/l, 3.4-7.09. A risk factor assessment questionnaire was completed at pre and post time points.

Results: There were no differences between groups in any measured variable at baseline. A total of 29 women (62%) completed all 3-assessments. On average at the pre-screening the women believed that they had only one risk factor (M = 1.53, SD = 1.42) and learned of two new clinical risk factors by participating (M = 3.65, SD = 1.44).

Summary: These results suggest that women may underestimate their personal risk for CVD and metabolic syndrome and can benefit from community-based screening interventions.

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THE EFFECTS OF GLUCOSE METABOLISM BY-PRODUCTS ON VASCULAR ENDOTHELIAL CELL ENERGY METABOLISM

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Objective: Glucose and its metabolic by-products, methylglyoxal (MG) and D-lactate (DLA), are elevated in diabetic patients. Our objective was to determine the changes in energy homeostasis (high energy phosphate substrates and phosphorylated-AMPK α 1) in vascular endothelial cells in the presence of supra-physiological levels of DLA, MG and glucose.

Methods: Human umbilical vein endothelial cells (HUV-EC-C) were cultured according to ATCC recommendations. Cells (3×10^5 cell/well) plated in 6-well plates were treated with 0.2 mM DLA, 5 μ M MG, or 20 mM glucose alone and in combination for 24h and 48h. ATP, ADP and AMP levels were quantified using HPLC-UV. Total and phosphorylated AMPK (pAMPK) were quantified through Western blot analysis. The quantitative dual-signal analysis from individual lanes was carried out using a VersaDoc Molecular Imager and by comparing total-AMPK α versus phosphorylated-AMPK α signal.

Preliminary results: DLA increased ATP levels in HUV-EC-C at 48h (132% of control). DLA increased ADP and AMP levels at 24h (159% and 195% of control, respectively) and 48h (143% and 132% of control, respectively). The AMP:ATP ratio in HUV-EC-C cells was increased (204% of control) at 24h DLA exposure, and returned to baseline levels at 48h. The percentage of pAMPK compared to total AMPK was slightly decreased at 24h (82% of control) with DLA exposure.

Conclusions: At supra-physiological levels that mimic diabetic levels, DLA affects energy homeostasis in human vascular endothelial cells in a time-dependent manner. The studies investigating the effects of MG, glucose alone or in combination with DLA on HUV-EC-C cell energy metabolism are ongoing.

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CORONARY RISK AT VISCERAL ADIPOSITY

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The purpose was studying possibility of diagnostics cardiovascular pathologies preclinical stages by abdominal adiposity estimation.

Under supervision were 560 practically healthy patients from 30 till 55 years at which was spent measurement of sagittal diameter, waist to hip ratio, BMI index, arterial pressure, an electrocardiography. Besides, concentration definition of glucose, hemoglobin A1, lipid parameters was carried out. By specially developed computer program the total coronary risk according to formulas Framingham was determined.

As a result at 156 surveyed (28 %) are revealed those or other lipid metabolism disturbances, including at 49 % of men and 42 % of women. At 57 % persons visceral type of adiposity distribution was found according to sagittal diameter and waist to hip ratio. Value of index BMI at persons of both sexes was over 28,2, man - 27,1 and women - 29,3 kg/m². And with the years the number of persons with obesity increased, in a greater degree at women. Average value of waist and hip ratio was 1,01, at men - 0,99, at women - 0,93. The total coronary risk at 19 % of surveyed persons index of coronary risk concerned a range "low risk", at 44 % - "moderate" and at 28 % regarded as "moderate high risk" and at 6 persons (9 %) corresponded to "high risk". Thus the metabolic syndrome was diagnosed for 43 % of persons with "moderate high risk" and all with "high risk". Correlation between presence of visceral adiposity, dyslipidaemia and Framingham coronary risk was revealed.

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SCREENING FOR CARDIOVASCULAR RISK FACTORS (DYSLIPIDEMIA AND HYPERTENSION) IN ADULT WOMEN MEXICANI. Campos Nonato, L. Hernández, **S. Barquera***Instituto Nacional de Salud Publica, Cuernavaca Morelos, Mexico*

Dyslipidemia and hypertension (D&H) are a public health problem that affects 35% of adult women in Mexico, and only 8.6% and 48.0% of cases respectively, known their diagnosis. The application of a screening that includes the main risk factors associated, timely help predict these diseases.

Objective: To develop a questionnaire screening for D&H, to detect with high sensitivity and specificity Mexican adult women with these diseases.

Methods: We used demographic and health information from the Mexican Health and Nutrition Survey-2006, and used the criteria of the ATP III and JNC 7 to define D&H. To build the Score, models were generated where prevalence ratio of D&H was the outcome, and the independent variables were age (≥ 40 years), abdominal obesity (≥ 88 cm), smoking (having smoked at least 100 cigarettes in life) and physical activity (≥ 7 hrs. a week of intense activity). Model was chosen with the best balance between sensitivity and specificity, and each prevalence ratio (PR) was assigned a score proportional to the sum of the RP.

Results: According to the RP, the score for each variable was age 4.5, abdominal obesity 3.0, smoking 2.5 and physical activity -1.0. This model with a sensitivity of 56.0%, specificity of 73.5% and positive predictive value of 65.6% was able to detect 32.7% of patients with D&H, equivalent to a score of ≥ 7 points on the Score.

Conclusions: The lack of physical activity, smoking and obesity are modifiable risk factors can also predict the onset of these diseases. Early detection of these risk factors through screening can identify a high probability of Mexican women with dyslipidemia and/or hypertension.

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SERUM LEVELS OF INSULIN-LIKE GROWTH FACTOR I, LEPTIN, AND 25-HYDROXYVITAMIN D WITH THE RISK OF CARDIOVASCULAR DISEASE AMONG OLDER ADULTS

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Purpose: To examine if serum IGF-I, leptin, and 25(OH)D interact with each other on the risk of cardiovascular disease (CVD).

Methods: 661 men and 744 women aged 60+ yrs from the NHANES III follow-up data were included in this analysis. During 11 yrs follow-up, 327 CVD deaths were recorded. Subjects were categorized into quartiles of sex-specific cut-offs of IGF-I, leptin and 25(OH)D. To examine the effect of interaction, the relative risk from sex separately Cox-regression models were used to measure the risk association of CVD with any two of the three as continuous within the quartiles of another one.

Results: After adjusting for known risk factors, in the high quartiles of IGF-I, an increased risk was observed to be associated with the increase of leptin in both sexes, but only in men the increase of 25(OH)D was observed to lower the risk. While in the quartiles of leptin, a decreased risk associated with the increased levels of IGF-I among women in lower quartiles and the increase of 25(OH)D among men in higher quartiles in men were observed. In the quartiles of 25(OH)D, an increased risk with increased levels for both leptin and IGF-I were observed among men in the lowest quartile; however, a decreased risk was observed to be associated with the increased level of IGF-I in women in the highest quartile.

Conclusion: This suggests that the serum levels of IGF-I, leptin and 25(OH)D may interact with each other on the risk of CVD in those older men and women.

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RELATIONSHIP BETWEEN MEASURES OF ADIPOSITY AND LEFT VENTRICULAR MASS IN ADOLESCENTS

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Objective: To evaluate the relationship between adiposity and left ventricular mass index (LVMI) in adolescents.

Methods: A total of 265 adolescents from Maracaibo, Venezuela (age-mean: 15±2 years; 42.6% men) underwent clinical evaluation and echocardiography. The following aspects were assessed: anthropometric measures of adiposity [body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR)] and blood pressure (BP). The LVM was obtained by M-mode echocardiography, and the LVM index (LVMI) was calculated. The associations among LVMI with BMI, WC, WHR and WHtR were evaluated using Pearson Correlation.

Results: The LVMI values were 29.49 ± g/m^{2.7} in all adolescents, 31.63± 8 g/m^{2.7} in males and 27.91 ± 7 g/m^{2.7} in females (p< 0.0001). Likewise, mean values of WC, BMI, WHR and WHtR were: 73.99 ± 11 cm, 21.97±5 k/m², 0.80±0.1 and 0.46±0.1, respectively. There were statistically significant correlations among LVMI with all adiposity measures in all adolescents and by gender. BMI and WC correlated strongly with LVMI (r=0.56, p< 0.0001 and r=0.535, p< 0.0001, respectively) in all subjects and in males (r=0.507; p< 0.0001 and r=0.459; p< 0.0001, respectively). However, in females, the most strong correlations were shown by BMI and WHtR (r=0.620, p< 0.0001 and r=0.601, p< 0.0001).

Conclusion: The measures of adiposity are associated with LVMI in

adolescents. BMI, WC and WHtR are the most important anthropometric factors that relate to LVMI in this study. Therefore, these parameters should be preferred for the assessment of the impact of obesity on LVMI in adolescents.

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METABOLIC SYNDROME AND DIABETES ARE ASSOCIATED WITH MORE PRONOUNCED CONCENTRIC LV HYPERTROPHY IN PATIENTS WITH SEVERE CALCIFIC AORTIC STENOSIS

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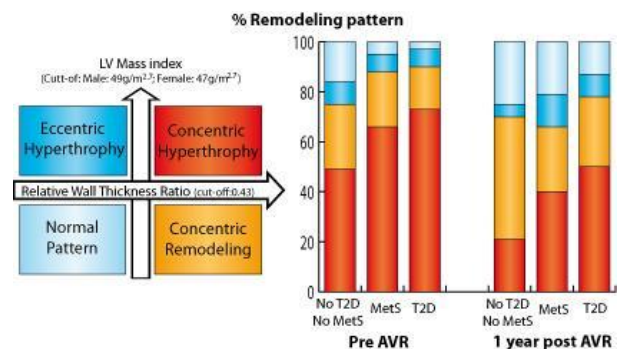
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Background: We reported that in patients with moderate aortic stenosis (AS), metabolic syndrome (MetS) is associated with more pronounced concentric LV hypertrophy. The aim of this study was to examine the relationship between MetS and prevalence of LV concentric hypertrophy in patients with severe AS.

Method and results: 510 patients with severe AS underwent isolated AVR. Among these patients, 131 (26%) had the MetS and 109 (21%) had type-2 diabetes (T2D). Patients with diabetes or MetS had larger waist circumference (T2D:106±16; MetS:104 ±12 vs. noMetS-noT2D:96±13cm; p< 0.0001), higher incidence of hypertension (86; 85 vs. 50%), coronary artery disease (CAD: 22; 18 vs. 10%) compared to those with noMetS-noT2D. The severity of AS was similar in the 3 groups (Peak aortic jet velocity: 417±81; 416 ±81 vs. 424±84mmHg; p=0.13). Patients were classified into four different LV patterns (Figure). Distribution of LV patterns was worse (p< 0.0001) in diabetes and MetS groups (Figure). In multivariate analysis, Diabetes and MetS remained (p=0.02 and p=0.04) associated with higher LV Mass index (LVMI).

In the 130 who underwent a Doppler-echocardiography 12 months after AVR, decrease in LVMI was similar in 3 groups (p=0.44), thus LVMI was higher (p=0.003) at 1 year in diabetes and MetS groups (49 ±14 and 53±12 g/m^{2.7}) compared to noMetS-noT2D group (43±15 g/m^{2.7}).

Conclusion: Diabetes and MetS are independently associated with higher prevalence of concentric hypertrophy in patients with severe AS without compensation on LV remodelling after AVR.



[Prevalence of LV pattern pre and post AVR]

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ASSOCIATION BETWEEN ABDOMINAL OBESITY AND MORTALITY AMONG PATIENTS WITH HEART FAILURE

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Objectives: To evaluate independent associations among overall obesity, abdominal obesity and mortality in subjects with heart failure.

Methods: A cohort study was carried out among subjects aged 18 to 85 years, with heart failure. Measurements of weight (kg) and height (m) were performed in order to calculate Body Mass Index (BMI, kg/m²). Waist circumference (WC, in cm) plus fasting triglycerides levels (TG, mmol/L) were used to calculate Lipid Accumulation Product Index (LAP, cm.mmol.l - abdominal obesity) and mortality was obtained from medical records. Data were expressed as mean \pm SD or percentage. Student's t test and Cox Regression Model were used to assess the objectives.

Results: 36 participants were included and their characteristics are as follow: aged 61.6 \pm 12.9 years, 55.6% were men, 69.4% white, 55.6% NYAH III -IV, EF 39.8 \pm 15.3 %, BMI 27.1 \pm 4.5kg/m² and LAP(ln) 3.9 \pm 0.8 cm.mmol.l. After 9.2 \pm 2.6 months of follow-up, mortality rate was 16.7%. Survivors had higher means of LAP(ln) comparing with patients who died (4.1 \pm 0.7 and 3.1 \pm 0.7, P = 0.007) and also BMI (27.6 \pm 4.5 and 24.5 \pm 3.8, P = 0.1). After adjustment for sex and age, Cox Regression Model showed that a unity increment in log-transformed LAP conferred an 8% increased protection for mortality (HR 0.08 95% CI 0.01 - 0.69, P = 0.02). There was no independent association between BMI and mortality.

Conclusions: An independent association between abdominal obesity and lower risk of mortality had been shown in subjects with heart failure.

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ASSOCIATION BETWEEN NECK CIRCUMFERENCE AND LIPID PROFILE IN PATIENTS WITH SEVERE DYSLIPIDEMIA

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Objective: The aim was to test the association of several anthropometric measures and lipid profile in a population of patients with severe dyslipidemia.

Methods: 65 patients admitted to the National Institute of Cardiology with dyslipidemia were evaluated and divided into two groups: 40 patients with severe dyslipidemia (triglycerides - TG increased 4.5 mmol / L or total cholesterol, TC> 7.8 mmol / L or HDL < 0.62 mmol / L) and 25 with dyslipidemia not severe (under those values). Anthropometric measurements (body mass index, BMI; waist circumference- WC, neck circumference-NC) and risk factors for cardiovascular disease. Statistical analysis was performed using SPSS.

Results: Patients with severe dyslipidemia had mean age 60.3 (11.7) years, 45% men, 89% hypertension and 57% of diabetes mellitus and 55% with previous MI. There was no clinical difference between the groups. There is a strong correlation between NC and lipid profile only in a severe dyslipidemia group (table). Linear regression showed the NC was positively related to logTG (r = 0.39, p = 0.01) and inversely with HDL (r = -0.54, p < 0.001), LDL (r = 0.6, p < 0.001).

Conclusion: In a population with high cardiovascular risk, nutritional

assessment is essential and the measurement of NC must be included in routine due to the simplicity of implementation and the ability to estimate the severity of lipid profile. These findings may have strong influence on the clinical management of patients with severe dyslipidemia.

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ASSOCIATION BETWEEN HYPERURICEMIA AND CARDIOVASCULAR RISK FACTORS

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Background: Previous studies show that hyperuricemia precede the development of the metabolic syndrome and can be a risk factor to diabetes type 2, cardiovascular disease and heart failure, independently of obesity.

Aim: To identify the association between hyperuricemia and cardiovascular risk factors (CRF).

Methods: The study population included 746 adolescents, all of them participants from the "Cohort Study of Health workers". CRF were evaluated according to IDF pediatrics criteria. The cut-off points for hyperuricemia was levels of uric acid >7mg/dl, for hyperinsulinemia >20mU/l, insulin resistant (IR) have HOMA >3.16. A multivariate regression analyses was used to evaluate the association between hyperuricemia and CRF.

Results: The proportion of female in the study population was 52%. Mean age was 14 \pm 3.7 years, prevalence of BMI>p85 was 30%, abdominal obesity (26.1%), hypertension (2.8%), hyperuricemia (10.7%), glucose \geq 100 (3.9%), hypertriglyceridemia (19%), low levels of HDL (62%), hyperinsulinemia (18%), IR (26%), CRP (11.3%) and MS (8.85%). Proportion of hyperuricemia was 6 times higher in men, (19 vs 3.1, p< 0.01). The study show association between hyperuricemia and age (OR:2.2;IC_{95%}1.3-3.6), hypertriglyceridemia (OR:2.8;IC_{95%}1.6-5.0) hyperglucemia (OR:3.4;IC_{95%}1.2-9.4), hyperinsulinemia (OR:3.1;IC_{95%}1.7-5.5), IR (OR:2.7;IC_{95%}1.5-4.7), abdominal obesity (OR:6.0;IC_{95%}3.5-10.2) and MS (OR:6.2;IC_{95%}3.2-11.8).

Conclusions: Hyperuricemia is associated to CRF. Hyperuricemia is not considered for adolescent health diagnostic. However early diagnostic is important to avoid the presence of several CRF.

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ASSOCIATION BETWEEN ABDOMINAL OBESITY AND SUBCLINICAL ATHEROSCLEROSIS MARKERS

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Introduction: Abdominal obesity is as a risk factor for coronary arteries disease. But association between abdominal obesity and subclinical atherosclerosis makers is not well. In this study we assessed this association in diabetic and non-diabetic participants in cross sectional study.

Material and methods: 123 diabetic with 153 non-diabetic adult participants were enrolled in this study. Anthropometric and blood pressure were measured under standard methods. Fasting blood samples were obtained and fasting blood sugar and serum concentration of hemoglobin A1C, homocysteine and lipid profiles were measured. Flow mediated dilation (FMD), carotid intima-media thickness (CIMT), aortic augmentation index (AAI) and pulse wave velocity (PWV) and heart variability (HV) were assessed in the participant according to guidelines.

Results: after adjustment for traditional CVD risk factors and homocysteine concentration in multiple linear regression model, FMD was associated to waist circumference in non-diabetic but there was not any relation in diabetic participant ($\beta=0.53$, $P=0.02$). CIMT was associated in diabetic participant but we could not detect any association in non diabetic participants ($\beta= -0.20$, $P=0.03$). We could not find any association between AAI and PWV with waist circumference.

Conclusion: it seems that FMD in non-diabetic subjects and CIMT in diabetic subjects is associated with abdominal obesity.

Inflammation

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RELATION OF C-REACTIVE PROTEIN TO OBESITY IN VARIOUS POPULATIONS: A META-ANALYSIS

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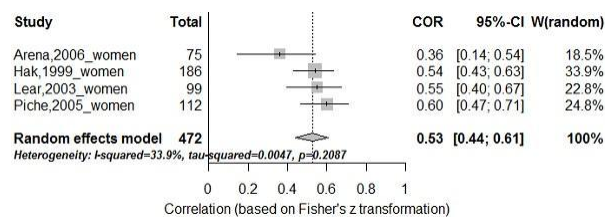
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Objectives: To assess the relationship between measures of obesity and C-reactive protein (CRP) in a systematic review and meta-analysis.

Methods: Articles published between 1966 and 2011 in the Medline and Embase databases were searched. Cross-sectional studies reporting odds ratios (OR) or correlation coefficients between body-mass index (BMI), waist circumference (WC), or waist-hip ratio (WHR) and CRP levels were obtained. Studies that did not meet the STROBE Statement criteria for cross-sectional studies were excluded. Information on study design, participant characteristics, levels of CRP, BMI, WC, and WHR and measures of effect were collected by two reviewers. Random effects meta-analyses were conducted for Pearson correlation coefficients based on Fisher's z transformation of proportions and ORs pooled using the inverse variance method.

Results: We identified 50 studies, including 137,764 subjects. The correlation between BMI and CRP was stronger in Western populations compared to Asian populations, and in women compared to men. Meta-analyses in subgroups revealed a stronger correlation in women ($r=0.53$, 95%CI 0.44-0.61) than men ($r=0.22$, 95%CI 0.19-0.26) of Western populations. Similar trends were observed in the correlations with WC and WHR. Summary of multivariate adjusted ORs also showed obesity in women to be most strongly associated with elevated CRP.

Conclusions: Measures of obesity are associated with an elevated level of CRP, although its magnitude greatly varies depending on one's sex and ethnicity. Further studies are needed to elucidate the mechanisms by which obesity and CRP are particularly strongly associated in obese women.



[Correlation between BMI and CRP in Western women]

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RELATIONSHIP BETWEEN SOLUBLE RECEPTOR FOR ADVANCED GLYCATION ENDPRODUCTS (sRAGE) AND ADIPOSITY: A PRELIMINARY STUDY

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Objectives: Advanced glycation endproducts (AGEs) are food-derived pro-inflammatory molecules that mimic endogenous ligands for the membrane-bound receptor for AGE (RAGE). RAGE activation promotes expression of NF- κ B. Soluble RAGE, a truncated variant of the parent receptor, plays an anti-inflammatory role by binding to AGE, making it unavailable for RAGE. The objective of this study was to examine changes in sRAGE with increasing adiposity and compare it with changes in high molecular weight (HMW) adiponectin, an adipokine which decreases with increasing adiposity.

Methods: Sixty-eight healthy, adult participants were recruited for this study.

Their fasting sera were analyzed for sRAGE, total adiponectin, HMW adiponectin, insulin, and cholesterol. Data were analyzed using Pearson's Correlation Coefficient. Step-wise linear regression modeling was used to determine the usefulness of body weight in predicting sRAGE. Independent t-tests were used to compare biomarkers based on gender.

Results: Indicators of adiposity were inversely correlated to sRAGE values ($n=68$) including weight (-0.409 ; $p=0.001$), waist circumference (-0.337 ; $p=0.005$), and BMI (-0.402 ; $p=0.001$). As anticipated, HMW adiponectin values ($n=34$) were positively correlated with sRAGE (0.406 ; $p=0.02$). In a step-wise linear regression model, weight, AGE and TG were significant predictors of sRAGE. HMW adiponectin was significantly higher in females compared to males ($p=0.009$), whereas sRAGE did not differ significantly.

Conclusions: These data suggest that adiposity negatively influences sRAGE, a circulating receptor which may counter-act inflammation. This is the first report to show such a relationship.

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INOS INDUCTION IS KEY TO NF κ B ACTIVATION AND MAY REPRESENT A NOVEL MECHANISM OF HEPATIC INSULIN RESISTANCE IN INFLAMMATION

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Introduction and aims: It has been previously demonstrated that NO modulate the NF κ B signaling pathway. However, no studies have tested whether iNOS modulates the NF κ B signaling in metabolic tissues in insulin resistance conditions. We have previously shown that iNOS plays an important role in inflammation-mediated insulin resistance and that this was regulated by an iNOS-dependent nitration of insulin signaling proteins. Here, we evaluated whether iNOS can modulate hepatic NF κ B activation during inflammation.

Methods: We subjected 8-12 wks old WT and iNOS-KO mice(KO) to an injection of either saline or LPS(20 mg/kg) to assess insulin sensitivity during a hyperinsulinemic-clamp. Furthermore, we induced iNOS in a hepatic cell line using a cytokine mixture with or without the iNOS-inhibitor 1400W.

Results: During hyperinsulinemic clamps we observed a reduction of insulin-mediated glucose disposal after LPS, which was completely abrogated in KO mice. This protection was associated with improved insulin-mediated suppression of glucose production and increased liver Akt activation in KO mice. Furthermore, a significant increase of NF κ B activation and nitration of I κ B α was observed in the livers of LPS-treated mice, indicating an increase in NF κ B activity. These effects of LPS were blunted in livers of KO mice, implicating a potential feedforward mechanism of hepatic NF κ B activation by iNOS. In agreement with the *in vivo* data, NF κ B transcriptional activity was increased in cells treated with cytokines, but this was reduced using 1400 W.

Conclusions: We conclude that iNOS contributes to hepatic NF κ B activation suggesting that this novel feedforward mechanism may contribute to inflammation, thereby further impairing hepatic insulin signaling and action.

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EFFECT OF VITAMIN E AND ALFA LIPOIC ACID IN NAFLD: A RANDOMIZED PLACEBO CONTROL OPEN LABEL PROSPECTIVE CLINICAL TRIAL-VAIN TRIALP.P. Basu^{1,2}, N.J. Shah², T. Nair², S. Farhat², S. Foustin², L. Ang², R.S. Brown Jr¹¹Columbia College of Physicians and Surgeons, New York, ²North Shore University Hospital at Forest Hills, Forest Hills, NY, USA

Non-Alcoholic Fatty Liver Disease (NAFLD) is a global epidemic. NAFLD progress to Non-Alcoholic Steatohepatitis (NASH), cirrhosis and cancer. Obesity and insulin insensitivity is the hallmark. Liver participates in glucose and fatty acid homeostasis. Nonexpelled free fatty acid and its toxic metabolites impact oxidative stress; free radicals influx which initiate inflammatory cascade to NASH and activate fibrotic path causing cirrhosis. This clinical trial highlights the effects of anti-oxidants in NAFLD.

Methods: One hundred fifty-five (n=155) with BMI over 28% with NAFLD and NASH were recruited and randomized into Group A (n=35)- Control, Group B (n=40) Alfa Lipoic Acid (ALA) 300 mg, Group C (n=40) Vitamin E 700 IU and Group D (n=40) ALA plus Vitamin E orally for six months. Pre and Post BMI, HOMA, Triglyceride, Hemoglobin A1c, Alanine aminotransferase (ALT), Retinol Binding Protein 4, Tumor Necrosis factor Alfa (TNF α), Leptin and adiponectin levels were compared. Everyone was allowed 1600 cal/day with modest exercise. Exclusion criteria: Diabetics, BMI >33%, Alcohol intake >30 grams/day, Hepatitis B, C, Hypothyroidism, medications including herbs and supplements.

Results: Pre and post analysis between ALA plus Vitamin E over placebo in six month; TG 43%, HbA1c 14%, HOMA 62.8%, ALT 14.4%, RBR4 50%, Leptin23%, Adiponectin19% TNF α 70%, and Steatotic score 70.7%

Conclusion: This clinical trial demonstrates the additive effects of ALA and vitamin E in NAFLD and NASH with significant improvements of inflammatory and steatotic score but no difference in the fibrotic score. Therapeutic application of ALA and Vitamin E should be considered for NAFLD.

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THE POSSIBLE MECHANISM OF PROGRANULIN/PGRN ON BONE STATUS IN OBESITY'S INFLAMMATION STATEA. Hossein-Nezhad¹, K. Mirzaei^{1,2}, S.A. Keshavarz², G. Khooshechin¹, S. Alatab¹¹Endocrinology and Metabolism Research Institute, Tehran University of Medical Sciences, ²Department of Nutrition and Biochemistry, School of Public Health and Institute of Public Health Research, Tehran University of Medical Sciences, Tehran, Iran

To investigate the concentration of PGRN and other inflammatory cytokines TNF- α , IL-1 β , IL-4, IL-6, IL-10, IL-13 and IL-17 in osteopenic and non-osteopenic obese subjects. Bone mineral density in subjects with different PGRN levels were compared to the appraisal of our hypothesis.

A total of 171 obese participants were included in the study. The circulating levels of TNF- α , PGRN, IL-1 β , IL-4, IL-6, IL-10, IL-13, IL-17, PTH, 25-Hydroxy Vitamin D and crosslaps were measured with the EIA method. BMD was measured by use of dual energy X-ray absorptiometry. Participants were categorized into osteopenic and healthy group. Of 171 participants, 51 (29.82 %) were osteopenic and 120 (70.17%) were healthy.

We found significantly higher concentrations of crosslaps, IL-17, IL-6, TNF α and IL-4 and lower concentrations of IL-13, IL-10, PGRN and free fat mass in osteopenic group. With raising the PGRN level, the concentrations of IL-13, IL-10 and 25-(OH) vitamin D were increased and the concentration of TNF α and IL-17 were decreased. Our results demonstrated that the density of bone at both sites of lumbar spine (L2-L4) and hip region was highest in 4th quartile and

lowest in first quartile of categorized PGRN concentration. The bone status was gradually improved with raising the PGRN level in parallel at lumbar spine (L2-L4) and hip regions.

Based on the pathway of effect of TNF α on bone metabolism, it appears that PGRN acts on the bone with mechanisms involving TNFR signaling, disturbance and TNF α performance, similar to the results that have been found in animal study.

Lipids/Lipoproteins

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APOLIPOPROTEIN B AND TRIGLYCERIDE/HDL RATIO ARE USEFUL PREDICTORS FOR LDL PARTICLE SIZE CHANGE WITH STATIN IN CORONARY ARTERY DISEASE PATIENTS

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Background: LDL particle size was determined with the influence of plasma triglyceride concentration, LDL cholesterol level and CETP activity.

Objectives: This study was to investigate statin effect on LDL particle size and the useful predictors for the change of LDL particle size in clinical practice.

Methods: This study was double-blinded, 8-weeks' treatment study and investigated the effect of atorvastatin 20 mg on LDL particle size and the predictors of LDL particle change in hypercholesterolemic Korean adults with coronary artery disease. 123 Patients with high LDL-C levels ($\geq 100\text{mg/dL}$) who signed informed consent were enrolled.

Results: Total 123 patients were enrolled and received treatment, and 26 patients dropped out of the study. 116 patients (50% male; 62.3 years) took the drug for 8 weeks. Treatment with atorvastatin 20mg reduced LDL-C and total cholesterol level by 46.3% and 31.6% respectively. HDL-C and apoA1 level were increased by 6.7% and 6.6% respectively. Triglyceride and apo B level were decreased by 15.0% and 36.3% respectively. Non-HDL cholesterol was decreased by 39.6% and type B pattern of small dense LDL was decreased from 83.6% to 2.6%. TG/HDL ratio was the most powerful index for the change of LDL particle size and apo B was the alternative for the TG/HDL ratio in this analysis ($p < 0.001$).

Conclusion: TG/HDL ratio and apo B were the useful indices for the change of LDL particle with the statin treatment.

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CENTRAL OBESITY DETECTED BY LIPID ACCUMULATION PRODUCT INDEX (LAP) IS ASSOCIATED WITH LIPID PROFILE AMONG INPATIENTS WITHOUT CARDIOVASCULAR DISEASE

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Objective: To evaluate associations between central obesity detected by lipid accumulation product index (LAP) and lipid profile among inpatients without cardiovascular disease.

Method: A cross-sectional study was made in 2011/2012 among subject aged 18 to 85 years in a tertiary hospital. Standardized measurements of weight (kg) and height (m) were performed in order to calculate Body Mass Index (BMI, kg/m^2). Lipid profile (total cholesterol - TC, LDL-cholesterol and HDL-cholesterol) was obtained from medical records and waist circumference (WC, cm) plus triglycerides levels were used to calculate LAP index (cm.mmol/L). Data were expressed as mean \pm SD or percentage. Pearson correlation and multiple linear regression were used to assess the objectives.

Results: Among 62 participants enrolled 51.6% were men, aged 56.1 ± 15.2 years, 17.7% smokers, BMI $27.3 \pm 5.3 \text{ kg/m}^2$, (Ln)LAP 3.9 ± 0.8 , TC 194.2 ± 52.3 , HDL-c 46.0 ± 19.2 and LDL-c 115.8 ± 41.9 . There were statistically significant positive correlations between (Ln)LAP and TC ($r = 0.35$, $P = 0.007$) and LDL ($r = 0.26$, $P = 0.04$), but a negative one with HDL ($r = -0.42$, $P = 0.001$). A multiple linear regression analysis was performed and a significant association was

detected between LAP log-transformed and TC (Beta= 27.1, SE= 12.2, $P = 0.03$) and HDL-c (Beta= -11.8, SE= 4.2, $P = 0.006$), after adjustment for sex, age and BMI. There was no association between (Ln)LAP and LDL-c.

Conclusion: There are independent associations among central obesity detected by LAP, TC and HDL-c in hospitalized patients without cardiovascular disease.

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EFFECT OF WEIGHT LOSS ON APOLIPOPROTEIN AI KINETIC IN MEN WITH METABOLIC SYNDROME

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Objective: To investigate the effect of weight loss, independent of changes in nutrient intake, on HDL metabolism in men with metabolic syndrome (MetS).

Methods: The diet of 19 men with MetS (NCEP-ATPIII) was first standardized to a Mediterranean diet (MedDiet), which was consumed for 5 weeks in weight-maintaining isoenergetic feeding conditions (all foods provided). Participants then underwent a 20-week free-living caloric restriction period, after which their diet was standardized back to the MedDiet again in weight stabilizing isoenergetic feeding conditions (5 weeks). At the end of the two controlled feeding phases, participants received a single bolus of [$5,5,5\text{-}^3\text{H}$] L-leucine and fasting blood samples were collected at predetermined time points over a 96-hr period. Apo AI kinetic was assessed using multicompartmental modeling.

Results: Body weight was reduced by $9.1 \pm 2.8\%$ and waist circumference by $7.9 \pm 2.8 \text{ cm}$ after caloric restriction (both $P < 0.001$). Weight loss tended to increase plasma HDL-cholesterol (C) concentrations (6.0%, $P = 0.059$), and this was mainly attributable to a significant 7.9% increase in plasma HDL₃-C concentrations ($P = 0.045$). These changes appeared to be exclusively due to a reduction in apoAI fractional catabolic rate (FCR, -7.8%, $P = 0.046$). Concurrent changes in VLDL-triglycerides with weight loss explained 38.6% of the change in apoAI FCR ($B = 0.066$, $P = 0.005$).

Conclusion: This is the first study to show that weight loss *per se*, independent of variations in nutrient intake, increases plasma HDL-C concentrations primarily by delaying the catabolism of apoAI, which in turn may be attributable to a weight loss-induced reduction in triglycerides concentrations.

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THE ROLE OF CORRECTION OF DISBACTERIOSIS IN TREATMENT OF ATHEROGENIC DISLIPOPROTEINEMIA

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Aim: To develop a pathogenetic therapy of dyslipidaemia.

Methods: 108 patients were examined in the age of 35-70 years. All patients before and after treatment were examined by several points: biochemical blood analysis (lipids, parameters of liver function), endotoxin and nitric oxide in blood, analysis of shortchain fat acids (SFA) in faeces, biopsy of liver. Patients have been divided into 2 groups: 1)steatosis; 2)steatohepatitis, and into 3 groups according to the therapy: 1)statin 10mg; 2)probiotic; 3)probiotic and statin.

Results: We didn't revealed direct correlation between biochemical parameters of liver function and heaviness of morphological changes in liver (appearance of morphological attributes of steatohepatitis precedes development of cytolytic and cholestatic syndrome). However patients with steatohepatitis had increased level of endotoxin (0.37 ± 0.01) and nitric oxide (72.25 ± 2.22) in blood. Total quantity of SFA in faeces was also decreased in those patients. There was more effective decrease of lipids, endotoxin and nitric oxide in those patients, who received probiotic in combination with statin. If patient received only probiotic

there was not any changes of lipids, but the level of endotoxin and nitric oxide became lower. If NAFLD progressed in steatohepatitis and there was high level of γ -GTP and transaminases we didn't notice such effective decrease of cholesterol.

Conclusion:

- 1) Application of statin in combination with probiotic is more effective in achievement of target levels of lipids and decreasing endotoxin and nitric oxide.
- 2) If patient has steatohepatitis, effectiveness in the hypolipidemic therapy decreases (in comparison with steatosis), because the metabolism of drugs in liver decrease.

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THE NON-HDL TO HDL RATIO IS AN INDEPENDENT PREDICTOR FOR POOR LONG-TERM CLINICAL OUTCOMES IN PATIENTS WITH TARGET LDL CHOLESTEROL

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Introduction: LDL Cholesterol/HDL Cholesterol (LDL-C/HDL-C) ratio and triglyceride/HDL Cholesterol (TG/HDL-C) ratio have been increasingly recognized as stronger prognostic factors of coronary artery disease than individual level of LDL-C and HDL-C. However, the significance of non-HDL cholesterol/HDL cholesterol (non-HDL-C/HDL-C) ratio, as another cardiovascular risk predictor, has not been investigated in patients who undergo percutaneous coronary intervention (PCI).

Hypothesis: Higher non-HDL-C/HDL-C ratio has a strong correlation with poor long-term clinical outcome in patients on statin within target LDL cholesterol level after PCI with drug eluting stents (DES).

Methods: A total of 9,292 consecutive patients who underwent PCI with DES in COACT (Catholic medical center percutaneous Coronary Intervention) registry from January 2004 to December 2009 were enrolled. Among these, we analyzed 2,704 patients with follow up lipid panel who had been kept on statin and attained low LDL-C (LDL-C < 100 mg/dL). We defined a major adverse cardiac event (MACE) as the composite of all-cause death, nonfatal myocardial infarction, and revascularization of any cause.

Results: The median follow up period was 28.2 months. Multivariate Cox proportional hazards regression analysis indicated that the presence of multivessel disease, angiographic ACC/AHA B2C lesion, non-LDL-C/HDL-C ratio were significantly associated with increased incidence of MACE after adjusting multiple variables (adjusted HR = 1.470, 1.248, 1.433, respectively).

	Crude HR	95% CI	p-value	Adjusted HR	95% CI	p-value
Multivessel disease	1.555	1.36-1.78	<0.001	1.470	1.26-1.72	<0.001
B2C lesion	1.358	1.16-1.59	<0.001	1.248	1.04-1.50	0.016
Non-HDL/HDL ratio	1.612	1.23-2.11	0.001	1.433	1.05-1.97	0.026

[Table 1]

Conclusions: Non-HDL-C/HDL-C ratio can be a potential risk predictor in patients on statin with target LDL-C in the drug eluting stent era.

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APOLIPOPROTEIN B AND APOLIPOPROTEIN B/APOLIPOPROTEIN A-1 RATIO ARE VALUABLE IN PREDICTING MAJOR ADVERSE CARDIOVASCULAR EVENTS IN TYPE 2 DIABETIC PATIENTS

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We investigated to find out lipid associated factor predicting major adverse cardiovascular events (MACE).

The subjects were 595 type 2 diabetic patients without previous cardiovascular disease or current lipid lowering medication whose serum apolipoprotein and conventional lipid levels were measured. MACE occurrence was identified using an electronic medical record system and paperweight phone-call. If the event was confirmed, we collected relevant hospital data.

MACE occurrence was confirmed in 80 subjects during the follow up period (median 62.9 months). The mean apolipoprotein B, apolipoprotein A-1, and apolipoprotein B/apolipoprotein A-1 ratio level were 1.01 ± 0.29 g/L, 1.36 ± 0.26 g/L, and 0.77 ± 0.29 g/L. Subjects were divided into two groups according to whether MACE occurred or not. Age, duration of DM, non-HDL-C, apolipoprotein B, and Apo B/Apo A-1 ratio levels were greater in subjects with MACE. Subjects were then divided into tertile of apolipoprotein B, apolipoprotein A-1, Apo B/Apo A-1 ratio, total cholesterol, triglyceride, HDL-C, LDL-C, and non-HDL-C. With increasing apolipoprotein B and Apo B/Apo A-1 ratio, the risk of MACE increased. After adjusting for age, sex, and duration of DM, the relative risk of MACE increased by 151% in the high-level apolipoprotein B group compared with the low-level group ($P=0.002$). A comparable increase of relative risk was observed in the high-level Apo B/Apo A-1 ratio tertile ($P=0.003$).

Apolipoprotein B and apolipoprotein B/apolipoprotein A-1 (Apo B/Apo A-1) ratio are more valuable than conventional lipid profile for predicting future MACE.

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VERY LOW LDL CHOLESTEROL BELOW 50MG/DL IS NOT HARMFUL FOR PATIENTS UNDERWENT PERCUTANEOUS CORONARY INTERVENTION IN DRUG ELUTING STENT ERA

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To investigate whether achieving lower concentrations of LDL-C below 50mg/dL is associated with improved clinical outcomes.

We analyzed a total of 9,292 consecutive patients who underwent PCI using drug eluting stent (DES) from January 2004 to December 2009. Among these, 2548 subjects who had initial and follow-up lipid panel and attained low LDL-cholesterol (LDL-C < 100mg/dL) with statin therapy were enrolled. Median follow up period was 28.3 months (interquartile range 15.1, 41.5 months). Laboratory study was performed at the time of index drug-eluting stent (DES) implantation and at the outpatient visit between three and twelve months later. We categorized patients into three groups based on the follow-up LDL-cholesterol level (LCL-C) : < 50, 50 to 70, 71 to 100 mg/dL (n=416, 1004, 1128, respectively). We compared major adverse cardiac events (MACE) including all-cause death, nonfatal myocardial infarction and revascularization of any cause according to the follow up LDL-Multivariable Cox regression analysis revealed that in the patients with well controlled follow up LDL-C level (LDL < 100 mg/dL), multivessel disease, presence of angiographic AHA/B2C lesion were strongly associated with increase in a hazard ratio(HR) of a composite of death, myocardial infarction and revascularization of any cause. But LDL-C level was not associated with the occurrence of MACE. In patients who underwent PCI with DES and well controlled LDL level, cholesterol paradox is not observed. It may be safe in patients with very low LDL-C level below 50 mg/dL in spite of continuous use of statin in terms of MACEs.

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CHARACTERISTICS OF ABDOMINAL ADIPOSE TISSUES IN WOMEN WITH ELEVATED PLASMA APOLIPOPROTEIN B LEVELSA. Michaud^{1,2}, M. Daris³, A. Tchermof^{1,2}¹Endocrinology and Genomics, Laval University Medical Center, ²Department of Nutrition, Laval University, ³Gynecology Unit, Laval University Medical Center, Quebec, QC, Canada**Objective:** We tested the hypothesis that women with elevated plasma apolipoprotein (Apo) B values are characterized by altered adipose tissue function independent of body composition and fat distribution.**Methods:** Omental and subcutaneous fat samples were surgically-obtained in 43 women (age: 47.0±5.1 years, BMI: 27.6±5.5 kg/m²). Body composition and fat distribution were measured by DEXA and computed tomography. A blood lipid-lipoprotein profile was obtained. Quantification of adipose tissue expression of several genes coding proteins involved in adipocyte differentiation and metabolism was performed by real-time RT-PCR. Glycerol release by mature adipocytes was measured as an index of lipolysis. Women were subdivided in subgroups with high vs. low plasma ApoB levels according to residuals of the regression between plasma ApoB levels, total body fat mass, BMI and visceral adipose tissue area.**Results:** By design, all adiposity values were similar between groups. Women with elevated ApoB levels had significantly higher values of total-cholesterol, LDL-cholesterol, triglycerides, VLDL-triglycerides, LDL-triglycerides, cholesterol/HDL-cholesterol ratio and LDL-ApoB/LDL-cholesterol compared to those with lower ApoB values (0.10 < p ≤ 0.05, for all). They also had lower mRNA expression of GLUT4 and adiponectin in subcutaneous fat as well as lower perilipin and IRS-1 in both compartments (0.10 < p ≤ 0.05, for all). Subcutaneous adipocyte isoproterenol-stimulated (10⁻⁵ to 10⁻¹⁰ M) and forskolin-stimulated (10⁻⁵ M) lipolysis responsiveness were significantly higher in women with elevated ApoB levels compared to women with low ApoB levels (p ≤ 0.05).**Conclusion:** Alterations associated with high ApoB levels are consistent with insulin resistance, lower adiponectin expression and higher lipolysis in subcutaneous adipose tissue, independent of adiposity and fat distribution.

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POSITIONAL ISOMERS OF TRIGLYCERIDES IN OILS, LIPIDS AND APOB-LIPOPROTEINS.V. Titov¹, A. Aripovsky²¹Russian Cardiology Research and Production Complex, ²Center for Applied Microbiology and Biotechnology, Moscow, RussiaEven complete similarity between fatty acids (FA) in triglycerides (TG) does not imply that they are functionally the same or possess the same physico-chemical properties. Esterification of the triatomic alcohol glycerol by FA at different positions converts TG into palmitic and oleic substrates for energy production in cells. Kinetic parameters of biochemical reactions in palmitic variant of fatty acid metabolism are always low, and in the biological reaction of exotrophy myocytes suffer from deficiency of exogenous FA that should be continuously compensated *in vivo* by activation of the biological reaction of endotrophy, i.e., potentiation of lipolysis in adipocytes. Biological role of insulin (INS) consists in preventing palmitic metabolism of saturated and monoenic FA. The necessity to activate lipolysis and increase blood plasma concentration of unesterified FA causes the INS resistance syndrome. Dietary excess of palmitic FA and INS deficiency *in vivo* induce a unilateral aphysiological effect. Palmitic metabolism of energy substrates is part of the pathogenesis of atherosclerosis, metabolic syndrome, obesity, nonalcoholic fatty liver infiltration and partially of essential arterial hypertension.

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IMPACT OF NON-HDL CHOLESTEROL ON THE DYSLIPIDIMIA IN SOUTH INDIAN POPULATION

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Objective: Although it is established that lipid profile among Asian & Indian is different compared to west, hallmark being lower total & HDL cholesterol. It is not clear whether Non HDL cholesterol varies among south Indian population. Impact of Non HDL levels may contribute to increased LDL Cholesterol & assessing dyslipidemia therefore, an evaluation of Non HDL Cholesterol may benefit.**Method:** An observational study among the master health check attendees at SRIC&R is taken up. Random selection of 3830 individuals whose HbA1c is < 7% and lipid profiles is measured. All fasting blood samples were collected and analyzed using dedicated system packs on Roche p-800 modular system & Recipe HPLC system for HbA1c. Total, HDL, LDL, cholesterol and fasting triglycerides were estimated and Non HDL cholesterol was calculated.**Results:** Based on the HbA1c levels the groups were classified as 91% Normal, 4% prediabetic and 5% Diabetic. The mean total cholesterol between Normal (185.76) & pre-diabetic (174.76), Diabetic (180.73) was statistically significant (P < 0.001). The difference in mean HDL cholesterol & mean LDL between the three groups is not statistically significant. The mean triglycerides between normal (181.26), pre-diabetic (148.20), diabetic (189.08) was statistically significant (P < 0.001). The mean non-HDL was statistically significant (P < 0.001) between Normal group (146.70), Pre-diabetic group (134.65) & Diabetic group (141.04).

Diabetes Status	Mean	Std dev	SE of Mean	95% CI for Mean lower----upper Min Max P-Value Sig diff between Lower Bound Upper Bound	min	max	P-value	signific ant diff betwn
1. Normal	146.70	38.92	0.66	145.40-147.99	66	269	0.001	1vs2
2. Pre diabetic	134.65	36.00	2.81	129.10-140.20	77	250		
3. Diabetic	141.01	44.05	3.26	134.62-147.47	56	321		

[NON-HDL cholesterol]

Conclusion: In this study the lipid profile in south Indian population varies, comparing the Non HDL component is useful in all groups. Therefore evaluation of Non HDL is of value among south Indian population.

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NIACIN AND INSULIN EFFECTS ON SPILLOVER OF LIPOPROTEIN LIPASE DERIVED FATTY ACIDS

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Spillover of free fatty acids (FFA) from meal triglyceride hydrolysis contributes to the FFA pool and correlates positively with plasma FFA concentrations.

To determine if lowering FFA concentration reduces spillover, volunteers were studied twice during continuous ingestion of a liquid mixed meal over 6.5 hours to achieve steady-state chylomicronemia and suppression of lipolysis. Fractional spillover was measured with infusions of [$U-^{13}C$] oleate and a [$3H$]-triolein labeled lipid emulsion. Six dyslipidemic volunteers (BMI=31±1) received IV insulin and 20% glucose to match glucose values from an identical study two weeks earlier with saline. Six lean (BMI=23±1) and 5 dyslipidemic (BMI=30±1) individuals received IV niacin (~3 mg/min) or saline given in random order on the two study days.

Meal-suppressed FFA concentrations were lower during insulin (75±8 vs 124±13 µmol/L, $p = 0.002$) and niacin (lean 50±4 vs. 102±7 µmol/L, $p < 0.002$; obese 74±7 vs. 139±16 µmol/L, $p < 0.01$) compared to saline. Oleate appearance was lower during insulin (27±3 vs 36±5 µmol/min, $p=0.004$) and niacin (lean 21±2 vs. 32±5 µmol/min, $p = 0.07$; obese 24±4 vs. 45±10 µmol/min, $p < 0.02$) vs. saline. Spillover was similar during insulin vs. saline (26±2% vs 25±2%, $p=NS$), but lower during niacin vs saline (lean 21±4% vs. 29±3%; obese 21±2% vs. 29±5%; both $p < 0.03$).

During continuous feeding, suppression of lipolysis with niacin, but not insulin, reduces spillover of meal-derived fatty acids. This finding is consistent with an antilipolytic effect of niacin on visceral fat, which is known to be relatively insulin resistant.

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POSTPRANDIAL LIPEMIA OF VISCERALLY OBESE DYSLIPIDEMIC MEN AFTER A 3-YEAR LIFESTYLE MODIFICATION PROGRAME. Pelletier Beaumont^{1,2}, J. Bergeron³, N. Alméras¹, A. Tremblay^{1,2}, P. Poirier^{1,4}, J.-P. Després^{1,2}¹*Institut Universitaire de Cardiologie et de Pneumologie de Québec,*²*Department of Social and Preventive Medicine, Université Laval, ³Lipid Research Center, CHUQ Research Center, ⁴Faculty of Pharmacy, Université Laval, Québec, QC, Canada*

Background: Postprandial hyperlipemia is another metabolic complication associated with an excess of visceral adipose tissue (AT).

Objective: To quantify the long term (3 years) effects of a lifestyle modification program on the postprandial lipemia of viscerally obese men.

Methods: Plasma TG-rich lipoprotein (TLR) levels were measured over 8 hours after the ingestion of a standardized dietary fat load in a sample of 45 abdominally obese but non diabetic men before and 3yrs after a lifestyle modification program. Visceral adiposity was assessed by computed tomography.

Results: Following the 3-yr intervention, subjects significantly reduced their volume of visceral $\Delta = -17\%$, $p < 0.0001$, and subcutaneous AT $\Delta = -11\%$, $p < 0.0001$ and they significantly improved their fasting metabolic risk profile ([decreased in triglyceride (-16%), $p < 0.0001$], increased their HDL (+17%, $p < 0.007$) levels]. However, no significant difference was found in their postprandial lipemia. Men were then stratified into 2 groups: men who had no change or increased ($n=29$) vs men who decreased ($n=58$) their postprandial lipemia. The latter group of men was characterized by greater reduction in their adiposity/fat distribution indices compared to men who increased their postprandial lipemia. Multivariate analyses revealed that the best model predicting changes in postprandial

lipemia included changes in visceral AT (partial $r^2=41\%$, $p=0.0001$) and in fasting triglycerides levels (partial $r^2=10\%$, $p=0.002$), which explained 51% of the variance of postprandial lipemia changes ($p=0.007$).

Conclusion: These results indicate that decreases in visceral AT and fasting TG levels are key targets to improve postprandial lipemia with a lifestyle modification program.

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DISCORDANCE BETWEEN LDL-CHOLESTEROL, NON-HDL CHOLESTEROL AND APOLIPOPROTEIN B LEVELS IN TYPE 2 DIABETES PATIENTS ACCORDING TO PRESENCE/ABSENCE OF HYPERTRIGLYCERIDEMIAJ. Smith^{1,2}, A.-L. Borel², J.-A. Nazare², S.M. Haffner³, B. Balkau⁴, R. Ross⁵, C. Massien⁶, N. Alméras², J.-P. Després²¹*Medicine, Université Laval, Québec, ²Centre de recherche de l'Institut universitaire de cardiologie et de pneumologie de Québec, Québec, QC, Canada, ³Baylor College of Medicine, Houston, TX, USA, ⁴INSERM, CESP Centre for research in Epidemiology and Population Health, U1018, Epidemiology of Diabetes, Obesity and Chronic Kidney Disease over the Lifecourse; University Paris Sud 11, UMRS 1018, Villejuif, France, ⁵Queen's University, Kingston, ON, Canada, ⁶Sanofi, Paris, France*

There is an on-going debate as to the best plasma lipid indicator of atherogenic potential. Treatment targets include an LDL-cholesterol (LDL-C) < 2.6mmol/l and a non-HDL-cholesterol (nonHDL-C) < 3.4 mmol/l in patients at high risk for CVD. However, apolipoprotein B (apoB) is recommended by some as the best indicator of atherogenic potential, with a target < 0.8g/l, as it represents the number of atherogenic particles regardless of their volume of cholesterol. Increased atherogenic particle number is commonly seen in patients with hypertriglyceridemia (hyperTG, TG≥1.7mmol/l), such as those with type 2 diabetes.

Objective: To determine the percentage of type 2 diabetic patients reaching the targets for LDL-C and nonHDL-C according to the presence/absence of hyperTG; further, to determine the discordance between nonHDL-C and apoB treatment targets.

Methods: Hospital-based physicians recruited 1815 outpatients with type 2 diabetes for the INSPIRE ME IAA study (44.8% women).

Results: The percentage of men reaching the LDL-C and nonHDL-C goals were 57.9% and 71.5% for normal TG and 51.4% and 39.4% for hyperTG. Among women with normal TG, 46.0% and 62.6% met the LDL-C and nonHDL-C goals while 38.0% and 30.9% with hyperTG met the goals. The frequency of statin use between the normalTG and hyperTG groups was not different. Among hyperTG patients with type 2 diabetes reaching both LDL-C and nonHDL-C goals, 8.5% of men and 9.3% of women had elevated apoB. **Conclusion:** LDL-C clearly underestimates the percentage of atherogenic lipoproteins in hyperTG patients with type 2 diabetes.

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IMPACT OF BUTTERMILK CONSUMPTION ON PLASMA LIPIDS AND SURROGATE MARKERS OF CHOLESTEROL HOMEOSTASIS IN MODERATLY HYPERCHOLESTEROLEMIC MEN AND WOMEN

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Objective: To investigate for the first time the impact of buttermilk consumption on plasma lipids and surrogate markers of cholesterol (C) homeostasis in humans.

Methods: Men and women ($n=34$) with moderate hypercholesterolemia (average LDL-C 3.8 mmol/l) were recruited in this double-blinded randomized crossover study. Their diets were supplemented with 45g of buttermilk and with 45g of a macro/micronutrient placebo designed to match the composition of buttermilk. Subjects consumed both treatments for consecutive periods of 4 weeks in a random order. Plasma lipid concentrations and surrogate markers of cholesterol absorption (campesterol, β -sitosterol), synthesis (lathosterol) and clearance (subtilisin/kexin-9, PCSK9) were measured post diet and compared using mixed models for repeated measures.

Results: Consumption of buttermilk led to a significant reduction in plasma cholesterol (-3.1%, $P=0.02$) and triglycerides (-10.7%, $P=0.008$). Plasma LDL-C concentrations were significantly reduced after buttermilk consumption among subjects with baseline LDL-C > 3.7 mmol/l (-5.9%, $P=0.004$) but not among those with baseline LDL-C < 3.7 mmol/l (+0.3%, $P=0.90$, P for interaction=0.03). The increase in plasma lathosterol concentrations with buttermilk in the whole sample (+12.2%, $P=0.002$) was comparable in magnitude between the high and low baseline LDL-C subgroups. However, β -sitosterol concentrations (-11.6%, $P=0.02$) were significantly reduced with buttermilk only in subjects with high baseline LDL-C. Multivariate analysis indicated that changes in plasma β -sitosterol concentrations ($P=0.01$) were the only significant predictor of the change in plasma LDL-C with buttermilk.

Conclusion: This study suggests that reduced cholesterol absorption seems to be the primary mechanism through which consumption of buttermilk reduces plasma cholesterol concentrations.

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VARIATION IN NON-HDL CHOLESTEROL LEVELS AMONG DIFFERENT COMMUNITIES OF SOUTH INDIA

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Objective: Non-HDL cholesterol is used as a secondary target of therapy in hypertriglyceridemia, diabetes & metabolic syndrome. No large data of Non-HDL among south Indian population is available. The aim is to measure Non-HDL and assess the variation in different communities due different food habits & identify its utility in management of susceptible groups.

Methods: 3830 individuals undergoing master health checkup are grouped as 1.hindu, 2. muslim and 3. Christian and examined. Fasting blood samples are collected to measure Lipid profile and calculate the non HDL. Analysis on Roche p-modular 800 system with dedicated kits is used.

Result: Statistical analysis by Kruskal-Wallis test, the mean total cholesterol in 1. is(183.33), 2.(189.31)&3.(184.55) significance of 0.025 between group 1&2 observed. Mean HDL cholesterol in 1.(39.28), 2.(38.35) & 3.(38.94), significance(0.010)between 1&2. Mean LDL cholesterol in 1. (108.70), 2.(110.84)& 3.(112.79) not significant. Mean Non-HDL in 1.(145.05), 2.(150.96) & in 3.(145.61) significance $P(0.005)$.

Conclusion: The difference in mean Non-HDL between the three communities was found to be statistically significant ($P < 0.01$). It existed between Hindu and Muslim communities and in all age groups. Thus Non-HDL cholesterol may vary with different dietary habits, therefore its identification is useful in management of dyslipidemia.

Metabolic Syndrome

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THE EFFECTS OF W3 FATTY ACIDS AND CONJUGATED LINOLEIC ACID ON INSULIN RESISTANCE AND PLASMA LIPID PROFILE IN FRUCTOSE-FED RATS

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This study was to examine whether w3 fatty acids or conjugated linoleic acid (CLA) supplementation improves insulin resistance and plasma lipid profile in fructose-fed rats (F). Twenty four female Wistar rats were divided into four groups: control group received starch diet (C), fructose group received 64% of fructose (F), fructose-w3 group received 1.6% w3 fatty acids (F-w3) and fructose-CLA group fed 1.6% CLA (F-CLA) for 2 months. An intraperitoneal glucose tolerance test was performed at 50 day of the experiment. Plasma glucose, insulin, lipids and HbA1c were determined. Blood pressure was measured.

Chronic fructose feeding did not alter plasma glucose, insulin, insulin sensitivity and insulinogenic index but increased HbA1c and blood pressure as compared to control rats. Glucose tolerance was higher at 60 min of glucose injection in F group than in C group. Enrichment of the fructose diet by CLA impaired tolerance to glucose by increasing the plasma glucose at all time points. After intraperitoneal glucose load, higher incremental areas under glucose curves were observed in F and F-CLA rats as compared to C and F rats. Addition of w3 or CLA lowered HbA1c and blood pressure. The fructose-fed rats displayed a higher plasma cholesterol and triglycerides and lower HDL-C compared to controls. The supplementation of the fructose-rich diet by either w3 or CLA lowered TC and TG but enhanced HDL-C.

In conclusion, administration of w3 or CLA to fructose rats did not improve glucose, insulin, insulinogenic index and insulin resistance but ameliorates blood pressure and plasma lipid profile.

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WAIST CIRCUMFERENCE AND BODY MASS INDEX AS PREDICTORS OF TYPE 2 DIABETES

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Aim: To establish which measure: waist circumference (WC) or body mass index (BMI), best predicts incident type 2 diabetes (T2D), to determine optimal cut-points of WC and BMI for prediction T2D.

Materials and methods: Population-based screening for glucose metabolism impairments among 661 adults conducted. BMI, waist circumference (WC) estimated. Logistic regression analysis performed and receiver operating characteristic (ROC) curves, with corresponding area under curve (AUC), evaluated predictive power of WC and BMI, measured at baseline.

Results: In univariate analysis, WC strongly associated with development of T2D in men ($B=0.048$, $p=0.002$) and women ($B=0.031$, $p<0.001$). BMI associated with T2D risk in men ($B=0.093$, $p=0.041$) and women ($B=0.071$, $p<0.001$). WC stronger predictor for T2D than BMI in men and women, ROC-AUC index, $p<0.001$ for WC and 0.67, $p<0.001$ for BMI in women, corresponding values in men 0.69, $p=0.002$ vs. 0.60, $p=0.100$. Optimal cut-points for men 92cm WC (sensitivity(Sn) 85%; specificity(Sp) 39%), 26 kg/m² BMI (Sn 76%; Sp 41%). For women cut-points 82 cm WC (Sn 92%; Sp 22%), 27 kg/m² BMI (Sn 89%; Sp 30%). In women with WC < 80cm, BMI >30 increases relative risk of T2D by 5.6-fold (95%CI 1.09-28.8) in comparison with normal weight. In normal

weight women, WC>88 increases T2D risk by 2.8-fold (95%CI 0.67-12) in comparison WC<80.

Conclusion: Measures of abdominal obesity were superior to BMI in prediction of T2D. Cut-off points for WC in prediction of T2D are close to values of metabolic syndrome definition according to IDF.

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COMPARISON OF WAIST CIRCUMFERENCE AND BODY ADIPOSITY INDEX AS METABOLIC SYNDROME CRITERIA IN MALES FROM CARTAGENA, COLOMBIA

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Objective: Waist Circumference (WC) has been employed for abdominal obesity assessment and as Metabolic Syndrome (MetS) criterion. Recently, a Body Adiposity Index (BAI) has been proposed to assess body fat distribution. The aim of this study was to compare WC and BAI as criteria for MetS definition.

Methods: A cross-sectional study was carried out in Cartagena, Colombia. Males aged 20-80 years from general population were randomly selected. Anthropometric and cardiometabolic parameters defined in the Joint Interim Statement as MetS criteria were measured. BAI was estimated according to Bergman et al. (2011). MetS frequency was estimated under two scenarios: 1) WC as obesity criteria, 2) BAI cut-off replacing obesity criteria. BAI cut-off for MetS was determined by ROC curve. Agreement between MetS definitions here proposed was calculated by Cohen's Kappa Index.

Results: A total of 268 participants were included (Average age 46.2 ± 14.9 y, WC 94.5 ± 11.2 cm and BAI 27.3 ± 5.8). High Blood Pressure, High Serum Triglycerides, Low Serum HDLc and High Serum Glucose prevalence were 52.6%, 54.4%, 22.3% and 26.4%, respectively. BAI cut-off was 26.5 (AUC=68.3%). MetS prevalence with WC criteria was 43.2% compared to a 39.9% by using BAI criteria. Agreement between MetS definitions was 0.848 ($p<0.001$, $z=13.7$).

Conclusions: No significant differences were found between WC and BAI criteria when they were independently applied for MetS definition. To our knowledge this is the first study where BAI is applied for MetS assessment in Hispanic population. Due to WC is widely employed in western population its application should be continued.

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EFFECTS OF GROWTH HORMONE TREATMENT ON METABOLIC SYNDROME IN ADULT WITH GH-DEFICIENCY TREATED FOR IDIOPATHIC GH-DEFICIENCY IN CHILDHOOD

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Objectives: In addition to growth hormone (GH) effects to promote linear growth in children, GH also has substantial effects on insulin sensitivity, lipolysis, lipidis, and body composition. GH-deficiency (GHD) in childhood may be result in early onset cardiovascular disease (CVD) in adulthood. Other clinical features in adult GHD include: changes in body composition (BMI), significant reduction in bone mass.

Material and methods: Among 35 male children with idiopathic isolated GHD, treated with rhGH more of four years, eight are adults now. Three of them are under GH-therapy after a new insulin tolerance test with a peak GH response less than 3mg/L, and five of them are off GH-therapy for at least 4 yr. The three patients under the GH-treatment reached their normal adult height. The others

are a near-normal height. Metabolic parameters, body composition, auxological parameters were compared using statistical t-test between the two groups: under GH-therapy or off rhGH.

Results: Fasting lipid profile, glucose HbA1c and insulin levels were normal and comparable between groups. Systolic and diastolic blood pressure was normal. Mean weight was 14.23 kg greater in adult GHD vs adult under GH-treatment and BMI was 28.5 kg/m² vs 22.5 kg/m². Mean percent body fat was significantly greater in GHD males (26.3%) vs treated males (8.7%).

Significant greater values were found in adult GHD for waist circumference (+23.72 cm), hip circumference (+10.92 cm), waist/hip ratio 0.92 vs 0.77.

Conclusion: GHD in young adult men who stopped the GH-therapy showed increased visceral adiposity and increased cardiovascular risk factors.

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DIASTOLIC HEART FAILURE IN PATIENTS WITH METABOLIC SYNDROME: PROGNOSIS BIOMARKERS

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Objectives: The aim of this study is to investigate whether a correlation can be made between NYHA functional class and multiple cardiac biomarkers in a well-characterized population of patients with diastolic Heart Failure (HF) and Metabolic Syndrome (MS).

Methods: Eighty hospitalized HF patients with left ventricular ejection fraction >60% (60 men, 20 women, 68±12.5 years old) were enrolled for this study. They were all previously diagnosed with MS (NCEP-ATP III criteria) and diastolic HF (Heart Failure Society of America criteria). Echocardiographic measurements were performed. Plasma concentrations of brain natriuretic peptide BNP or NT-proBNP, gamma-glutamyl transpeptidase (GGT), serum uric acid (SUA) and C-reactive protein (CRP) were measured. Mann-Whitney U test and Kruskal-Wallis test were used to compare the biomarkers levels in categorical variables.

Results: Plasma BNP levels, CRP values in the NYHA III-IV classes were significantly higher than in the NYHA I-II classes ($p < 0.001$). GGT was increased in NYHA III and IV classes both for men and women (70 U/L ± 5.76 U/L). The SUA values were found in the upper 1/3 of the normal physiologic - homeostatic range (> 4 mg/dl) in NYHA I and II. Abnormal SUA elevations (> 7 mg/dl in men and > 6.5 mg/dl in women) had NYHA III and IV classes.

Conclusions: The BNP, CRP, GGT levels are associated with disease severity. GGT may provide additional prognostic information, especially in patients with mild heart failure. SUA values should be monitored in order to alert the clinician to an overall increased risk of worsening HF.

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THE EFFECTS OF HEALTH MANAGEMENT PLATFORM WITH INTERNET-BASED INTERVENTION ON THE MARKERS OF METABOLIC SYNDROME AMONG ABDOMINALLY OBESE ADOLESCENT GIRLS

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Objectives: This study investigated the effects of a 3-month health management platform with Internet-based (HMPI) intervention in Taiwanese adolescent girls with high risk of metabolic syndrome.

Methods: A prospective, pretest and posttest, controlled, quasi-experimental design recruited 134 Taiwanese adolescent girls with high risk of metabolic syndrome at two nursing colleges. After school approval and written informed consent, abdominally obese adolescent girls (waist circumference ≥ 80 cm) were recruited. The intervention group (n=60) which were completed 3-month HMPI intervention, consisting of 150+ minutes of regular exercise/week; increasing fruit and vegetable intake to 5+ servings/day; decreasing total fat to < 30% of total calorie consumption, tailored graphical feedback was provided; one-on-one psychobehavioral counseling, peer-group support, and reminder system also included. Control group (n=74) received a booklet with basic health education. All participants completed anthropometric and metabolic measures including BMI, waist circumference, BP, HDL, triglyceride and fasting glucose at both stages.

Results: The intervention group showed significant within-group improvements in all markers of metabolic syndrome, except TG. Significant group differences were observed in BMI ($F=1.66$, $p=0.027$), waist circumference ($F=2.63$, $p=0.000$) and fasting glucose ($F=1.79$, $p=0.017$). The reversal of metabolic syndrome risk factors, improved significantly than control group ($\chi^2=10.57$, $p=0.014$). Number of log-ins in the diary and exercise, were significantly correlated with BMI change ($r=0.314$, $p=0.015$) and waist circumference change ($r=0.312$, $p=0.015$).

Conclusions: The 3-month HMPI intervention had positive effects on reserve the markers of metabolic syndrome in abdominally obese adolescent girls. Continued follow up may be required for long-term maintenance in lifestyle behavior change.

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IMPACT OF METABOLIC SYNDROME ON PROGRESSION OF AORTIC STENOSIS: INFLUENCE OF AGE AND STATIN THERAPY

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Background: Recent randomized trials have failed to demonstrate any significant effect of statin on aortic stenosis (AS) progression. Retrospective studies have reported an association between metabolic syndrome (MetS) and faster AS progression. The objectives of this study were: (1) to prospectively examine the relationship between MetS and AS progression and (2) to evaluate the effect of age and statin on AS progression.

Methods: This pre-defined sub-study included 243 of the 269 patients enrolled in the ASTRONOMER (AS Progression Observation: Measuring Effects of Rosuvastatin) trial. Follow-up was 3.4±1.3 years. AS progression rate was measured by calculating annualized increase in peak aortic jet velocity (V_{peak}) measured by Doppler-echocardiography.

Results: Patients with MetS (27%) had faster stenosis progression ($+0.25 \pm 0.21$ vs. $+0.19 \pm 0.19$ m.s⁻¹.yr⁻¹; $p=0.03$). Predictors of faster AS progression in multivariable analysis were older age ($p=0.01$), higher degree of valve calcification ($p=0.01$), higher V_{peak} ($p=0.007$), and MetS ($p=0.005$). Impact of MetS on AS progression was most significant in younger (< 57y.o) patients (MetS: $+0.24 \pm 0.19$ vs. noMetS: $+0.13 \pm 0.18$ m.s⁻¹.yr⁻¹; $p=0.008$) and among patients on statin ($+0.27 \pm 0.23$ vs. $+0.19 \pm 0.18$ m.s⁻¹.yr⁻¹; $p=0.045$). The MetS*Age interaction was significant ($p=0.01$) but not the MetS*Statin interaction. At one year, statin was associated with deterioration in insulin resistance (HOMA index: $+0.41 \pm 1.15$ vs. -0.01 ± 0.88 ; $p=0.004$).

Conclusions: MetS was a powerful and independent predictor of faster AS progression, especially in younger patients. These findings emphasize the importance of identifying and treating MetS in AS patients. The faster stenosis progression in the subset of normocholesterolemic patients with MetS receiving statin will need to be confirmed by future studies.

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CARDIAC DYSFUNCTION IN SHRSP.Z-LEPR^{FA}/IZMDMCR RATS WITH METABOLIC SYNDROME**S. Kagota¹**, Y. Tada¹, K. Maruyama¹, H. Wakuda¹, K. Nakamura², M. Kunitomo², K. Shinozuka¹¹Department of Pharmacology II, ²Department of Pharmacology I, School of Pharmacy and Pharmaceutical Sciences, Mukogawa Women's University, Nishinomiya, Japan**Background:** Metabolic syndrome is known to increase the risk of abnormal cardiac structure and function, which are considered to contribute to increased cardiovascular disease and mortality. We previously reported that left ventricular hypertrophy and diastolic dysfunction occur in SHRSP.Z-*Lep^{fa}/IzmDmc* (SHRSP fatty) rats, an animal model of metabolic syndrome.**Aims and Methods:** To search for possible mechanisms underlying the abnormal function, we determined the left ventricular systolic function and the expressions of the proteins sarcoplasmic reticulum (SR) Ca²⁺-ATPase (SERCA) 2a and phospholamban in the left ventricle of SHRSP fatty rats using a Langendorff perfusion system with constant perfusion pressure and a Western blot method. These proteins play important roles in regulating Ca²⁺ reuptake into SR.**Results:** Male 18-week-old SHRSP fatty rats exhibited increase in body weight, high blood pressure, and metabolic abnormalities. The left ventricular developed pressure was unchanged, and the coronary flow rate (calculated from the flow rate and heart weight) was significantly decreased in SHRSP fatty rats compared to those of normal control Wistar-Kyoto rats. Protein expressions of SERCA2a and phospholamban were decreased in the left ventricle of SHRSP fatty rats.**Conclusions:** These results demonstrate that the cardiac systolic function remains unchanged in SHRSP fatty rats. The diastolic dysfunction observed in rats with metabolic syndrome may be associated with decreased Ca²⁺ reuptake into SR during diastole resulting from decreased SERCA2a levels, and development of the abnormality may be partially related to the decrease in coronary flow.

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ASSOCIATION OF RESISTIN C-420G GENE POLYMORPHISM WITH RISK FACTORS FOR METABOLIC SYNDROME IN OBESE SUBJECTS**S. Tiwari¹**, A.K. Singh¹, S. Shiv¹, S.M. Natu², B. Mittal³, A.B. Pant⁴¹Physiology, ²Pathology, CSM Medical University, ³Medical Genetics, SGPGIMS, ⁴In Vitro Toxicology Laboratory, Indian Institute of Toxicological Research, Lucknow, India**Objective:** Single nucleotide polymorphisms (SNPs) in resistin gene are strongly associated with hyperresistinemia, which may eventually increase risk of insulin resistance and metabolic syndrome (MS). Aim of this study was to investigate the impact of the Resistin C-420G polymorphism on various components of the metabolic syndrome, and serum resistin levels in obese subjects.**Design and patients:** In a case control study, 358 subjects were enrolled for the study. 194 were cases (with metabolic syndrome, MetS) and 164 male were controls (without metabolic syndrome, wMetS).**Research methods and Procedures:** All the biochemical estimations were carried out according to standard protocol. Resistin and Insulin levels were measured by the standard protocol (ELISA) as illustrated in the kit. The C-420G variant was detected by PCR amplification and restriction endonuclease digestion.**Results:** Homozygous mutant genotype (GG) ($p < 0.007$; OR=2.99; 95% CI=1.37-6.49) and mutant allele G ($p < 0.03$; OR=1.44; 95% CI=1.05-1.97) of

resistin were significantly less observed in controls as compared to cases. Subjects without metabolic syndrome were found to have significantly lower levels of serum resistin and insulin resistance in comparison to male with genetic polymorphism for resistin C-420G.

Conclusion: Our results suggest that the C-420G polymorphism of the Resistin gene may be associated with some of the risk factors for metabolic syndrome (Hypertension, serum Triglyceride).

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OXIDATIVE STRESS AND COMORBIDITIES ASSOCIATED WITH MORBID OBESITY. VARIATION AFTER WEIGHT LOSS OBTAINED WITH BARIATRIC SURGERY**A. Vázquez Prado¹**, L. De Tursi Rispoli², A. Vázquez Tarragón³, G. Saez Tormo⁴, A.I. Mahmoud⁵¹Surgery, General University Hospital, ²Surgery, Hospital General, Requena, ³Surgery, Hospital General Universitario Dr. Peset, ⁴Análisis Clínicos, Biología Molecular, ⁵Surgery, Hospital General Universitario, Valencia, Spain**Introduction:** Oxidative stress (OE) is closely related to the metabolic syndrome, which is often associated with obesity.

Surgical treatment of morbid obesity gets weight loss and the improvement of comorbidities.

The aim of this paper is to assess whether the improvement of diabetes, hypertension and dyslipidemia obtained by surgery are associated with improved levels of OE determined in these patients.

Material and methods: We present a series of 28 morbid obese patients consecutively operated on by duodenal switch technique. Improvement of diabetes ($n=11$), hypertension ($n=15$) and dyslipidemia ($n=13$) and OE levels (MDA, 8-oxo-dG, GSH, GSSG and GSSG/GSH), were studied, comparing the values obtained in preoperative and one, three, six and 12 months after surgery.**Results:** After surgery, all patients lost weight, so mean BMI was 31.9 ± 5 at first year ($p < 0.01$).Mean values of metabolites were also decreased in the postoperative follow-up with statistically significance in all period studied ($p < 0.01$).Postoperative mean glycemia value was 102 ± 2 mg/dL at first year ($p < 0.01$). Cholesterol mean value was 140 ± 2 at first year ($p < 0.01$). Triglycerides mean value was 97 ± 3 mg/dL at first year ($p < 0.01$).Thirteen patients (86.7%) cured of hypertension between the third and sixth month ($p < 0.01$).**Conclusions:** Weight loss has been progressive throughout the study period. Values of OE metabolites decreased with statistically significant differences, the same as improvement of comorbidities associated with obesity. We conclude that the weight loss of morbid obese patients obtained by surgery leads to a significant improvement in comorbidities and in OE metabolites.

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TRAITS OF METABOLIC SYNDROME AND EARLY DEFECTS IN INSULIN SECRETION AND SENSITIVITY

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NCEP-ATPIII guidelines require coexistence of three traits to define Metabolic Syndrome (MetS). Abdominal obesity, low-HDL-C and high-triglycerides are the earlier and most frequent traits, counting the same for diagnostic purposes. However, they may not contribute equally to insulin/glucose abnormalities and to risk of diabetes.

Δ Insulin₀₋₃₀/ Δ Glucose₀₋₃₀, Matsuda index, Disposition index (DI) and HOMA-IR ratio were measured to determine which single trait (abdominal obesity, low-HDL-C or high-triglyceride), was associated with greater insulin/glucose abnormalities.

Glucose tolerance test with plasma glucose and insulin levels was conducted in 562 Latin-Americans. MetS was diagnosed according to ATPIII guidelines.

Compared to subjects with no traits, subjects with only abdominal obesity had increased insulin resistance (higher HOMA-IR, lower DI and Matsuda Index), but no evidence of beta-cell dysfunction. Low HDL-C alone + high-triglycerides were not associated with insulin resistance or beta-cell dysfunction. DI in subjects with no traits, sole abdominal obesity, sole low-HDL-C or combined with high-triglycerides averaged: 6.19 ± 0.5 , $4.72 \pm 0.33^*$, 6.93 ± 0.6 and 5.82 ± 0.5 , respectively. Additionally, all indices deteriorated with increased number of traits. In subjects with 1, 2, 3 and 4-5 traits, DI was 21.4%, 40%, 57% and 76% lower, respectively, than in subjects with no traits. Importantly, all four indices were more impaired in subjects with 4-5 traits than with 3 traits.

All traits are not equally associated with defects in insulin resistance or secretion. Compared to abdominal obesity, low-HDL-C + high-triglycerides may bear a lesser weight in risk prediction. Our findings support using IDF-guidelines to define MetS, where obesity is a required trait for the diagnosis.

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LEPTIN C-2549A GENE POLYMORPHISM: EVALUATION OF THE HETERO- AND HOMOZYGOTE FREQUENCIES IN NORTH INDIAN ADULT WOMEN HAVING METABOLIC SYNDROMEA. Gupta¹, S. Tiwari¹, A.K. Singh¹, S. Agrawal², B.N. Paul³, C.M. Pandey⁴, Obesity and Metabolic Syndrome

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Background: Leptin, together with its polymorphism, plays a significant role in various metabolic and biochemical processes in a human body. The purpose of the study was to evaluate the hetero- and homozygote frequencies of leptin gene in women having metabolic syndrome (MetS), compared to women without metabolic syndrome (wMetS).

Methods: The C-2549A gene has been studied in 269 MetS women (NCEP ATP III criteria) (age 31.91 ± 6.05) and 272 wMetS (controls) women (age 30.96 ± 7.01). The division into heterozygotes and homozygotes of the leptin gene was established by RFLP method using PCR. To determine the importance of differences between the frequency of alleles and genotypes, a software— INSTAT and Hardy-Weinberg test was used, $p < 0.05$ is concluded to be statistically significant.

Results: The proportions of genotypes frequency of leptin 2549 C/A gene in wMetS women was in Hardy-Weinberg equilibrium ($\chi^2=0.01$; $p=0.93$). The frequencies of wild CC genotype were 40.81% vs. 30.11% and mutant AA, 13.23% vs. 20.08% whereas allele frequencies of C allele, 63.79% vs. 55.02%

and A allele, 36.21% vs. 44.98% were observed in wMetS and MetS women. The frequencies of homozygous mutant AA ($p=0.008$; OR=2.06) and CA+AA ($p=0.012$) differed significantly with wild CC genotype while the frequency of wild CC and heterozygous CA ($p=0.056$; OR=1.47) did not differ significantly among wMetS and MetS women. Like genotypes, the frequency of mutant A allele also differed significantly with wild C allele between two groups ($p=0.004$).

Conclusion: The heterozygote and homozygote frequencies for the C-2549A of leptin gene in MetS women differ from wMetS women.

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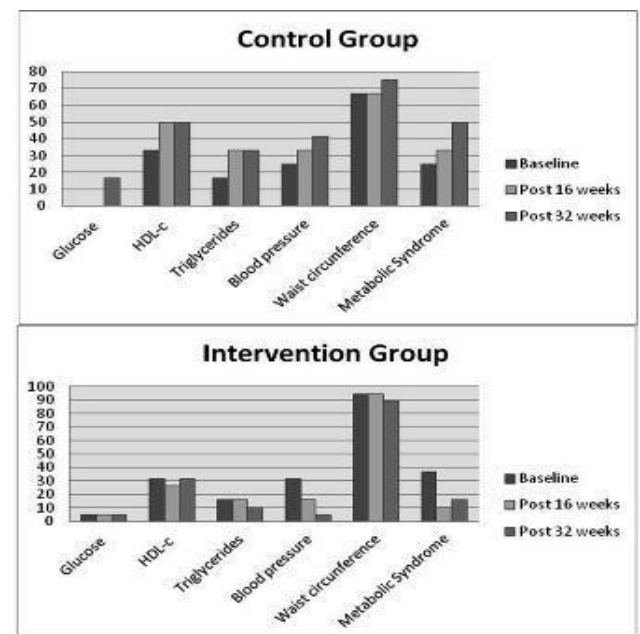
MULTIPROFESSIONAL TREATMENT REDUCES THE PREVALENCE OF THE METABOLIC SYNDROME IN OBESE ADOLESCENTSJ.A.A. Bianchini¹, D.F. da Silva¹, A.R. Matsuo¹, C.A.L. Barrero¹, D.A.M. Hermoso¹, V.D. Seron¹, F. Hernandez², I.D.R. Carolino², C.C.S. Nardo¹, N. Nardo Jr¹

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Objective: To assess the effects of thirty two weeks of multiprofessional treatment on the prevalence of the metabolic syndrome (MS) and its risk factors in obese adolescents.

Methods: We evaluated 31 obese adolescents (54.8% boys) aged eleven to eighteen years classified according to Cole et al. (2000) cut-off points. Adolescents were allocated in intervention (n=19) and control (n=12) group. Waist circumference, blood pressure, glucose, triglycerides and HDL cholesterol (after 12 hours of fasting) were measured at baseline, post 16 weeks and post 32 weeks. To diagnose MS we used International Diabetes Federation criteria. Adolescents completed 32 weeks of intervention aimed to promote feeding and exercise behavior changes based on cognitive behavioral therapy with the help of a team composed of physical educators, nutritionists, psychologists and a pediatrician. We used relative frequency to analyze data.

Results: Main findings are presented in figure 1. A decrease in the prevalence of MS was observed in the intervention group, where in contrast the prevalence in control group increased.



[Figure 1. Evolution in prevalence of MS and risk]

Figure 1: Evolution in prevalence of MS and its risk factors in obese adolescents.

Conclusions: Multiprofessional strategy reduced the prevalence of MS and its risk factors in obese adolescents after 16 and 32 weeks.

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IMPACT OF LIFESTYLE INTERVENTION-INDUCED ABDOMINAL FAT LOSS ON HEART RATE VARIABILITY IN SUBJECTS WITH METABOLIC SYNDROME: PRELIMINARY RESULTS

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Objectives: To investigate the impact of a three weeks residential program (RP) controlled for nutrition and physical activity on heart rate variability (HRV) and abdominal fat (AF) in middle-aged metabolic syndrome (MetS) subjects.

Methods: Fifty six subjects (22 M/ 34 F) with MetS characteristics, (age 59.3 ± 4.9 years, BMI 33.69 ± 3.90 kg.m⁻²) completed the RP controlled for nutrition (negative energy balance : -500 kcal per day) and physical activity (3.5 hours per day). Body weight and AF by dual energy X-ray absorptiometry, fasting blood samples and indices of HRV from a 24-hour holter monitoring were measured at baseline and after RP.

Results: After RP, subjects showed significant improvement in MetS parameters, along with reduction in body weight and AF mass (-411 ± 205 g ; $p < 0.001$). RP decreased 24h heart rate (HR) and enhanced HRV. Parasympathetic night changes between baseline and after RP correlated with AF loss ($r = 0.34$, $p = 0.012$).

HRV	Baseline	After 3 weeks program	p
HF (ms ²)	141.50 \pm 107.99	221.02 \pm 171.90	0.0037
LF (ms ²)	516.45 \pm 431.48	734.5 \pm 479.43	0.021
LF/HF	4.30 \pm 2.83	3.95 \pm 2.19	0.128
SDNN (ms)	46.13 \pm 11.54	56.95 \pm 15.23	0.0002
rMSSD (ms)	25.97 \pm 10.37	30.68 \pm 10.7	0.0146
pNN50 (ms)	7 \pm 7	8.02 \pm 5.94	0.0011

[HRV parameters]

Conclusion: Our preliminary results demonstrate enhanced HRV following AF loss, which may result in a lower risk of sudden and cardiovascular death in MetS subjects.

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COMBINED EFFECTS OF AMLODIPINE PLUS ATORVASTATIN TREATMENT ON CAROTID ATHEROSCLEROSIS IN ZUCKER OBESITY METABOLIC SYNDROME RATS

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Obesity and metabolic syndrome are major risk factors for ischemic stroke and carotid arterial atherosclerosis. To investigate the effects of amlodipine in combination with atorvastatin on carotid atherosclerotic changes in metabolic syndrome. 8-week-old Zucker obesity rats were treated with vehicle, amlodipine, atorvastatin, or combination of amlodipine plus atorvastatin for 28 days. Histological studies of common carotid arteries showed that lipid deposition determined by Sudan III staining was significantly reduced in rats treated with amlodipine or atorvastatin alone, and was further reduced by combination with amlodipine plus atorvastatin. Immunohistochemical studies of the proinflammatory cytokine tumor necrosis factor (TNF)- α , the arterial calcification initiator bone morphogenetic protein (BMP) 2, the angiogenic factor Notch1, and the smooth muscle cell marker α -smooth muscle actin (SMA) showed that the high expression of all 4 proteins in vehicle-treated rats, was greatly decreased by amlodipine, atorvastatin, or combination with amlodipine plus atorvastatin, in ascending order. Double immunostaining showed marked colocalization of TNF- α with BMP2 and Notch1 with α -SMA in the vehicle group, which was greatly reduced by amlodipine plus atorvastatin. These data suggest that combination therapy may be more effective in preventing atherosclerotic processes and subsequent carotid vascular events than administering amlodipine or atorvastatin alone in metabolic syndrome Zucker obesity rats.

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PROTECTION AGAINST ISCHEMIC STROKE DAMAGE BY SYNERGISTIC TREATMENT WITH AMLODIPINE PLUS ATORVASTATIN IN ZUCKER OBESITY METABOLIC RAT

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Obesity and metabolic syndrome are major risk factors for ischemic stroke and carotid arterial atherosclerosis. We compared neuroprotective effects of single or combination therapy of amlodipine (AM) and atorvastatin (AT) in such a metabolic syndrome model Zucker obesity rats. The animals were pretreated with vehicle, AM, AT, or the combination of AM plus AT for 28days, and physical and serum parameters were analyzed, then 90min of transient middle cerebral artery occlusion (tMCAO), was performed followed by immunohistochemical analyses at 24h. Without affecting serum levels of lipids, adiponectin, and leptin, the combination therapy of AM plus AT ameliorated the post-ischemic brain weight increase. The single treatment with AM or AT itself exerted neuroprotective effects with reducing inductions of MMP-9 and AT2R, as well as with preserving collagen IV, and the combination therapy of AM plus AT showed a further synergistic benefit against acute ischemic neural damages. Single AT was more protective on these 3 molecules than single AM at this time point of 24h after tMCAO. Thus, the combination therapy with AM plus AT extended the neuroprotective effect of single treatment with AM or AT on a part of neurovascular unit and a hypertension-related receptor in metabolic syndrome Zucker obesity rats.

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ASSOCIATION OF METABOLIC SYNDROME AND ITS COMPONENTS WITH HYPOTHYROIDISML. Chandra¹, A. Jain¹, D.K. Dhanwal², P. Lali¹¹Biochemistry, ²Medicine, Maulana Azad Medical College, New Delhi, India**Objectives:** The metabolic syndrome (MS) and thyroid hypo-function are associated with cardiovascular diseases. The present study was designed

(1) to find out occurrence of MS in hypothyroid patients and

(2) to determine the association between the components of MS and thyroid hypo-function.

Methods: One hundred eighteen subjects with the diagnosis of hypothyroidism based on their clinical and thyroid function test profile were included in this cross sectional hospital based descriptive study with their informed consent. The diagnosis of MS was made based on National Cholesterol Education Program (NCEP) Adult Treatment panel (ATP III) criteria.**Results:** The prevalence of MS was comparable in overt hypothyroidism {56% (n=34)} and subclinical hypothyroidism {60% (n=35)}. TSH levels were high in metabolic syndrome (14.6±5.42 mIU/L) in comparison to non metabolic syndrome group (11.5±4.8 mIU/L). Overt hypothyroid group had significantly higher serum triglyceride levels (198.1±58.6 mg/dl) than subclinical hypothyroid group (155.29±45.65 mg/dl) and subclinical hypothyroid group had significantly higher fasting plasma glucose (136±33.1 mg/dl) as compared to overt hypothyroid group (111.8±19.2 mg/dl). TSH had significant positive correlation with fasting glucose ($r=0.337$, $p=0.009$), diastolic blood pressure ($r=0.208$, $p=0.049$) and triglycerides level ($r=0.231$, $p=0.04$) in overt hypothyroid cases. Serum fT_3 had significant negative correlation with abdominal obesity in both overt and subclinical hypothyroidism.**Conclusions:** Screening for the MS in thyroid hypo-function is warranted as it is prevalent in hypothyroidism. Patients with higher TSH in subclinical hypothyroidism are at more risk of developing metabolic syndrome. Thyroid hypo-function, obesity and MS are associated by an intricate mechanism.

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IMPACT OF THE IGFBP-3/IGFBP-3R SYSTEM IN METABOLIC SYNDROMEL. Mohanraj¹, W. Li², Y. Oh^{1,2}¹Pathology, MCV Campus, Virginia Commonwealth University, ²BioCure Pharma LLC, Richmond, VA, USA

The Insulin-like growth factor binding protein-3 (IGFBP-3), a major binding protein of IGF in circulation modulates IGF functions by regulating IGF binding to its receptors. It also contributes to the pathophysiology of a variety of disease such as cancer, diabetes and ischemia in an IGF-independent manner. Furthermore, a novel IGFBP-3 receptor (IGFBP-3R) has been recently identified and demonstrated to mediate IGF-independent anti-tumor effects of IGFBP-3 in human cancer. However the functional significance of IGFBP-3R for the biological actions of IGFBP-3 in other diseases is yet to be unraveled.

Our recent studies have demonstrated that IGFBP-3 blocks specific physiological manifestations of asthma in vivo. This unique anti-inflammatory action of IGFBP-3 is further illustrated in metabolic syndrome (MS). In human primary adipocytes, we show that IGFBP-3 sensitizes insulin resistance and restores normal pattern of adipokine production under chronic inflammation conditions. We have also identified that in human primary aortic endothelial cells (HAECs) IGFBP-3 inhibits TNF- α , C-reactive protein- and high glucose-induced NF- κ B activity, thereby suppressing NF- κ B-regulated protein expression, such as ICAM-1, VCAM-1 and MCP-1 as well as inhibiting monocyte attachment on HAECs. Furthermore, knockdown of endogenous IGFBP-3R results in complete inhibition of IGFBP-3 effects suggesting that IGFBP-3 inhibits the obesity-induced NF- κ B activity in HAECs by activating IGFBP-3R signaling.

In conclusion, our findings suggest that the IGFBP-3/IGFBP-3R system plays a pivotal role in the pathogenesis of MS, and IGFBP-3 may present itself as a therapeutic for obesity-induced insulin resistance and for events occurring in the early stages of atherosclerosis and metabolic syndrome.

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METABOLIC DISORDER IN PATIENTS WITH CARDIAC ISCHEMIAR. Kassymaliyeva¹, K. Vukelic², K. Kos³¹Private Clinic, Almaty, Kazakhstan, ²Diabetology, Health Center Grosuplje, GROSUPLJE, ³Health Center Grosuplje, Grosuplje, SloveniaIn accordance to some scientific data the prevalence of Metabolic disorder (MD) among population over 30 yrs old is 10 to 20% in advanced industrial countries. The combination of MD disorders accelerates the progress of atherosclerosis and similar vascular diseases. The revelation of MD in patients with cardiac ischemia was the main objective of our research. 45 patients were examined, 36 men and 9 women at the age of 43 to 75 years. The control group : 26 men of appropriate age and in good health. The BMI and visceral obesity were counted with coefficients. The total period of trial was taken 12 weeks. The experience of cardiac ischemia disease in patients was 10 years over. BMI > 30.0 kg/m² was found in 22.8%. BMI was 28.78 ± 0.93 kg/m² average. The visceral obesity was found in 80.0%. Hyperuricemia (8.1±0.27mg/dl, $p<0.01$) - in 39 patients with cardiac ischemia and hyperglycemia (7.2±0.15, $p<0.01$) - in 24. The increase LDL-cholesterol, (4.8±0.29 mMol/l $p<0.01$ respectively) was found as well as increase of total cholesterol (6.23±0.18 mMol/l), triacylglycerol (1.52±0.07 mMol/l, $p<0.01$). The decrease of HDL-cholesterol (1.01±0.04 mMol/l). In case of visceral adiposity the following tendencies were detected: uric acid was increased by 13.2% ($p>0.02$), LDL-cholesterol was decreased by 16.6% ($p>0.02$). These results are showing the certain deviations of lipid metabolism in visceral adiposity patients. Hence, the metabolic disorders were found in all examined patients in various degrees. In case of visceral adiposity disorders of lipid metabolism were strongly pronounced.

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SLEEVE GASTRECTOMY IS ASSOCIATED WITH IMPROVED CONTROL RATE OF METABOLIC SYNDROME PARAMETERS BUT REDUCED EFFECT ON LDL-CE. Leibovitz^{1,2}, J. Wainstein^{2,3}, M. Shimonov^{2,4}, P. Shachter^{2,4}, D. Gavish^{2,5}¹Obesity Clinic, Wolfson Medical Center, Holon, ²Sackler School of Medicine, Tel Aviv University, Tel Aviv, ³Diabetes Clinic, ⁴Surgery 'A', ⁵Medicine 'A', Wolfson Medical Center, Holon, Israel**Introduction:** Bariatric surgery is the best treatment for weight reduction in obese individuals. One of the benefits from this treatment is also the improved control rate of cardiovascular risk factors. We analyzed the effect of sleeve gastrectomy, on cardiovascular risk factors.**Methods:** Included in this analysis were all patients that underwent sleeve gastrectomy in our medical center that had complete records of risk factors before and after surgery.**Results:** Included were 41 patients (52% males, mean age of 56±18 years) that completed at least 6 months of follow-up. Mean BMI before surgery was 43±7.8 kg/m². Co-morbidities included Dyslipidemia (63%), diabetes (52%), Hypertension (50%), Ischemic heart disease (10%) and non cardiac atherosclerotic vascular disease (3%). After a mean of 216 days following surgery, the patients lost an average of 29 kg, and their mean BMI dropped to 32±9.4 kg/m². As a result, mean blood pressure was reduced from 148±13.5/84±9.5 mmHg to 133±17/76±8.9 mmHg. Mean HDL cholesterol increased from 40±10 to 46±12 mg/dL, and mean triglycerides reduced from 205±94 mg/dL to 135±63 mg/dL. Among the diabetes patients, mean HbA1c dropped from 11.3±12.3% to 10±13.6%. All changes were highly significant. These changes were also associated with reduced need for risk factor control medications. However, mean total cholesterol and LDL cholesterol did not

change significantly (from 184 ± 42 to 175 ± 53 mg/dL, and from 111 ± 40 mg/dL to 104 ± 41 mg/dL, respectively).

Conclusion: Sleeve gastrectomy was associated with rapid and significant improvement of the risk factors associated with metabolic syndrome, but less pronounced effect observed on LDL cholesterol.

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RELATIONSHIPS BETWEEN METABOLIC SYNDROME COMPONENTS AND BONE MINERAL DENSITY IN UKRAINIAN POSTMENOPAUSAL WOMEN

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The purpose of our study was to reveal associations between tissue body composition, compounds of metabolic syndrome (MS) and bone mineral density (BMD) in postmenopausal women.

Design & method: The sample consisted of 90 postmenopausal 60-69 years old women (age: mean=63.9; S.D.=0.4); duration of menopause: mean=14.1; S.D.=0.9). MS was considered according to IDF (2005 yr) criteria. Total body, lumbar spine, femoral neck, ulna radius bone mineral density (BMD), lean and fat mass distribution were measured by dual-energy X-ray absorptiometry were compared for the cohorts with and without the MS. Other parameters including age, weight, height, the level of glucose, lipids were taken into account. Data were analyzed using Statistical Package 6.0 (Statsoft).

Results: Findings revealed that 55 (61.1%) of these postmenopausal women had MS. In patients with and without MS compared, fat mass was higher in the former group. In patients with and without MS compared, BMD was lower in the former group at femoral neck (0.77 ± 0.02 ; 0.89 ± 0.03 , respectively; $F=10.2$; $p=0.002$), ulna radius (0.57 ± 0.02 ; 0.64 ± 0.02 , respectively; $F=6.4$; $p=0.01$) and at different body regions also. Lean mass comparing didn't show significant differences. Diabetes mellitus and hyperglycemia in subjects compared with age and body mass index matched non-diabetic subjects were associated with lower BMD. Serum concentration of triglycerides was a negative predictor of BMD. Increasing quantity of the MS components in women during the postmenopausal period had a negative correlation with BMD at every site.

Conclusion: Our findings suggest that body fat mass is not significant protective factor for BMD loss.

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METABOLIC SYNDROME AMONG URBAN MOROCCAN ADULT WOMEN

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Objectives: To determine the prevalence of Metabolic syndrome (MS) and its components and to examine its relationship with both obesity and Anthropometric variables of body composition.

Methods: The study was conducted in an agricultural community, El Jadida province of Morocco. On a sample of 182 women aged 18-55 years, fasting blood samples were collected and the prevalence of MS was determined using the NCEP-ATPIII criteria. Data on socio-economic status and lifestyle factors were collected using a questionnaire.

Results: The MS prevalence was 20.9 %, it was prevalent in a fifth of overweight and 37.8 % of obese. 8.8 % had no risk factors, 91.2% had at least one MS component, while one subject had all risk factors. Low-HDL cholesterol (82.4%), Hypertension (36.8%) and abdominal obesity (25.8%) were common among women with MS while high triglyceridemia was the least common (6.6%). MS showed greater and more statistically significant values for all

anthropometric variables evaluated. Only 5.5% of women practice physical activity, 25.8 % had no education level whereas 58.8% are married. MS was also more prevalent in obese, older, married, and women without education.

Conclusions: The study shows that high prevalence of MS is associated with markedly increased prevalence of obesity. Intervention programs designed for reducing obesity through lifestyle modification, including increased physical activity, may have a considerable impact in reducing MS and future complications in this population. It is also suggested that the simultaneous interpretation of anthropometric measurements could be used as screening tool to identify Metabolic syndrome.

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INFLUENCE OF REGULAR EXERCISE ON CELL ADHESION MOLECULE EXPRESSION IN YOUNG WOMEN WITH METABOLIC SYNDROME

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Objectives: Recent studies have reported regular exercise may improve proinflammatory status in individuals with metabolic syndrome. Accordingly this study was designed to determine the influence of exercise on soluble plasmatic cellular adhesion molecules in women with metabolic syndrome.

Methods: Sixty adult women with metabolic syndrome according to the criteria reported by the National Cholesterol Education Program Adult Treatment Panel III volunteered for this study. Forty-five were randomly included in experimental group to perform a 12-week aerobic training program, 3 days/week, consisting of warm up (10-min), main part (20-35-min [increasing 5 minutes each 3 weeks]) at a work intensity of 60-75% of peak heart rate (increasing 5% each 3 weeks) and cool-down (10-min). Control group included 15 age, sex and BMI-matched women with metabolic syndrome that will not perform any program. Written informed consent was obtained. Further our protocol was approved by an institutional ethic committee. Plasmatic E-Selectin and P-Selectin levels were measured by ELISA, using a commercially available kit (Parameter, R&D Systems) twice: 72-hours before starting the program (pre-test) and after its ending (post-test).

Results: When compared to baseline soluble E-Selectin concentration was decreased significantly after our 6-week protocol (76.4 ± 7.2 vs 57.1 ± 6.4 ng/ml; $p=0.018$). Conversely, no changes were reported in P-Selectin concentration (127.0 ± 9.2 vs 121.2 ± 8.9 ng/ml; $p=0.22$).

Conclusion: A 12-week aerobic training program decreased plasmatic E-Selectin concentration in women with metabolic syndrome.

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SARDINE PROTEIN LOWERS INSULIN RESISTANCE AND PREVENTS THE DYSLIPIDEMIA AND THE CARDIAC OXIDATIVE STRESS IN RATS FED A HIGH-FRUCTOSE DIET**D. Ait Yahia**¹, Z. Madani¹, K. Louchami², W.J. Malaisse², A. Sener²¹*Biologie, University Es-Sénia, Oran, Algeria, ²Laboratoire d'Hormonologie Expérimentale, Université Libre de Bruxelles, Bruxelles, Belgium***Background:** Chronic consumption of high-fructose diet is associated with the development of metabolic syndrome.**Objective:** The purpose of this study was to demonstrate the effect of dietary administration of fish protein, on insulin resistance, plasma lipid profile and cardiac oxidative stress in high-fructose-fed rats.**Design:** Male Wistar rats were fed either casein (C) or sardine protein (*Sardina pilchardus*) (SP) with or without high-fructose (HF) (64%) for two months, after which intraperitoneal glucose tolerance test, plasma glucose, lipids and heart oxidative stress were determined.**Results:** A significant increase in body and heart weights, adiposity, glucose, insulin, leptin, TNF- α , triglycerides, free fatty acids and HOMA-IR and decrease in food and energy intakes and GLP-1 were observed in HF-fed rats. Moreover, rats exposed to HF diet exhibited impaired glucose tolerance relative to control rats. A strong elevation of heart TBARS, hydroperoxides and carbonyls and reduced NO after the ingestion of HF was reported. HF diet lowered SOD, CAT and GSH-Px activities. Administration of SP to HF rats reduced significantly food and energy intakes, adiposity, triglycerides, FFA, leptin and TNF- α , glucose, insulin, HOMA-IR and improved glucose tolerance. In addition, SP increased GLP-1 than C in HF rats. Heart hydroperoxides, carbonyls and NO were lower in SP-HF relative to C-HF. GSH-Px activity in heart was higher in SP-HF than in C-HF.**Conclusion:** Administration of sardine protein could prevent and reverse the insulin resistance, lipid profile and cardiac oxidative stress induced by the high-fructose diet and may have some benefits in patients suffering from metabolic syndrome.

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EFFECTS OF PROTEIN AND FIBRE SUPPLEMENTATION OF A YOGURT ON APPETITE SENSATIONS AND ENERGY INTAKE

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Dairy food, dietary fibre and protein are all three known to influence positively appetite sensations and to induce a reduced subsequent energy intake. In the present study, we examined the impact of protein and fibre supplementation of a yogurt on appetite sensations and energy intake. Forty-one healthy women (30.9 ± 5.3 year old; BMI = 23.1 ± 2.1 kg/m²; waist circumference = 79.3 ± 5.5 cm) participated in a double blind crossover study, which included two conditions. Each testing session began by the consumption of a standardized breakfast that was followed 120 minutes later by the intake at snack time of a yogurt supplemented or not with protein and fibre. Prospective energy intake was measured 120 minutes after the snack at the subsequent ad libitum buffet-type lunch. Consumption of the yogurt supplemented with fibres (inulin and guar gum) and protein at snack time reduced subsequent energy intake by 406 kJ ± 963 kJ (97 kcal ± 230 kcal) compared with the control yogurt (P=0.01). No difference in appetite sensations measured by visual analog scales was seen between the two treatments. These data suggest that acute consumption of a protein and fibre enriched yogurt promotes satiety as evidenced by reduced subsequent energy intake compared to a regular yogurt.

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RISK OF OBESITY AMONG WOMEN: FINDINGS FROM EXPLORATORY DIETARY PATTERNS

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Objectives: Evidence from epidemiological studies suggests an increasing trend in risk of overweight and obesity, which might reflect dramatic changes in lifestyle behaviors including dietary intakes. This study was aimed at identifying the major dietary patterns in relation to general and abdominal obesity among adult women.

Methods: Overall, 187 healthy women aged 18-45 years participated in this cross-sectional study. Dietary intakes during the previous year were evaluated using a 125-item validated food frequency questionnaire. Weight, height and waist circumference (WC) were measured based on the standard protocols and body mass index (BMI) was calculated dividing the weight in kilograms by square of height in meters. General obesity was defined as BMI ≥ 30 kg/m² and WC > 88 cm represented abdominal obesity. Data were analyzed using exploratory factor analysis and logistic regression analyses.

Results: Two major dietary patterns emerged from the factor analyses which were labeled as "healthy" and "unhealthy". After adjusting for potential confounders, those in the highest quartile category of unhealthy dietary patterns, had higher risk of general (OR: 2.60, P < 0.05) and abdominal (OR: 3.10, P < 0.05) obesity, compared to those in the lowest quartile.

Conclusion: Healthy dietary pattern is associated with lower risk of both abdominal and general obesity in adult women.

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THE CO-OCCURRENCE OF ANEMIA OR IRON DEFICIENCY AND OVERWEIGHT AMONG NON-PREGNANT COLOMBIAN FEMALES: 2005 NATIONAL SURVEY OF THE NUTRITION SURVEY

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Overweight and micronutrient deficiencies have been manifested in the same individuals. This study investigated the association between iron deficiency (ID), anemia and weight status among non-pregnant Colombian females aged 13-49 y (n=3,267). Data from the 2005 National Survey of the Nutrition Situation were used. The prevalence of ID (plasma ferritin < 12.0 µg/L; individuals with CRP > 1.2 mg/dL excluded) and anemia (altitude-adjusted hemoglobin < 12 g/dL) was estimated. The likelihood of having ID and anemia was tested as a function of overweight (BMI-age Z-score > 1 to 2 SD for 13-17 y, BMI 25.0 to 29.9 kg/m² for 18-49 y) and obesity (> 2 SD for 13-17 y, ≥ 30 kg/m² for 18-49 y) using multivariate logistic regressions, accounting for survey design. Additionally, demographic predictors of ID and anemia, as well as of combined overweight/obesity with ID or anemia were identified. The prevalence of overweight and obesity was 29.1 and 13.1%, whereas of ID and anemia, 16.1% and 32.5%, respectively. Contrary to previous reports, overweight and obese women had lower likelihood of anemia (OR [95% CI]=0.8 [0.7, 0.9] and 0.8 [0.6, 1.0], respectively) than normal-weight women. Overweight/obesity combined with ID or anemia was present among 6.3% and 12.8% of women, respectively. Overweight/obesity and anemia were prevalent in Colombia. Although overweight and obesity were associated with lower likelihood of anemia, a sizeable group of women was identified as experiencing both over and under-nutrition. Because of potential for exacerbated health problems in the presence of over and under-nutrition, these conditions should continue to be monitored.

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POPULATION COMPLIANCE TO NATIONAL DIETARY RECOMMENDATIONS AND ITS DETERMINANTS: FINDINGS FROM THE ORISCAV-LUX STUDY

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Objectives: To determine the proportion of adults meeting national recommendations for food and nutrients intake and to identify the demographic, socioeconomic and behavioural factors that may contribute to weaken dietary compliance.

Design: Cross-sectional study.

Setting: Nationwide study in Luxembourg (ORISCAV-LUX), 2007-2008.

Subjects and methods: A representative stratified random sample of 1352 adults aged 18-69 years participated in the nationwide cardiovascular health survey. The Food Frequency Questionnaire was used to estimate food intake. Radar charts were built to compare graphically the compliance of the participants to different key dietary guidelines on the same set of axes. The 13 food- and nutrients-based recommendations were scored and summed to create a Recommendation Compliance Index RCI (range -0.5 to 14). Ordinal logistic regression analyses were performed to determine the factors contributing to poor dietary compliance.

Results: Several food-and nutrients-based guidelines were insufficiently respected compared to others. The greatest gaps occurred in the adherence to grains and dairy products consumption, as well as to total lipids and notably to the saturated fatty acids. Age, country of birth, economic status, smoking status, and subject's awareness of the importance of balanced meal emerged as

independently associated with weak dietary compliance. Obese subjects were more conformed to dietary recommendation compared to normal weight subjects.

Conclusion: The findings underscore the need for specified nutrition education messages along with targeted interventions. Efforts should be continued to increase population awareness to the importance of healthy lifestyle and equilibrated food.

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POSTMENOPAUSAL WOMEN'S ENERGY EXPENDITURE AND SUBSTRATE OXIDATION IN RESPONSE TO ACCUTE LIPID OVERLOAD

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Objective: To investigate the effect of a lipid overload on energy expenditure and substrate oxidation of postmenopausal women.

Methods: Overweight postmenopausal women were grouped according to estradiol (E₂): Group A (GA)- E₂≤39 pg/ml, GB- 40≥ E₂≤59 pg/ml and GC- E₂≥60 pg/ml. Body composition (DXA), plasma E₂ and FSH were determined. Resting metabolic rate (RMR), O₂ and CO₂ volume, and energy expenditure after 5 h of a single lipid overload (1100 kcal, 72% fat) were measured using indirect calorimetry. For comparison of groups, appropriate ANOVA was applied (*=P< 0.05).

Results: 44 women, age 55±5 y, menopause 8±7 y ago, BMI 31±4 kg/m², lean body mass 58±4% and fat mass 42±4%. Plasma E₂ and FSH values in GA: 30±7* pg/ml and 54±29 μUI/ml, GB: 47±6* pg/ml and 51±31 μUI/ml, GC: 91±40* pg/ml and 37±22 μUI/ml, respectively. Baseline values for GA: RMR 1351±229 kcal/d, lipid oxidation (LipOx) 40±40 mg/min and carbohydrate oxidation (ChOx) 160±150 mg/min; GB: 1320±201 kcal/d, 40±20 mg/min and 150±50 mg/min; GC: 1343±131 kcal/d, 40±20 mg/min and 140±60 mg/min. Mean percent postprandial energy expenditure, after 30 and 270 min, increased from baseline in GA to: +11% and +20%, GB: +9% and +7%, GC: +8% and +12%, respectively. LipOx changed from baseline to 0% and +75%* in GA, GB: +25% and -50%*, GC: -75% and +50%, respectively. ChOx changed from baseline to +6% and -25% in GA, GB: -7% and -60%, GC: -79% and -14%, respectively.

Conclusion: Energy expenditure and substrate oxidation of postmenopausal women is irrespective of plasma estradiol level.

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OVERWEIGHT POSTMENOPAUSAL WOMEN GHRELIN, LEPTIN AND PYY AFTER ACCUTE LIPID OVERLOAD

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Objective: To investigate ghrelin, leptin and PYY profile after accute lipid overload on a group of postmenopausal women.

Methods: Overweight postmenopausal women were grouped according to estradiol (E₂): Group A- E₂≤39 pg/ml, GB- 40≥E₂≤59 pg/ml and GC- E₂≥60 pg/ml. Body composition (DXA), plasma E₂ and FSH were determined. Plasma ghrelin, leptin and PYY were determined before and after 5 h of a single lipid overload (1100 kcal, 72% fat). For comparison of groups, appropriated Kruskal-Wallis was applied (*=P< 0.05).

Results: 25 women, age 56±5 y, menopause 8±6 y ago, BMI 31±4 kg/m², lean mass 58±5% and fat mass 42±5%. Plasma E₂ and FSH values for GA: 29±7*

pg/ml and 51±33 μUI/ml, GB: 45±7* pg/ml and 54±22 μUI/ml; GC: 73±16* pg/ml and 36±26 μUI/ml, respectively. Baseline values for ghrelin in GA: 945±644 pg/ml, GB- 590±335 pg/ml and GC- 674±502 pg/ml; leptin in GA: 38±28 ng/ml, GB: 56±37 ng/ml and GC: 50±8 ng/ml; PYY in GA: 105±30 pg/ml, GB: 77±44 pg/ml and GC: 92±48 pg/ml, respectively. Mean percent postprandial ghrelin, after 30 and 270 min, changed from baseline in GA to: -20% and -35%, GB: +13% and -5%, GC: -0.7% and -31%, respectively. Leptin decreased from baseline in GA to: -11%* and -8%, GB: -5%* and -14%, GC: -10% and -4%, respectively. PYY increased from baseline in GA to: +71%* and +123%, GB: +86% and +173%, GC: +35%* and +102%, respectively.

Conclusion: A lipid overload was able to increase ghrelin and PYY values and decrease leptin values on a postmenopausal women group.

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EFFECT OF NUTRITION EDUCATION INTERVENTION ON NUTRITION KNOWLEDGE AND LIFE STYLE PRACTICES OF PRIMARY SCHOOL CHILDREN IN COLOMBO, SRI LANKA

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Objectives: The purpose of this study was to determine the effect of nutrition education intervention on nutrition knowledge and lifestyle practices of primary school children.

Methods: A cluster randomized control trial was conducted for grade 4 children of randomly selected 8 National schools in Colombo district in 2008. Schools were randomly allocated to intervention and control. 472 children participated (361 intervention). The intervention group received 10 sessions on healthy diet and life style practices while the control group received usual curriculum. Life style practices and nutrition knowledge were assessed using questionnaires. Height and weight were measured.

Results: The prevalence of these nutrition indices, scores of nutrition knowledge and life style were similar in both groups (p>0.05). The mean score for nutrition knowledge was 58.4 (SD 12.8) and for life style was 36.1 (SD 5.0).

There were significant increments (p< 0.05) in the post-intervention scores of nutrition knowledge (84.0 vs.68.4) and life style practices (38.0 vs. 35.8) of intervention group compared to control. Daily intake of fruits (64.0% vs 29.7%) and green leaves (58.0% vs 36.0%) were significantly increased in intervention group (p=0.000). Significantly high percentage of children (p< 0.05) in intervention group were physically active in leisure time (38.0% vs 23.4%) and interval (87.6% vs 64.9%). Intervention group had significantly low percentage (p< 0.05) for children having late breakfast (10.1% vs 20.7%) and children eat while watching TV (39.0% vs 50.5%).

Conclusions: Study showed that the nutrition education intervention produced significant improvements in nutrition knowledge and life style practices.

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STUDY OF BODY MASS INDEX AND DIETARY HABITS OF PERSONS WITH DEVELOPMENTAL DISORDERS

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Purpose: Persons with developmental disorders frequently tend to have an unbalanced diet and these have been indicated to cause an increase prevalence of obesity, diabetes and other lifestyle diseases. This study aimed at supporting so that persons with developmental disorders can practice healthy foods.

Methods: Biometric examinations (height, weight) and a survey of nutrition and dietary habits using the food frequency method (FFQ) were conducted on 6 persons with developmental disorders residing in XX prefecture, Japan. Then, examined using a Japanese Food Guide Spinning Top.

Results:

(1) According to the results of the biometric examinations, the average height of the subjects was 162.8 ± 7.4 cm, average body weight was 62.2 ± 17.3 kg and average BMI was 23.4 ± 5.7 . Three of the six subjects was obese (grade 1) and one had low body weight.

(2) According to the results of the survey of nutrition and dietary habits, the subjects were found to consume large amounts of main dishes and demonstrated lipid levels that exceeded the target intake level. The subjects also consumed small amounts of staple foods. In addition, they also consumed conspicuous amounts of sweets and soft drinks.

Discussion and conclusion: Even though the subjects of this study consisted of young people, elements were found that indicated that they were already at risk to the onset of lifestyle diseases. We therefore would like to examine ways of providing effective support for persons with developmental disorders so that they are able to lead healthy lives throughout their life.

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SERUM LEPTIN CONCENTRATIONS IN RELATION TO DIETARY PATTERNS IN CHINESE MEN AND WOMENH. Zuo^{1,2}, Z. Shi^{1,3}, Y. Dai¹, B. Yuan¹, G. Wu¹, Y. Luo¹, A. Hussain²

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Objectives: To evaluate the association between serum leptin concentrations and dietary patterns in a Chinese population controlling for obesity and other confounders.

Methods: Data from the 2006 wave of the China Health and Nutrition Survey (CHNS) in Jiangsu Province were used. One thousand and seventy Chinese adults (488 men and 582 women) had leptin and dietary intake measured. Body mass index (BMI) was calculated as a parameter of obesity. Factor analysis was used to derive four dietary patterns. Analysis of covariance and multivariate regression analysis were performed to assess the association between serum leptin concentrations and the dietary patterns.

Results: Serum leptin concentrations were significantly lower in men than in women ($p < 0.001$). Western pattern (rich in meat, milk and cake) was significantly associated with higher level of serum leptin in men and women, both in unadjusted model (p for trend < 0.001) and after adjusting for sex, age, income, total energy intake, physical activity, smoking status, and BMI (p for trend $= 0.007$ for men and p for trend < 0.001 for women). Multivariate adjusted serum leptin concentrations were significantly related to Western pattern in men ($\beta = 0.166$, $p = 0.002$), women ($\beta = 0.168$, $p < 0.001$) and all subjects ($\beta = 0.167$, $p < 0.001$). The associations were not significant for the other three dietary patterns in relation to serum leptin, after adjusting for potential confounders.

Conclusions: Serum leptin concentrations were associated with dietary patterns in Chinese men and women, independently of BMI and other factors.

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INFLUENCE OF ABDOMINAL OBESITY STATUS ON RESPONSE TO THE MEDITERRANEAN DIETA. Bédard^{1,2}, S. Dodin^{1,3}, L. Comeau¹, S. Lemieux^{1,2}

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Objectives: The aim of this study is to compare cardiometabolic changes between abdominally obese and non-abdominally obese individuals in response to a controlled 4-week isocaloric Mediterranean diet (MedDiet).

Methods: Participants were thirty-eight abdominally obese individuals (waist circumference > 102 cm in men and > 88 cm in women) and thirty-one non-abdominally obese individuals aged between 25 and 50 years who had slightly elevated LDL-cholesterol (LDL-C) concentrations (3.4 – 4.9 mmol/l) or total cholesterol to HDL-cholesterol (HDL-C) ratio ≥ 5.0 . Anthropometric and cardiometabolic variables were measured before and after the MedDiet.

Results: A group by time interaction was noted for waist circumference ($P = 0.0160$), abdominally obese subjects having a significant decrease whereas non-abdominally obese subjects had a nonsignificant increase (respectively -1.1% and $+0.3\%$). The MedDiet resulted in decreases in total cholesterol, LDL-C, apo B, apo A-1 and apo A-2 concentrations in both groups ($P < 0.05$). Abdominally obese subjects decreased their systolic and diastolic blood pressure ($P < 0.05$) while a tendency was observed in non-abdominally obese individuals ($P < 0.10$). No change was observed for triglyceride and HDL-C concentrations and for all variables related to glucose/insulin homeostasis. No group by time interaction was observed for any of the metabolic variables studied. Similar results were obtained after adjustments for age, sex, Mediterranean score at baseline and baseline metabolic values.

Conclusions: Even if abdominal obesity is linked to important metabolic abnormalities, our results suggest that, among individuals with slightly elevated LDL-C, abdominally obese individuals have similar cardiovascular benefits from a MedDiet under isocaloric conditions than non-abdominally obese individuals.

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PPAR γ PRO12ALA POLYMORPHISM INDUCES ANTIINFLAMMATORY BENEFIT FROM CHANGES IN FATTY ACIDS INTAKE IN BRAZILIAN INDIVIDUALS AT HIGH CARDIOMETABOLIC RISK

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Introduction: A complex interaction between the PPAR γ Pro12Ala polymorphism and dietary factors such as the proportions of fatty acids is described. It is unclear how carriers of the PPAR γ Pro12Ala polymorphism respond to dietary interventions.

Objective: To assess whether the presence of the PPAR γ Pro12Ala polymorphism interferes in the association of fatty acids intake with inflammation and insulin sensitivity in Brazilian individuals submitted to lifestyle intervention.

Methods: 129 individuals (65.9% women, 56.2 ± 11.6 yrs, 30.3 ± 5.4 kg/m²) with prediabetes underwent a 18-month intervention on diet (24h-food recalls) and physical activity; clinical data were collected at baseline and after follow-up. PPAR γ Pro12Ala genotyping was performed using ASPCR; Hardy-Weinberg equilibrium was tested. Correlations were tested and multiple linear regression used to verify association between changes in fatty acids intake and changes in clinical variables.

Results: The frequency of Ala allele was 15.5%. In total sample, dietary changes were not correlated to changes in C-reactive protein (CRP) or HOMA-IR. Only in the subset with the variant allele, decrease in *trans* fatty acids was correlated to reduction in HOMA-IR ($r=0.650$, $p=0.002$). Moreover, decrease in omega-6/omega-3 ratio was correlated to reduction in CRP ($r=0.539$, $p=0.021$). Changes in omega-6/omega-3 ratio remained associated with changes in CRP ($\beta=0.092$, $p=0.019$), after adjustments for changes in waist circumference, in physical activity, sex and age.

Conclusion: Variant allele carriers of PPAR γ Pro12Ala SNP may have a better inflammatory response to changes in omega-6/omega-3 ratio in Brazilian individuals. This knowledge may be useful to select individuals with higher chances of responding to specific dietary interventions.

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ANTI INFLAMMATORY EFFECT OF LONG TERM HIGH COMPLEX CARBOHYDRATE DIET AND PHYSICAL ACTIVITY IN SEVERELY OBESE VOLUNTEERS

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Aim: The presence of low grade, internal inflammation is one of the main causes for development of insulin resistance, type 2 diabetes mellitus and atherosclerosis. The aim of the study is to evaluate the effect of Life style modifications on the inflammatory profile of obese volunteers.

Methods: Blood samples were taken before and after 8 months of intensive life modification program, including consumption of high-complex carbohydrate diet and intensive physical activity in a group of apparently healthy severely obese volunteers.

Results: Substantial improvement was noted in the biometric, metabolic and inflammatory biomarkers. A reduction was found in BMI and in the concentrations of CRP, triglycerides, LDL, total cholesterol, insulin concentration, HOMA-R, the adhesion molecule ICAM1 and the pro-inflammatory cytokines TNF α and IL6. Erythrocyte sedimentation rate and the degree of red cell aggregation were reduced. However, a significant increment in fibrinogen concentrations was noted.

Conclusion: The study shows the beneficial anti inflammatory properties of this intervention program. The pro-aggregating properties of fibrinogen following intense physical activity are probable counterbalanced by the anti-aggregatory properties of an improved lipid profile and an attenuated acute phase response. The study suggests that strenuous physical activity is not advised for untrained obese individuals.

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SERUM 25-HYDROXYVITAMIN D CONCENTRATIONS IN RELATION TO MARKERS OF INFLAMMATION IN OVERWEIGHT AND OBESE MEN

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Background and aims: Obesity is a major public health problem in Korean, and the prevalence of obesity has significantly increased over the past decades. Low-grade inflammation is a characteristic of the obese state, and adipose tissue releases many inflammatory mediators. There is an inverse relationship between vitamin D levels and the degree of obesity, therefore it has been difficult to distinguish the independent effects of obesity and vitamin D on inflammatory status. The purpose of this study is to look at serum 25-hydroxyvitamin D (25(OH)D) and inflammatory markers in overweight and obese men.

Methods: Serum concentration of 25(OH)D, adiponectin, interleukin-6 (IL-6), hs-CRP, insulin, glucose, and lipid profiles were determined in 138 healthy overweight men (mean age; 49.77 \pm 9.76, BMI; 26.37 \pm 2.65).

Results: Subjects with vitamin D deficiency demonstrated high IL-6 ($p = 0.002$) and low HDL-cholesterol ($p = 0.049$) compared to subjects with normal vitamin D values. Serum 25(OH)D showed a negative correlation with IL-6 ($r = -0.168$, $p = 0.049$) and triglyceride ($r = -0.184$, $p = 0.03$). Increasing 25(OH)D levels were associated with increasing HDL-cholesterol ($r = 0.25$, $p = 0.003$) and adiponectin ($r = 0.185$, $p = 0.03$). We observed no significant associations with LDL-cholesterol, glucose, and HOMA-IR. In multivariate regression analysis models, after adjustment for age, BMI, smoking status, and alcohol consumption, 25(OH)D is an independent predictor of adiponectin and HDL-cholesterol ($p = 0.005$ and $p = 0.019$ respectively).

Conclusion: Our results support the major role of 25(OH)D in the inflammatory environment observed in overweight and obese men.

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SUBCLINICAL NUTRITIONAL DEFICIENCIES AMONG MORBIDLY OBESE PATIENTS AND AFTER BARIATRIC SURGERY

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Despite the excess of calorie intake needed to promote the massive weight gain, the obese patients are recognised as potentially nutritionally deficient. This is true, especially related to the micronutrients. Thus, the objective of this work was to assess the nutritional status of morbidly obese patients and those that underwent bariatric surgery (BS). The participants ($n=13$) were requested to record a three-day food journal to measure energy intake and nutrients. Other measures included blood samples collection for assessment of nutrients. The intake adequacy was based on the dietary reference intake (DRIs). The food diaries were analyzed using AVANUTRI version 4.0. The subjects were divided in two groups, the pre-surgical ($n=9$) and the post-bariatric surgery by gastric bypass ($n=4$) group. The average age was 39.1 \pm 13.1 years, with a BMI of 44.9 \pm 10.4 kg/m². The dietary records indicated that the intake in both groups was not adequate for: vitamins A, D, E, B5, B6 and folate as well as for calcium, magnesium, iron, copper, iodine, zinc, manganese and potassium. In addition, vitamin B12 and ferritin were deficient among the post-surgical group and excessive sodium intake was observed in the pre-surgical group. The results highlight the importance of nutritional assessment in both pre-surgical and post-surgical obese patients to reduce the chances of nutritional deficiencies.

Funded by: Fundacao Araucaria - Parana - Brazil.

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DIETARY INTAKE AND ADEQUACY IN CANDIDATES FOR BARIATRIC SURGERY AND POST-BARIATRIC PATIENTSB.G.M. Pagan¹, D.A. Capelato¹, A.D.S. Cremon¹, D.A.M. Hermoso¹, L.J. Hintze¹, I.D.R. Carolino², N. Nardo Jr¹¹Physical Education, ²Medicine, Health Centre Science, State University of Maringa, Maringa, Brazil

This study aims to assess the adequacy of dietary intake according to the Brazilian Food Pyramid and the food consumption by individuals in the pre and post bariatric surgery. The study was conducted with 14 adults, 64.3% non-operated group and 35.7% operated group, 78.6% are women. Mean age 44.6±6.4 years. Dietary data were obtained from a 24 hours dietary records being transformed into energy values using the program for nutritional assessment AVANUTRI 4.0, which calculated the diet composition. Adequacy was classified according to Brazilian Food Pyramid published by Philippi (1999) where food was classified into 7 groups: breads/ cereals/ pasta; fruits; vegetables; beans; milk/ dairy; meat/ eggs and oil/ fats/ sugars/ sweets.

Results: The average intake in kilocalories was 1739.7±684.8 and 1859.6±592.1 for the pre operated and operated group respectively. The most consumed food group is beans for both groups, this is possibly because rice and beans are the staple food in Brazil. However, the pre operated group showed higher consumption of white rice, bread, cereals and pasta. Whereas oil, fat, sugar and sweet were mostly consumed by the operated group. Individuals in operated group have a poor and little varied diet, causing a higher intake of sugars and fat after bariatric surgery, which may explains the higher caloric intake presented by this group, increasing the risks of weight regain which is normal for some of these individuals after surgery.

Funded by Fundacao Araucaria - Parana - Brazil.

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IMPACTS OF A BILIOPANCREATIC DIVERSION WITH DUODENAL SWITCH SURGERY ON EATING BEHAVIORS AND ANTHROPOMETRIC MEASUREMENTS OF SEVERELY OBESE PATIENTSN. Bonneville¹, J. Martin¹, A. Auclair¹, M. Bastien¹, V. Provencher², P. Poirier¹¹Centre de Recherche de l'Institut Universitaire de Cardiologie et de Pneumologie de Québec, ²Faculté des Sciences de l'Agriculture et de l'Alimentation, Université Laval, Quebec, QC, Canada

Introduction: Studies following biliopancreatic diversion surgery (BPD) report a decrease in restriction behaviors of the severely obese patients.

Objective: To evaluate the impacts of BPD with duodenal switch (DS) on eating behaviors and anthropometric measurements.

Methods: A total of 125 severely obese people (Body Mass Index (BMI) of ≥ 40 or ≥ 35 kg/m² with comorbidities) were recruited through the bariatric surgery clinic of our institution. They were invited to complete a validated French version of the Three-Factor Eating Questionnaire (TFEQ) (51 items). A year later, 106 of them completed the TFEQ; 73 underwent a BPD-DS while 33 did not [control (CO) group]. Anthropometric measurements were performed at 0 and 12 months.

Results: The entire cohort was 41 ± 10 yrs, weighted 133.9 ± 27.4 kg with a BMI of 48.7 ± 7.6 kg/m², a lean mass of 66.0 ± 14.1 kg, a fat mass of 32.6 ± 17.9 kg, and a fat percentage of 50.3 ± 5.7 %. There was no difference between cognitive restraint, disinhibition, and susceptibility to hunger between both groups at baseline. A year later, disinhibition scores significantly decreased in both groups ($p=0.02$ for BPD-DS group, $p<0.001$ for CO group), but cognitive restraint increased ($p=0.017$) and susceptibility to hunger decreased ($p<0.001$) only in the BPD-DS group. In this group, a higher decrease in susceptibility to hunger was associated with greater weight loss ($r=0.316$, $p=0.006$).

Conclusion: Our data suggest that eating behaviors following BPD-DS differ from those exposed in the literature following BPD alone.

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EFFECT OF DIET PROTEIN SOURCES AND STRENGTH TRAINING ON BODY WEIGHT, VISCERAL ADIPOSITY, GLICEMIA AND SERUM PROTEIN IN MENOPAUSED RATSG.F. Braggion^{1,2}, J.S. Cury³, N.E.A. de Lima⁴, I.Z. Lopes⁴, E. Ornelas³, L.B.M. Maiffrino³¹Physical Education Post Graduation Program, São Judas Tadeu University, São Paulo, ²Nutrition, USCS - Municipal University from São Caetano do Sul, São Caetano do Sul, ³Post Graduation, São Judas Tadeu University, ⁴Graduation, São Judas University, São Paulo, Brazil

Purpose: The aim of this study was to analyze the effect of different protein source diets associated with strength training and menopause on body weight, visceral adiposity, serum glucose and protein in elderly male Wistar rats.

Methods: 38 elderly rats, divided into: 5 menopausal groups: Control (C), Vegetal Protein Diet-Sedentary (DPVS) and Trained (TVPD), Animal Protein Diet-Sedentary (DPES) and Trained (TAPD) and 2 non-menopausal groups: Trained Vegetable Protein Diet (TVPDN) and Trained Animal Protein Diet (TAPDN). 8 months after menopause, trained animals underwent strength moderate intensity training: 12 weeks, 3x/wk, 6 repetition, 70% body weight load. Food intake was controlled. The diet varied only as to the source of protein: animal (mixed casein+vegetal) and vegetal (soybean+corn). The amount of energy and macronutrients were similar. The sedentary group exercised once a week without load. Animals were decapitated, the blood collected to measure glucose and serum protein. The visceral adipose tissue were weighted. Statistical analysis was One Way ANOVA and Bonferroni correction ($p<0.05$).

Results:

Tab.1 Body composition and blood parameters according diet and training protocol

Group (n)	Food Intake (g/day)	Initial 6 months Weight (g)	Pre training 14 months Weight (g)	Final 17 months Weight (g)	% Body Adiposity/ Body weight	Glicemia (mg/dl)	Serum Protein (mg/dl)
Contr (n:5)	15.5±3.2	231.0±18.5	312.0±22.5	322.0±25.8	5.6±1.9	-	-
SVPD (n:5)	13.8±0.8	247.0±18.2	305.0±21.5	318.0±42.3	7.1±3.2	124.0±28.1	7.5±0.9
TVPD (n:6)	15.8±1.7	218.3±12.9	353.5±48.8	382.5±60.8	7.4±2.5	70.1±24.2	7.7±0.5
SAPD (n:5)	14.4±2.2	238.0±14.8	342.0±35.8	388.0±46.9*	9.7±2.8**	126.4±32.0	8.0±0.7
TAPD (n:9)	14.1±1.1	227.2±13.2	330.8±39.5	338.1±43.7	10.1±2.5**	67.22±12.7	7.5±0.9
TVPDN (n:4)	15.5±0.0	213.7±22.5	288.7±22.5	288.2±34.7	3.3±1.3**	107.2±44.8	7.1±1.4
TAPDN (n:4)	13.9±3.0	232.5±8.4	267.5±42.9	258.2±34.0*	4.2±1.9*	98.2±7.1	23.9±31.3

(* $p<0.05$) ; ** difference between groups**[Results:]**

Conclusion: Our data suggest that the menopause seems to be more determinant of changes in body composition than diet and strength training; and the consumption of animal protein seems to be a factor associated with visceral obesity, independent of menopause or strength training.

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LOW-DOSE SUPPLEMENTATION WITH CALANUS OIL ATTENUATES VISCERAL ADIPOSITY AND LOW-GRADE INFLAMMATION DURING HIGH FAT FEEDING

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Oil from the marine zooplankton *Calanus finmarchicus* contains mono- and polyunsaturated fatty acids, which are bound as monoesters with unsaturated fatty alcohols, thus forming a wax ester. It is also rich in the anti-oxidant astaxanthin.

Objectives: To study the effect of long-term dietary supply of Calanus oil (and purified wax ester) on obesity, adipose tissue inflammatory status and insulin sensitivity in diet-induced obese mice, using purified EPA/DHA for comparison.

Diets: C57BL/6 mice were fed a high-fat diet (HFD) for an initial 8 weeks period, followed by another 17 weeks either with no supplementation or supplemented with 1.5% Calanus oil (CAL), 1% purified wax ester (WE) or 0.2% purified EPA/DHA, each diet getting the same content of DHA and EPA. Lean controls received ordinary chow throughout the entire feeding period.

Results: Both CAL and WE attenuated diet-induced obesity, as well as hepatic steatosis and glucose intolerance. CAL and WE also reduced adipocyte size, macrophage infiltration, as well as obesity-induced gene expression of TNF α , IL-6, IL-1b and MCP1. EPA/DHA expressed primarily anti-inflammatory action, with no apparent effect on obesity.

Conclusion: Dietary supplementation with a small amount of Calanus oil reduces bodyweight and visceral fat deposition during high fat feeding, counteracts low-grade inflammation in adipose tissue and improves whole-body insulin sensitivity. Calanus oil-derived wax ester has similar beneficial effects as crude oil, indicating that the effect of the oil is confined to its lipid constituent, although the active component remains to be determined.

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IMPACT OF DAIRY PRODUCTS CONSUMPTION ON BLOOD PRESSURE IN HEALTHY SUBJECTS WITH LOW GRADE INFLAMMATIONA. Cyr¹, M. Abdullah², C. Richard¹, P. Jones², P. Couture¹, B. Lamarche¹¹INAF, Laval University, Québec, QC, ²Richardson Centre for Functional Foods and Nutraceuticals, University of Manitoba, Winnipeg, MB, Canada

Objective: To investigate the impact of dairy consumption on systolic (SBP) and diastolic blood pressure (DBP) in men and women with low grade systemic inflammation.

Methods: This multicenter single-blind randomized crossover study included 125 men and women aged between 18-70 y with CRP values >1 mg/L. As part of prudent 4-week diets, participants were asked to incorporate dairy products (375 ml/d of low-fat milk, 175g/d of low-fat yogurt and 30g/d of regular cheddar cheese) or energy equivalent control products (290 ml/d of fruit juice, 156 ml/d of vegetable juice, 20g/d of cashews and one cookie). Each 4-week diet was consumed in random order and separated by 4-8 week wash out. Blood pressure was measured twice, at two different visits at the end of each diet. The mean of the two measurements was used for analysis.

Results: Overall, the DAIRY diet had no impact on weight and waist circumference compared to the CONTROL diet. The DAIRY diet had no significant impact on SBP compared with the CONTROL diet (110.0 \pm 12.9 vs. 109.9 \pm 13.5 mmHg, $P=0.91$). However, SBP was reduced significantly among subjects with SBP>120 mmHg compared to those with SBP< 120 mmHg (-2.5%, $P=0.04$ vs. +0.9%, $P=0.17$ respectively, P for interaction=0.007). There was no change in DBP with the DAIRY diet ($P=0.15$).

Conclusion: These preliminary data suggest that short-term intake of 3 servings of dairy products per day reduces SBP in subjects with subclinical inflammation and with SBP values above 120 mmHg.

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EFFECT OF DIFFERENT DIETARY OILS ON PLASMA ADIPONECTIN CONCENTRATIONS: A RANDOMIZED CROSSOVER CONTROLLED INTERVENTIONL. Baril-Gravel¹, C. Richard¹, P. Couture¹, D.A. Jenkins², S. West³, P. Kris-Etherton³, P. Jones⁴, B. Lamarche¹¹INAF, Université Laval, Québec, QC, ²University of Toronto, Toronto, ON, Canada, ³PennState University, University Park, PA, USA, ⁴Richardson Centre for Functional Foods and Nutraceuticals, University of Manitoba, Winnipeg, MB, Canada

Objective: We investigated in the COMIT Study the impact of oils containing various amounts of alpha-linolenic acid (ALA), linoleic acid (LA), oleic acid (OA) and docosahexaenoic acid (DHA) on plasma adiponectin concentrations.

Methods: In this multicenter, double-blind, randomized, crossover controlled feeding study, 99 healthy men (n=45) and women (n=54) with abdominal obesity and moderate hypertriglyceridemia, aged 18-68y were fed 5 isoenergetic diets (15.5% protein, 35.7% fat, 50.6% carbohydrate) of 4 weeks each, separated by 4-week washouts. Each diet incorporated 60g/3000kcal of different dietary oils (table). Plasma adiponectin concentrations after each diet were compared using mixed models.

	ALA	LA	OA	DHA	SFA
Control (g)	0.2	41.6	10.6	0.0	4.7
Flax (g)	19.2	22.5	10.7	0.0	4.8
Canola (g)	5.9	11.7	35.2	0.0	4.3
CanolaOA (g)	1.4	8.8	42.8	0.0	3.9
CanolaDHA (g)	1.2	7.6	37.9	3.5	5.2

[Fatty acid profiles of experimental oils]

Results: CanolaDHA was the only oil associated with a significant increase in plasma adiponectin concentrations compared with the Control oil (+4.8%, $P=0.01$). Consumption of Canola (+5.1%, $P=0.01$) and CanolaOA oils (+3.1%, $P=0.04$) also increased plasma adiponectin compared to Flax oil.

Conclusion: These data from COMIT suggest that: 1- ALA on its own has no effect on plasma adiponectin, 2- OA replacing ALA and LA increases adiponectin, 3- combination of OA and DHA is associated with the highest adiponectin concentrations. Implications of such changes in adiponectin in terms of cardiovascular risk require further investigation.

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ENABLERS AND BARRIERS INFLUENCING PLAIN WATER CONSUMPTION OF MIGRANT'S CHILDREN LIVING IN MEXICO AND UNITED STATES**J. Espinosa Montero**¹, A.G. Palos Lucio², M. González Picazo³, L. Ramírez Aguilar⁴¹Instituto Nacional de Salud Pública, ²Departamento de Enfermedades Crónicas y Dieta, Instituto Nacional de Salud Pública, ³Instituto Nacional de Salud Pública, Cuernavaca Morelos, ⁴Departamento de Enfermedades Crónicas y Dieta, Instituto Nacional de Salud Pública, Cuernavaca México, Mexico**Objective:** Identify barriers and facilitators related to water consumption in school-age children of migrant children from Mexico and the United States.**Methods:** We conducted a qualitative analysis in an elementary school of Morelos, México and Illinois, EU. In México we interviewed children, parents, teachers and vendors within the school; in EU we interview children and parents. All interviews were transcript and analyzed using Atlas ti. Ecological model was used as a framework to identify the influence of enablers and barriers in the PW consumption.**Results:** A total of 16 children, 16 mothers, 8 teachers, and 2 vendors within the school were included in México. A total of 12 children and 4 parents were included in U.S.A.

Highlight the following potential enablers: Primarily related to water as satiety and the intrinsic notion of naturalness and cleaning. At individual level the perceptions and positive beliefs about the intake, self-efficacy to drink it and skills and supplies to take it to school. At school level the recreational activities and teacher's modeling. At home, the positive perception of the mother, the family income and habits and beliefs of parents. The barriers at the school level are irregularity in the supply, inadequate hygienic measures of jugs, prohibition of drinking in the classroom, and modeling contradictory teachers. At community the social norms, the pollution and depletion of springs.

Conclusions: Educational interventions that enhance the enablers and diminish barriers to intake PW should target children's home and school habits in order to increase PW consumption.

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TWO MEALS A DAY ARE BETTER THAN SIX FOR PATIENTS WITH TYPE 2 DIABETES**H. Kahleova**¹, L. Belinova¹, M. Hill², T. Pelikanova¹¹Diabetes Centre, Institute for Clinical and Experimental Medicine, ²Institute of Endocrinology, Prague, Czech Republic**Objectives:** Caloric restriction is crucial in the treatment of type 2 diabetes (T2D), traditionally apportioned into 5-6 meals/day. We compared the effect of six vs. two meals a day with the same caloric restriction on body weight, HbA1c and plasma lipids in subjects with T2D.**Methods:** In a randomized, crossover study, we assigned 54 patients with T2D to follow two regimens of a hypocaloric diet (-500 kcal/day), each for 12 weeks: six meals a day (A), and two meals a day (B). The diet in both regimens had the same macronutrient and energy content. We measured weight, HbA1c, fasting glycemia, plasma C-peptide and lipids. For statistical analysis, 2x2 crossover ANOVA was used.**Results:** Body weight decreased in both regimens ($p < 0.001$), more in B (-2.3; 95% CI -2.7 to -2.0 kg in A vs. -3.7; 95% CI -4.1 to -3.4 kg in B; $p < 0.001$). Fasting glycemia decreased in both regimens ($p < 0.001$), more in B (-0.47; 95% CI -0.57 to -0.36 mmol/L in A vs. -0.78; 95% CI -0.89 to -0.68 mmol/L in B; $p = 0.004$). Fasting C-peptide decreased in both regimens ($p < 0.001$), more in B (-0.05; 95% CI -0.09 to -0.01 nmol/L in A vs. -0.14; 95% CI -0.18 to -0.1 nmol/L in B; $p = 0.05$). Hb1Ac, plasma triglycerides and LDL-cholesterol decreased

comparably in both regimens. No significant change in total or HDL-cholesterol was observed in either regimen.

Conclusions: Our data suggest that fewer bigger meals may be better than more smaller ones for patients with T2D.

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ASSESSING BODY IMAGE AND RELATION WITH BODY MASS INDEX AND FOOD GROUP CONSUMPTION AMONG ECONOMIC UNIVERSITY STAFFS IN TEHRAN, IRAN**Z. Kargamovin**, B. Rashidkhani, Z. Asadi*Community Nutrition, Nutrition Sciences and Food Technology Sh.Beheshti University of Medical Sciences and Health Services, Tehran, Iran***Aims:** Body image is a person's attitude about him/herself. When body image is lower than ideals, it may cause ones lower self esteem, depression, and it may decrease staffs' efficiency.**Method:** This study was a cross sectional study in which 188 of 203 economic university staffs were selected. People with special disease, diabetes, pregnant women, persons in grief period were excluded from the study. All subjects were given informed consent and their weight and height was measured by two educated nutritionist and their demographic, physical activity, and food frequency questionnaire, and MBSQR were completed by interviewers.**Results:** BMI and body image were not significantly different. Men's physical activity was significantly more than women's. Men's sweet snacks and beverages consumption were significantly more than women's. There was a weak relation between BMI and body image dissatisfaction ($r = 0.16$). In this study there was no significant correlation between daily food intake and BMI. Body image showed no significant relation with any daily food item except milk and milk products. Physical activity was not related with daily food items. Only there was a relationship between physical activity in men and salty snacks consumption in them. Finally, we found a formula to calculate body image score from BMI and physical activity.**Conclusion:** Due to more physical activity in men and worse weight satisfaction in women, It's better to instruct sport spaces in the all work places, that employee can do physical activity in rest times.

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EFFECTS OF DIETARY MACRONUTRIENTS AND ABDOMINAL FAT CHANGES ON ENERGY EXPENDITURE AFTER WEIGHT LOSS: RESULTS FROM THE POUNDS LOST TRIAL**R. de Souza**^{1,2,3}, V.J. Carey⁴, F.M. Sacks^{1,4}, C.M. Loria⁵, N.M. Laranjo⁴, S.R. Smith^{6,7}, G.A. Bray⁶¹Department of Nutrition, Harvard School of Public Health, Boston, MA, USA, ²Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, ³Clinical Nutrition and Risk Factor Modification Center, St. Michael's Hospital, Toronto, ON, Canada, ⁴Channing Laboratory, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, ⁵National Heart, Lung, and Blood Institute, Bethesda, MD, ⁶Pennington Biomedical Research Center, Baton Rouge, LA, ⁷Translational Research Institute for Metabolism and Diabetes, Orlando, FL, USA**ABSTRACT****Background:** Weight loss reduces energy expenditure, but metabolic adaptations to different macronutrient profiles have not been extensively studied.**Objective:** To determine if energy-reduced diets emphasizing fat, protein, or carbohydrate differentially reduce total (TEE) or resting energy expenditure (REE), and assess the relationship between changes in abdominal fat and energy expenditure.

Design: In a subset of participants (n=55) enrolled in a randomized trial of 4 energy-reduced weight loss diets, changes in body composition, TEE, and REE were measured after 6 months. Comparisons were between assigned levels of protein (25% v. 15%), fat (40% v. 20%), and across 4 levels of carbohydrate (35% through 65%).

Results: Overall, TEE fell by 127 ± 55 kcal/d (mean \pm SEM) ($\gg 4.7\%$), and REE by 130 ± 15 kcal/d ($\gg 8.2\%$), with no statistically significant differences in change between levels of protein or fat, or across the 4 levels of carbohydrate. REE, adjusted for lean and fat mass, was significantly lower at 6 months than predicted from changes in body composition (by 53 ± 17 kcal/d; $P=0.003$), indicating a metabolic adaptation. The REE adaptation was seen only in the 15% protein (-80 ± 18 kcal/d; $P < 0.001$) and 20% fat diets (-64 ± 20 kcal/d; $P < 0.003$). Visceral or subcutaneous abdominal fat changes were not associated with changes in energy expenditure independent of lean mass change.

Conclusion: After 6 months of weight loss, energy expenditure decreased, primarily due to changes in lean mass, but REE decreased more than predicted on the low-fat and average-protein diets. Changes in abdominal fat were not associated with changes in energy expenditure independent of lean mass.

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IMPROVING NUTRITIONAL STATUS OF CHILDREN UNDER 6 THROUGH NUTRITION COUNSELING IN RURAL AREA

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Promoting mothers nutritional knowledge is one of the effective way for improving child nutrition.

Goal: To increase the level of knowledge, attitude and practice of mothers in child nutrition under 6.

Methods: This study was an interventional study in small district in Khozestan province of Iran. Data collected with designing a KAP questionnaire for mothers. Before intervention a pre-test questionnaires for KAP were filled by mothers and data analyzed. Then, mothers participated in nutrition education classes. Afterwards, the post-test questionnaire were filled.

Results: At the beginning of the study the mean points for knowledge, attitude and practice of mothers on principles of nutrition in children were 71.2%, 68.6% and 69.3% respectively. After the intervention these figures reached 85.6%, 74.4% and 82.1% respectively. The changes were statistically significant ($P < 0.01$, $P < 0.05$ and $P < 0.05$ respectively). The mean points gained by mothers living in suburb villages were lower than mothers living in the main villages before and after the intervention.

Conclusion: This study showed that training mothers in the principles of nutrition in children improves their nutritional knowledge, attitude and practice, increasing the mean points obtained in each of these from a previous mean. Gathering information on their knowledge and practice levels can help health personnel on child nutrition and out carrying appropriate training sessions to improve the nutritional status in children.

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BENEFICIAL EFFECT OF NUTRITIONAL SUPPORTIVE PLAN AMONG UNDER-NOURISHED CHILDREN IN POOR FAMILIES WITH COLLABORATING SOME ORGANIZATION IN IRAN

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Malnutrition in the form of Protein - Energy Malnutrition (PEM) and micronutrient deficiencies, is one of the most important health problems in developing

countries, Iran included. The purpose of this study was to improve nutritional status among under-nourished children in poor families.

Methods: A total of 50,000 children under 5 (girls and boys) in 30 provinces in Iran which suffered by moderate and severe malnutrition participated ($< -2SD$ weight for age) in this program. Malnourished children belong to poor families were determined; weights and heights were measured and anthropometric indicators were determined based on WHO, 2007. Then, these malnourished children were introduced to Imam Khomeini Foundation. Khomeini Foundation as one of the biggest NGO in Iran which supports poor families since 1979. This study collaborated with Ministry of Welfare, Ministry of Health and Emam Khomeini. They have started to receive monthly supportive food basket which could support their daily nutritional requirements. This basket included (meat, egg, cheese, legumes, milk, tuna fish, chicken, liquid oil). Along with food support community health workers were actively involved with counseling of mothers on the nutritional requirements of children. Nutritional support out for whoever has been improved nutritional status. However, nutritional education still had continued.

Results: The results of monitoring & evaluation (according to anthropometric indicators) of this plan have shown around more than 45% of children that received food basket had consistently improved nutritional status.

Conclusion: Likewise other international nutrition programs in developing countries this project showed that inter sector collaboration have been the best way for decreasing malnutrition in children.

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INCREASING THE LEVEL OF KNOWLEDGE, ATTITUDE AND PRACTICE OF MOTHERS IN CHILD NUTRITION UNDER 6 IN RURAL AREA BY COUNSELING

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Ministry of Health and Medical Education, Tehran, Iran

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Conclusion: This study showed that training mothers in the principles of nutrition in children improves their nutritional knowledge, attitude and practice, increasing the mean points obtained in each of these from a previous mean. Gathering information on their knowledge and practice levels can help health personnel on child nutrition and out carrying appropriate training sessions to improve the nutritional status in children.

Obesity

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THE RELATIONSHIP OF OBESITY AND HEALTH BEHAVIOR AMONG PERIMENOPAUSAL WOMEN

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Objectives: Overweight and obesity are the high risk factors for chronic disease, cardiovascular disease and type II diabetes, and the obesity even has been regarded as a disease and defined by the World Health Organization (WHO) in 1977. Therefore, the BMI is proposed to assess the severity of obesity which is able to show the correlation of obesity and other diseases. On the other hand, women in the perimenopausal period experience hormone and metabolic change which increase the body weight and the morbidity of cardiovascular disease. This paper, accordingly, mainly focused on exploring the relationship between the BMI and the health behavior of perimenopausal women.

Methods: The study was a cross-sectional design and the data was collected within the perimenopausal women those are the patients of gynecologic clinic by using interview questionnaires.

Results: A total of 39 women were interviewed with the mean age of 48.5 years (range 36-64 years). The results indicated that approximately 53.8% of the women had body mass index (BMI) ≥ 24 kg/m², and health behavior showed statistically significant negative correlation with BMI ($p=0.031$). Perimenopausal women of health behavior showed statistically significant negative correlation with perceived perimenopausal disturbances ($p=0.056$) but BMI with perceived perimenopausal disturbances were no significant.

Conclusions: The transition of perimenopausal period shows an opportunity for perimenopausal women to promote the health behavior which may decrease BMI and perceived perimenopausal disturbances. According to the mentioned above, it is suggested to establish a program for premenopausal women in order to build up their own health behavior.

Smoking

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SMOKING DOES NOT AFFECT THE ASSOCIATION OF BODY MASS INDEX WITH ABDOMINAL OBESITY IN BRAZILIAN ADOLESCENTS

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Objective: To evaluate the association of smoking during lifetime with body mass index (BMI) and abdominal obesity in adolescents from a population-based sampling from southern Brazil.

Methods: Adolescent boys and girls, aged 12 to 19 years, were interviewed at home in a cross-sectional study, using standardized questionnaires. Smoking was determined by have been smoked 100 cigarettes or more during lifetime. Weight (kg) and height (m) were measured, and BMI (kg/m²) for age and sex was calculated. Waist circumference (WC, cm) was used to identify abdominal obesity (AO), and the average was analyzed for the upper vs. other tertiles. Data were expressed as mean \pm SD or percentages. The associations of BMI and AO by smoking were analyzed using the modified Poisson Regression, adjusted for age and sex.

Results: Participants (n=612) aged 15.1 \pm 1.8 years were enrolled, 52% girls, 10% reported smoking (vs. 5.6% of boys), with WC of 73.6 \pm 9.3 for boys and 71.1 \pm 10.1 for girls (P=0.008), and BMI of 21.4 \pm 4.0. Among non-smoking adolescents there was an association of BMI with AO (P < 0.0001), as well as among smoking adolescents (P= 0.002). Multivariate analysis showed that the association was not independent of age and sex, since it was no longer significant after the adjustment (risk ratio= 1.01; 95%CI: 0.65-1.55).

Conclusions: Smoking does not account, independent of age and sex, for low BMI and lack of abdominal obesity among adolescents.

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SMOKING STATUS AND BODY FATNESS INDICATORS: A CROSS-SECTIONAL SURVEY AMONG 1948 CHINESE MALE ADULTS

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The relationship between smoking and obesity has been widely assessed, but the results were inconclusive. Moreover, few researches examined the relationships of smoking with body mass index (BMI), waist circumference (WC), hip circumference (HC) and waist-to-hip ratio (WHR) simultaneously, which could not comprehensively assess the effects of smoking on fat distribution. This study aimed to investigate associations of smoking with BMI, WC, HC and WHR in Chinese male adults.

Methods: 1948 Chinese male adults aged 20-85 years were selected from a community-based chronic disease screening project in Guangzhou and Zhuhai of China. They were consisted of never smokers (n=982), current smokers (n=846) and former smokers (n=210). Each subject was interviewed with a structured questionnaire. BMI, WC, HC and WHR were also measured. ANCOVA was used to assess the associations of smoking with body fatness indicators. Results indicated that current smokers had lower BMI and HC but higher WHR than never smokers after adjustment for confounders. In current smokers, heavy smokers (>15 cigarettes/day) had higher BMI than light smokers (1-15 cigarettes/day) without controlling for WC, but this association was conversed with adjusting for WC. Furthermore, heavy smokers had higher WC and WHR, but lower HC than never smokers after controlling for confounders. Former smokers who quitted smoking < 1 year had larger BMI than never smokers and former smokers who quitted smoking for 1-5 years or >5 years. In summary, cigarette smoking may decrease BMI but increase waist

fat, and smoking cessation may increase BMI in a short time after quitting smoking.

Steroid Hormones

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TESTOSTERONE TREATMENT IN 255 HYPOGONADAL, ELDERLY MEN LEADS TO CONTINUOUS REDUCTIONS OF BODY WEIGHT AND WAIST CIRCUMFERENCE OVER 5 YEARS

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Introduction: Obesity is associated with reduced testosterone. This study analysed effects of normalization of testosterone in hypogonadal men.

Methods: Open-label, single-center, cumulative, prospective registry study of 255 men (mean age 60.6 ± 8.0 years), with testosterone levels between 1.7 -3.5 ng/mL (mean: 2.87 ± 0.4) receiving parenteral testosterone undecanoate 1000 mg/12 weeks after an initial 6-week interval.

Results: After 5 years the following changes occurred: weight (kg) decreased from 106.22 ± 16.93 (minimum: 70, maximum: 139) to 90.07 ± 9.51 (min 74.00, max 115). The statistical significance was $p < 0.0001$ vs baseline and vs the previous year over 5 years indicating a continuous weight. Waist circumference (cm) declined from 107.24 ± 9.14 (min 86, max 129) to 98.46 ± 7.39 (min 84, max 117) ($p < 0.0001$ vs baseline and vs the previous year over 5 years). Body mass index (BMI, m/kg²) declined from 33.93 ± 5.54 (min 21.91, max 46.51) to 29.17 ± 3.09 (min 22.7; max 36.71) ($p < 0.0001$ vs baseline and vs the previous year over 5 years). The mean per cent weight loss after 1 year was 4.12 ± 3.48%, after 2 years 7.47 ± 5.01%, after 3 years 9.01 ± 6.5%, after 4 years 11.26 ± 6.76% and after 5 years 13.21 ± 7.24%. At baseline, 96% of men had a waist circumference of ≥ 94 cm. This proportion decreased to 71% after 5 years.

Conclusions: Normalising testosterone produced progressive loss of weight, waist circumference and BMI over the full 5 years of the study.

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WEIGHT LOSS AND BENEFICIAL EFFECTS ON METABOLIC SYNDROME AFTER LONG-TERM TREATMENT WITH TESTOSTERONE UNDECANOATE INJECTIONS IN 334 HYPOGONADAL MEN

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Background: Testosterone treatment in men with hypogonadism is standard therapy, particularly in younger men with congenital forms of hypogonadism.

Methods: 334 patients (147 with primary hypogonadism, 100 with secondary and 87 with late-onset hypogonadism aged 15 to 72 years (mean 42 ± 15 years) received altogether 6596 intramuscular injections of 1000 mg of testosterone undecanoate during a maximal treatment time of 15 years, corresponding to 1403 treatment years.

Hypogonadism was defined as total testosterone below 12 nmol/L and occurrence of symptoms.

Results: Individual dosing intervals ranged from 10 to 14 weeks. Serum T concentrations increased from 5.8 to 16.1 nmol/L within the first year of treatment and remained stable thereafter. Body weight decreased from 103.0 ± 16.3 kg at baseline to 79.1 ± 12.6 kg at the end of the observation period. Body mass index declined from 31.8 ± 5.2 to 24.4 ± 3.2 kg/m². Waist circumference declined from 114.0 ± 10.5 to 94.1 ± 8.7 cm.

Systolic blood pressure decreased from 148.0 ± 13.8 to 128.0 ± 10.6, diastolic from 98.0 ± 10.9 to 81.0 ± 10.2 mmHg, triglycerides from 198.0 ± 32.8 to 145.0 ± 21.2 mg/dL. HDL increased from 38.4 ± 9.7 to 53.6 ± 11.7 mg/dL. Glucose decreased from 108.1 ± 29.7 to 91.2 ± 15.2 mg/dL.

p-value for change from baseline: $p < 0.001$ for all parameters.

Conclusion: Intramuscular injections of testosterone undecanoate lead to improvements in body composition and other features of the metabolic syndrome. These changes are maintained over a long-term follow-up period.

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TESTOSTERONE THERAPY WITH TESTOSTERONE UNDECANOATE LONG ACTING INTRAMUSCULAR INJECTIONS IN HYPOGONADAL MEN IS ASSOCIATED WITH REDUCTION IN OBESITY

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Introduction: Obesity and the metabolic syndrome are frequently associated with late onset hypogonadism (LOH). We sought to study the effects of testosterone replacement therapy on weight, body mass index (BMI) and waist circumference (WC) in patients with LOH.

Materials and methods: As of November 2004 130 patients with LOH (diagnosis criteria: total testosterone ≤ 3.5 ng/dl and documented erectile dysfunction (ED) according to Sexual Health Inventory for Men score (SHIM; ≤ 21) were included in a prospective cohort study to investigate the effect of long-acting testosterone undecanoate (TU) 1000 mg intramuscular injection. Treatment was initiated at day 1 (T1), then the second dose was administered 6 weeks later (T2). TU was injected at 3 months intervals thereafter. The parameters weight and waist circumference were measured at baseline and at every treatment visit. Serial BMI, WC and percentage of weight change from baseline were calculated.

Results: Median follow-up time was 4.7 years. The mean weight decrease from baseline to the last visit was 14.3 ± 8.7 kg (minimum -5, maximum 44), the mean percentage weight loss was 13.0 ± 6.8% (minimum -5.3, maximum 34.4), the mean of BMI points decreased was 4.5 ± 2.7 (minimum -1.6, maximum 13.4), and the mean drop in WC was 11 cm ± 6 (minimum -13, maximum 24). There is a strong linear relationship between weight loss, decrease in BMI and decrease in WC and time on TU treatment.

Conclusion: Long-term testosterone treatment with TU results in significant reduction of all parameters of obesity.

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THE IMPACT OF ESTRADIOL LEVELS IN METABOLIC AND INFLAMMATORY STATUS IN MORBID OBESITY

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The inflammatory condition associated with obesity play a major role in the pathogenesis of obesity-related morbidities. The dysregulation of estrogens metabolism has been associated with the susceptibility to obesity. Nonetheless, the influence of estrogens on obesity-related inflammation has been little explored.

The aim of this study was to evaluate the relationship between total plasma estradiol and inflammatory and metabolic markers in a sample of morbidly obese patients undergoing bariatric surgery.

In 26 men and 221 women divided by menopausal status (90 premenopausal and 41 postmenopausal), body mass index (BMI), waist and hip circumference, blood pressure, lipid profile, plasma glucose, insulin, HbA1c, estradiol, cortisol, sex hormone binding globulin (SHBG), testosterone, and hs-CRP were measured during standard clinical evaluation. Adipose tissue (subcutaneous and visceral) samples were collected during surgery at the Hospital of S. João, Portugal (protocol approved by the Ethics Committee of hospital) to determine size and number of adipocytes.

Plasma estradiol levels were positively correlated with BMI and HbA1c in men and negatively correlated with morning cortisol levels. When all women were analyzed, estradiol levels were negatively correlated with: age, SHBG, testosterone and adipocyte number in visceral adipose tissue. In premenopausal women, estradiol levels were negatively associated with BMI, hip circumference, SHBG and positively correlated with the alteration in HDL (< 50 mg/dL) and IR-HOMA. No significant associations were found between estradiol and hs-CRP.

In conclusion, estradiol levels in men seem to be a marker of adiposity, and in premenopausal women, seem to predict metabolic dysfunction.

POSTER SESSION 2:

Adipokines

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EVIDENCES OF POSSIBLE RELATIONSHIP BETWEEN RETINOL-BINDING PROTEIN 4 CONCENTRATION, FAT MASS AND BONE MINERAL DENSITY**K. Mirzaei**^{1,2}, A. Hossein-Nezhad¹, H. Ansari¹, A. Najmafshar¹, S.A. Keshavarz³¹Endocrinology and Metabolism Research Institute, Tehran University of Medical Sciences, ²Department of Nutrition and Biochemistry, ³School of Public Health and Institute of Public Health Research, Tehran University of Medical Sciences, Tehran, Iran

Retinol-binding protein 4 (RBP4) is an adipokine that associated with insulin resistance and obesity. The association between RBP-4 and bone mineral density (BMD) in obese subjects has not been fully investigated previously. The aim of this study to investigate the association between RBP4, BMD (g/cm²), fat mass, visceral fat and markers of bone metabolism in obese subjects.

Participants were 198 obese subjects with a mean of age, weight, fat mass and visceral fat; 35.25±10.75 years, 82.57±8.83 kg, 30.27±6.66 kg and 8.25±1.45 kg respectively. Serum RBP4 levels were quantified by ELISA and Lumbar spine (L2-L4) and total hip BMD that measured by DEXA. Associations between serum concentrations of RBP4, BMD, serum concentrations of PTH and 25(OH) vitamin D, were investigated.

RBP-4 concentration showed an inverse relationship with *Total hip BMD Z-score* ($r=-0.58$, $P=0.04$). Based on BMD T score the prevalence of osteopenia in lumbar spine and hip were 29.22% and 11.78% respectively. Comparison between osteopenic and healthy groups demonstrated that the higher concentration of RBP4 and PTH and lower concentration of 25(OH) vitamin D in osteopenic obese subject compared with healthy one. There were no significant differences in terms of fat mass and visceral fat between two groups. In conclusion, we observed a negative association between RBP4, and *Total hip BMD Z-score* in obese persons and this association preserved when adjusting for age and body mass index. These results suggest the potential role of RBP4 in bone metabolism and may justify some controversial findings about bone loss discordance in obesity.

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SERUM ADIPONECTIN AND ITS ASSOCIATION WITH LIPID PROFILE AND GLYCEMIA IN A BRAZILIAN GROUP OF BREAST CANCER PATIENTS**A.B. Santana**¹, F.M. Bonini¹, E.C. de Faria¹, M.S.C. Gurgel², F.L.P. Costa¹, R. Andrade¹, S. de Barros-Mazon¹¹Department of Clinical Pathology, ²Department of Gynecology, Faculty of Medical Sciences, State University of Campinas, Campinas - SP, Brazil

Introduction: Some metabolic dysfunction such as hyperglycemia and dyslipidemia has been associated with breast cancer risk. Considering that hypoadiponectinemia, another factor associated with breast cancer, is also a risk factor for metabolic syndrome and a hallmark of obesity, one would expect its association with altered glycemia and lipid profile in overweight/obese breast cancer patients.

Aim: We carried out a comparative study to investigate the association of adiponectin levels with glycemia and lipid profile in postmenopausal overweight/obese and non-obese Brazilian breast cancer patients.

Patients and methods: 73 consented patients, aged 45 to 80 years were classified in two groups: one was composed of non-obese women (BMI ≤ 24.9 kg/m², WC < 88 cm) and the other of overweight (BMI ≥ 25 kg/m²) plus obese women (BMI ≥ 30 kg/m²), with WC ≥ 88 cm. Serum samples were analyzed for

adiponectin, glucose, total cholesterol (t-CHOL) and fractions (LDL-cholesterol and HDL-cholesterol) and for triglycerides. Adiponectin and biochemical parameters were compared by Mann-Whitney test and the correlation analysis was done by Spearman test. The probability value (p) of 0.05 or less was considered significant.

Results: The concentrations of glucose were higher in overweight /obese group and adiponectin concentrations were positively correlated with HDL-cholesterol and inversely with triglycerides and glucose.

Conclusion: These preliminary results allow the inference that among postmenopausal patients bearing breast cancer the relationship of adiponectin with glycemia and lipid profile follows the pattern observed in some components of the metabolic syndrome.

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IS ABDOMINAL HYPERTROPHY AN INDEPENDENT PREDICTOR OF CIRCULATING ADIPOKINE CONCENTRATIONS?**J. Lessard**^{1,2}, A. Michaud^{1,2}, M. Daris³, A. Tchernof^{1,3}¹Centre de Recherche Institut Universitaire Cardiologie et Pneumologie de Québec, ²Université Laval, ³Centre Hospitalier de l'Université Laval, Québec, QC, Canada

Objectives: Adipocyte size is recognized as a critical determinant of adipokine secretion. However, it is unclear whether abdominal adipocyte hypertrophy predicts plasma adipokine concentrations independent of total and abdominal adiposity levels. Our objective was to assess whether abdominal adipocyte hypertrophy is an independent predictor of plasma leptin, adiponectin and IL-6 concentrations.

Methods: 60 women (age:47.3±4.9, BMI:27.2±5.0) undergoing gynaecological surgery were recruited. Body composition and fat distribution were measured by dual energy x-ray absorptiometry and computed tomography respectively. Adipocyte sizing was performed by collagenase digestion of omental and subcutaneous adipose tissue samples obtained during surgery.

Results: Adiponectin concentration was negatively correlated with body weight, BMI, body fat mass, percent body fat, adipose tissue areas and fat cell diameters ($-0.3 \leq r \leq -0.4$, $p < 0.05$). Plasma leptin level was strongly and positively associated with body weight, BMI, body fat mass, percent body fat, adipose tissue areas and adipocyte diameters ($0.81 \leq r \leq 0.92$, $p < 0.0001$). IL-6 concentration was correlated with body weight, BMI, body fat mass, lean body mass and subcutaneous adipose tissue area ($0.41 \leq r \leq 0.53$, $p < 0.05$). In multiple regression models, body fat mass remained as the strongest predictor of plasma leptin level (67.8% explained variance, $p < 0.0001$) and IL-6 concentration was specifically predicted by total, subcutaneous and visceral adipose tissue areas (13.2%, 8.8% and 7.9% variance respectively, $p < 0.05$). Regression models for adiponectin levels revealed that subcutaneous adipocyte diameter was the best predictor of adiponectin level (37.9% explained variance, $p < 0.001$).

Conclusion: For any given adiposity level, abdominal subcutaneous adipocyte hypertrophy is an independent predictor of adiponectin concentration.

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EFFECT OF LEVOTHYROXINE ON ADIPONECTIN AND INSULIN SENSITIVITY IN PATIENTS WITH METABOLIC SYNDROME AND SUBCLINICAL HYPOTHYROIDISM

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Objectives: It is known, that presence of a metabolic syndrome (MS) and subclinical hypothyroidism (SH) repeatedly strengthens processes of formation of atherosclerosis of a vascular wall. At the same time, therapy of statin with levothyroxine replacement therapy (LRT) possess additional anti-inflammatory effects on formation of atherosclerotic process at patients with MS, SH.

Methods: 50 patients with MS, SH are surveyed which have made 2 groups: 1 gr. - 27 pts with MS and SH with undergoing LRT; 2 gr. - 23 pts with MS, SH without LRT. During 16 weeks all pts received atorvastatin (AS) at the same dose - 10 mg. Patients of 1 gr. additionally received LRT - 50-75 mkg/daily.

Results: It was found that levels of adiponectin in 1 gr. increased from 1.8 ± 0.2 $\mu\text{g/ml}$ to 2.3 ± 0.3 $\mu\text{g/ml}$ after 16 weeks of combination therapy (atorvastatin and LRT) and reduction of the HOMA- index from 3.9 ± 0.1 to 2.3 ± 0.1 . Authentic changes in body weight and level of leptin it not been received, but after 16 weeks of treatment has been marked. Increase of adiponectin levels to a comparable degree in patients with MS through mechanisms related to decreases in triglyceride levels and increases in HDL cholesterol levels.

Conclusion: The increase in adiponectin levels and reduction of the insulin resistance may be an additional mechanism for the beneficial effects of combination therapy (atorvastatin and LRT) at the patients with MS, SH.

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EFFECTS OF A ONE YEAR LIFESTYLE MODIFICATION PROGRAM ON TOTAL ADIPONECTIN AND ITS ISOFORMS IN VISCERALLY OBESE, DYSLIPIDEMIC MENM. Côté¹, P. Poirier¹, P. Mauriège¹, J. Bergeron², N. Alméras¹, A. Tremblay¹, I. Lemieux¹, J.-P. Després¹¹CRIUCPQ, ²CHUL Research Center, Quebec, QC, Canada

Objective: To examine the impact of an abdominal fat loss induced by a lifestyle modification program on total-adiponectin and on the distribution of adiponectin isoforms.

Methods: Total-adiponectin and adiponectin isoforms [low-molecular-weight(LMW), middle-molecular-weight(MMW) and high-molecular-weight(HMW)] were determined in 95 visceraally obese men assigned to a personalized nutritional and physical activity management program.

Results: After 1-year, total, MMW, HMW-adiponectin concentrations increased as well as the ratio HMW/total-adiponectin. Percent changes in total and HMW-adiponectin were negatively correlated with %changes in BMI, waist circumference and visceral adipose tissue (VAT) and positively correlated with %changes in HDL-cholesterol. No associations were found between %changes in LMW, MMW and ratio HMW/total-adiponectin and changes in anthropometric and cardiometabolic risk variables. Multivariate analyses revealed that only %changes in total-adiponectin in combination with %changes in VAT predicted the %changes in HDL-cholesterol. When subjects were classified according to the 50th-percentile of VAT %changes and then further classified using the 50th-percentile of total-adiponectin % changes, we found that men with the largest increases in total-adiponectin and with the greatest reduction in VAT were those who had the most substantial increase in HDL-cholesterol. A similar analysis failed to show any contribution of the HMW isoform to the changes in HDL-cholesterol.

Conclusions: We did not find evidence for an added value of HMW over total-

adiponectin in the evaluation of the cardiometabolic effects of a 1-year lifestyle intervention. However, in visceraally obese men, the response of HDL-cholesterol to the intervention program was partly explained by the combination of increased total-adiponectin and reduction in VAT.

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LEPTIN AND ADIPONECTIN CONCENTRATIONS AND ROLE OF MARINE N-3 FATTY ACIDS IN PATIENTS WITH DIABETES TYPE IIS. Sarbolouki¹, M. Djalali¹, A.R. Dorosti¹, M.R. Eshraghian², S.A.R. Ebadi³, S.B. Hashemi⁴¹Department of Nutrition and Biochemistry, ²Department of Statistics and Epidemiology, School of Public Health and Institute of Public Health Research, Tehran University of Medical Sciences, ³Department of Internal Medicine, Faculty of Medicine, Shahid Behshti University of Medical Sciences, ⁴Iranian Tissue Bank Research and Preparation Center, Imam Khomeini Hospital, Tehran University of Medical Sciences, Tehran, Iran

Introduction: Omega-3 fatty acid supplementation could be effective in controlling some complications of diabetes; however, increase in body weight following omega-3 intake and increased leptin secretion from rat adipocytes in the presence of EPA is a controversial issue, but this effect is not clear to induce leptin and adiponectin secretion in patients with diabetes. In this study, we evaluated effects of eicosapentaenoic acid (EPA) alone or with vitamin E on serum leptin, adiponectin, weight, BMI and waist-hip ratio (WHR) in patients with diabetes.

Materials and methods: In this double-blind, placebo-controlled trial on 136 overweight, patient with type II diabetes, that were randomly assigned to either treatment or control groups. Participants received either omega-3 fatty acid or a placebo every day for a period of three months. The patients' serum leptin and adiponectin concentration, weight, BMI and WHR were assessed at the beginning and after 3 months of the supplementation.

Results: 127 patients with a mean BMI of 27.8 ± 1.7 kg/m² completed the study. After intervention fasting leptin and adiponectin increased by 78% and 30.4%, in EPA+E and 37.5% and 37% ($P < 0.001$), respectively in EPA group, compared to other groups. Weight and BMI were significantly lower than the baseline in both groups (EPA+E, 2% and 3.6%, $P < 0.001$; and in EPA, respectively 1% and 1.08%, $P < 0.05$). Changes in WHR was not significant within and between groups.

Conclusion: EPA by itself has a statistically significant effect on serum leptin, adiponectin, weight and BMI in patients with diabetes in comparison with other groups.

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CIRCULATING ADIPOCYTOKINES IN COMORBID PATIENTS WITH ISCHEMIC CARDIOMYOPATHY AND TYPE 2 DIABETES MELLITUST. Kochegura¹, P. Makarevich¹, Y. Parfyonova²

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Objectives: Type 2 diabetes mellitus (DM), insulin resistance and obesity are associated with deviation of several adipocytokines levels, such as reduced adiponectin and increased leptin contents. Studies show that low adiponectin level is associated with increased incidence of myocardial infarction (MI). We studied correlation of DM and adipocytokines levels in patients with ischemic cardiomyopathy (ICM) and attempted to show its correlation with blood glucose, insulin and lipids.

Methods: Adipocytokines level was evaluated in ICM (n=26), ICM+DM patients (n=26) and healthy volunteers (n=28). Plasma adipocytokines were assayed using ELISA for total adiponectin and leptin (R&D Systems).

Results: Plasma leptin level in all groups correlated with BMI (body mass index). We showed a moderate positive correlation between these two parameters ($r=0.6$, $p=0.001$). Maximum leptin levels were found in ICM+DM patients. We also found a correlation between blood leptin and glucose ($r=0.38$, $p=0.02$) and insulin ($r=0.53$, $p=0.001$).

Adiponectin level in plasma of ICM patients was higher than in controls (63.5 [49.5; 83.3] ng/ml vs 40.5 [29.5; 51.3] ng/ml, $p=0.04$) and ICM+DM patients (63.5 [49.5; 83.3] ng/ml vs 50.9 [32.1; 61.5] ng/ml, $p=0.05$). In ICM patients group we found a positive correlation between adiponectin and high density lipoprotein cholesterol levels ($r=0.41$, $p=0.009$).

Conclusion: Obesity in patients with ICM and ICM+DM is associated with high levels of leptin, glucose and insulin. Increased adiponectin in ICM patients can result in cardioprotective effect due to antiatherogenic influence of HDL cholesterol which is found to increase in patients with higher adiponectin.

Childhood Obesity

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EXAMINING THE ROLE OF SCHOOL-BASED PHYSICAL ACTIVITY AND NUTRITION ON BMI CLASSIFICATIONS IN PRIMARY SCHOOL AGED CHILDREN

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Background: The childhood obesity epidemic is well documented. Since children spend approximately half of their waking hours in school, the role of the school day necessitates further investigation as it may play a role in childhood obesity. As such, the role of school-based nutrition and physical activity on BMI classification were examined.

Methods: Pedometer step counts, daily written and photo logs of home-packed school lunches were collected over four days. Total calories, sugar and servings of fruits and vegetables consumed were extrapolated. Comparisons were made between BMI classifications (less than or greater than 25 kg/m²) by grade and by sex.

Results: One hundred sixteen children (50 boys, 66 girls) from grades three to six participated. Step counts were significantly greater in children with acceptable BMI than those of overweight/obese BMI (6631 ± 1736 vs. 5839 ± 1823 ; $p < 0.05$). Boys with acceptable BMI accumulated more step counts than girls of both acceptable and overweight/obese BMI (7290 ± 1919 vs. 6104 ± 1388 and 5322 ± 1549 ; $p < 0.05$). Children in Grades 5 and 6 of overweight/obese BMI accumulated significantly less steps (4533 ± 1420 ; $p < 0.05$) than all other comparison groups. None of the nutrition school-based determinants were significantly different across any BMI groups.

Conclusions: School-based physical activity is a delimiting factor for BMI classification in children while nutrition consumed in school does not differ between BMI classifications. Educators and school administrators should address physical activity opportunities for children, particularly girls and junior grades.

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DEVELOPMENTAL COORDINATION DISORDER, LEG LENGTH TO HEIGHT RATIO, AND CHILDHOOD OBESITY

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Objective: To estimate the relationship between leg length to height ratio (LLHR) and body mass index (BMI) with probable developmental coordination disorder (pDCD) status in children.

Methods: A sample of children from The Physical Health Activity Study Team (PHAST), which followed students in the District School Board of Niagara to monitor their the height, weight, aerobic fitness, and physical activity levels, was used. A total of 1972 children (990 males and 982 females) aged 11 to 13 and had information on standing height, sitting height, weight, BOTMP percentile scores, and physical activity levels.

Results: After adjusting for gender and age, multivariate logistic regression analyses indicated that those in the 2nd, 3rd, 4th, and 5th quintile of LLHR have 0.744 (95% CI: 0.566, 0.995), 0.548 (95% CI: 0.407, 0.739), 0.412 (95% CI: 0.302, 0.561), 0.278 (95% CI: 0.199, 0.388) lower odds of being overweight/obese, respectively (p -value for trends < 0.0001). In addition, compared to typically developing children, those who have pDCD have 2.937 (95% CI: 1.896, 4.550) higher odds of being overweight/obese. There was no interaction between pDCD and quintiles of LLHR (p -value=0.4713). Moreover, on average, every one point increase in physical activity score reduces the odds of being obese/overweight by 0.975 (95% CI: 0.961, 0.989) times.

Conclusions: Both leg length to height ratio and pDCD are associated with childhood obesity. Leg length to height ratio and pDCD can be used as predictors for the development of future programs to prevent cardiovascular disease.

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USING SOCIAL COGNITIVE THEORY TO PREDICT PEDIATRIC OBESITY PREVENTION BEHAVIORS IN MOTHERS OF PRE-SCHOOLERS

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Background: The purpose of this study was to measure five, maternal-mediated social cognitive theory constructs (environment, expectations, emotional coping, self-control, and self-efficacy) for predicting four behavioral determinants (physical activity, fruit and vegetable consumption, sugar-free beverage consumption, and screen time) of pediatric obesity.

Methods: Instrumentation incorporated three stages of data collection and analysis. Stage 1 included evaluation of face and content validity of the instrument by a panel of six experts over two rounds in addition to readability assessment by Flesch-Kincaid ease and grade level tests. Stage 2 evaluated test-retest reliability of the instrument by having the same group of participants ($n=30$) complete the instruments two separate times with four weeks between administrations. Acceptable test-retest coefficient values were set a priori at 0.70. Stage 3 evaluated construct and predictive validity of the instruments through structural equation modeling. Each of the four behavioral determinants of childhood obesity (endogenous variables) was modeled separately according to the five social cognitive theory constructs (exogenous variables). Applying a participant-to-parameter ratio of 5:1, a sample size of 165 was required to build each model.

Results: Each of the four models met the acceptable *a priori* Cronbach's alpha reliability values of > 0.70 . The specified models met the *a priori* goodness-of-fit indices of chi-square value of $p > 0.05$, goodness-of-fit index > 0.90 , root mean square error of approximation < 0.80 , and normed fit index > 0.90 .

Conclusion: Social cognitive theory is a useful framework for measuring and predicting maternal-mediated determinants of pediatric obesity.

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PREVALENCE OF OBESITY AMONG 0 TO 4 YEAR OLD CHILDREN IN THE PUBLIC HEALTH MIRAMICHI REGION (PHMR) OF NEW-BRUNSWICK, CANADA

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Objectives: Determine the prevalence of obesity (PO) among 0 to 4 year old children; Verify whether a relationship exists between sex, age and observed PO; Identify the critical age of early expression of obesity.

Methods: The study of the PO was carried out by retrospective study of 2595 medical records of children born between 2004 and 2009 in PHMR. Information on weight and height of children (each month for the first six months and each three months thereafter) were used to calculate weight/age and weight/height ratios by age group and sex, and estimate PO. WHO criteria was used to define obesity: BMI $> 99.9^{\text{th}}$ percentile.

Results: The study population consisted of 1347 boys (51.9%) and 1244 girls (47.9%). Two cases were rejected due to unknown sex (0.2%). PO varies from 2.7% to 13.2% for boys and 0.9% to 13.0% for girls with averages of 5.7% and 5.1% respectively. At 19 months, the PO among girls exceeds that of boys. Lack of information on file of determinants concerning these cases does not allow us

to explain this behavior. However, the second part of this study (prospective study), currently underway, seeks to identify the determinants of obesity in children of the PHMR. The highest PO was for boys 44 months old (13.6%), while girls the same age had a significantly smaller PO of approximately 8.8%.

Conclusion: The results show higher rates of PO in young child than other studies and they raise the question of the critical age for which intervention is necessary.

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OVERWEIGHT RISK AND OVERWEIGHT AMONG 0 TO 4 YEAR OLD CHILDREN IN THE PUBLIC HEALTH MIRAMICHI REGION (PHMR) NB, CANADA

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Objectives: The study is to highlight the existence and the prevalence of children aged 0 to 4 years living in the Public Health Miramichi Region (PHMR) who are at risk of being overweight (POWR) or who are overweight (POW).

Methods: The study was conducted using data from the medical records of 2595 children born between 2004 and 2009. This data included their sex, age, weight and height. The WHO criteria were used to define the POWR (BMI > 85th percentile) and POW (BMI > 97th percentile).

Results: All of the 2595 children (1347 boys /51.9%, 1244 girls/47.9% and 4 unknown sex/0.2%) were born between 2004 and 2009. The POWR was significantly higher in boys than in girls, ranging from 22.14% to 55.26% in boys compared to 15.34% to 50.91% in girls. There is a significant increase in POWR when boys (55.26%) reach the age of 44 months. In contrast, the increase for girls arrives earlier at the age of 13 months (50.91%). The risk is real for both sexes between the ages of 12 and 44 months. Regarding the rate of children who are overweight (POW), the maximum is reached at 44 months for boys (23.68%) and 19 months for girls (18.93%).

Conclusion: The results show that the data gathered in this study differs from those found in standard growth charts, hence the importance of intervening quickly to help prevent the consequences of childhood obesity in the PHMR.

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WAIST CIRCUMFERENCE MEASURES SIGNIFICANTLY HEALTHIER AMONG MULTIETHNIC INTERVENTION CHILDREN (AS COMPARED TO CONTROLS) IN AN ELEMENTARY SCHOOL-BASED OBESITY PREVENTION INTERVENTION

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Introduction: Childhood onset obesity and related health consequences continue to be major clinical and public health issues. Schools provide an opportunity to implement prevention strategies to large, diverse pediatric audiences. Healthier Options for Public Schoolchildren was an elementary school-based obesity prevention intervention with both nutrition and physical activity components.

Methods: The study was a quasi-experimental school-based obesity prevention intervention targeting ethnically diverse 6-13-year-olds (Kindergarten-6th). Over two school years (August 2004-June 2006), six elementary schools (four intervention; one control, N=3,183, 48% Hispanic) in Florida participated in the study. Waist circumference (WC) data was reported in the Fall of 2005 and Spring of 2006 only and these one year results are reported here.

Results: Among boys, the mean incremental change in WC (measured in centimeters [cm]) increase was significantly less in the intervention (1.35 cm +/- 0.88 [SD]) versus control schools (3.83 cm +/- 0.94) (P< 0.0001). Among girls the mean incremental change in WC increase was significantly less in the intervention (1.20 cm +/- 0.84) versus control schools (4.17cm +/- 0.89) (P< 0.0001). Similarly, waist-to-height ratio results showed the intervention group mean incremental change was significantly less versus the control group for boys (P=0.0002) and girls (P< 0.0001).

Conclusions: Elevated WC is strongly correlated with cardiometabolic disease risk factors and should be monitored in young children as such. School-based obesity prevention interventions show promise in improving weight and potentially cardiometabolic health in elementary-school aged children.

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PREVALENCE AND TREND OF DYSLIPIDEMIA FROM 1996 TO 2006 AMONG NORMAL AND OVERWEIGHT ADOLESCENTS IN TAIWAN

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Objectives: We have set out to evaluate the trend of dyslipidemia from 1996 to 2006 and evaluate its relationship with weight status among adolescents in Taiwan.

Methods: Two cross-sectional surveys were conducted in 1996 and 2006 among junior high school adolescents in Taipei. Anthropometric and lipid profile data were measured using standard methods. The cutoffs for abnormal lipid profiles were determined using guidelines from the American Heart Association.

Results: From 1996 to 2006, the prevalence of dyslipidemia and hypercholesterolemia increased from 13.0% to 22.3% and 6.2% to 13.8%, respectively. The prevalence of hypertriglyceridemia and low HDL dyslipidemia increased from 2.96% to 4.27% and 6.5% to 11.6%, however only in boys. When compared to normal weight subjects, overweight boys and girls faced a 2.0 and 1.6-fold increased risk of dyslipidemia in the 2006 study, respectively. The risk of hypercholesterolemia and hypertriglyceridemia for overweight boys compared to normal was 1.3 and 12 fold, respectively. The increased risk of low HDL-C dyslipidemia for overweight subjects was 2.6 and 7.2 fold in boys and girls, respectively. In 2006, each unit increment of BMI was associated with 29%, 13%, and 13% risk of hypertriglyceridemia, low HDL-C dyslipidemia and dyslipidemia for boys, and 25% risk of low HDL-C dyslipidemia in girls.

Conclusions: These surveys indicate the prevalence of dyslipidemia have increased significantly for both boys and girls in both normal weight and overweight adolescents. Weight management and early screening of dyslipidemia in adolescents will be key to prevent dyslipidemia and related comorbidities.

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DIETARY HABITS HAVE A STRONGER EFFECT ON BODY FAT THAN BMI AMONG SAUDI CHILDREN

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In many industrialized countries as well as in countries in economic transition, childhood overweight and obesity are increasing in alarming rates and reaching epidemic proportions. This study was carried to find out the correlation between food habits and both of body fat and BMI. We selected 861 children (242 girl and 619 boy); they were randomly chosen from 34 primary school in Qassim, their age ranged from 6-10 yrs old. Anthropometric measurements including body weight, height, and BMI were measured. Body fat was determined by Futrex device (Futrex 6100 A/ZL for children). Also, children's mothers were requested to fill a questionnaire for collecting data about social status, medical history, food habits and consumption pattern. The study showed that body fat has stronger positive and significant correlation with frequency of fast foods, drinking carbonated beverages, frequency of carbonated beverages, and amount of carbonated beverages ($r = 0.11, 16, 16, 13$ respectively and $P < 0.05$), while BMI has positive significant and non convincing correlations with eating meals at regular times, eat vegetable salad, eat fast foods, and eat at restaurants ($r = 0.09, 0.08, 0.09$, and 0.09 and $P < 0.05$). In conclusion body fat is more affected by dietary habits and food consumption pattern while BMI has no clear correlation with food habits, the study recommend the use of body fat measure as an indicator for obesity among children.

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OBESITY IN PRE-SCHOOL AGED CHILDREN IN JOS, NIGERIA

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Background: Hitherto, the developing countries nutritional challenges have largely centred on undernutrition as a result of poverty, ignorance and high burden of infectious disease, and even more so with the HIV pandemic. With rapid urbanization a new trend in nutritional disorders is emerging.

Methodology: Pre-school aged children, 3-5years, attending preparatory school in Jos, Nigeria where selected using multi-stage sampling method. Height was measured to the nearest 0.1cm, weight to the nearest 0.1kg, mid-upper arm circumference (MUAC) to the nearest 0.1mm. Body mass index for age, weight-for-age, and MUAC z-scores was derived using the world health organization (WHO) Anthro version 3.2.2 software.

Result: In all, 244 subjects were recruited. Mean weight for 3yr olds was $15.5\text{kg} \pm 2.0$ (CI 15.1-15.9), 4yrs old $17.5\text{kg} \pm 2.6$ (CI 17-18.1), and 5yr olds 20.4 ± 2.4 . Males weighed more, $p = 0.0017$ particularly among the 4yr olds, $p = 0.0024$. 2.9% had BMI for age z score $> +2$ and 3.3% with z score < -2 . In males, BMIFA z score was 3.6% ($> +2$ z score). In females 2.3% had z scores $> +2$ and 4.6% with z score < -2 ($p = 0.045$). 2.5% had MUAC for age z-score $> +2$ with none having z score < -2 . Males, 3.6% for z score $> +2$ and females 1.5% had z score $> +2$. Linear regression model showed a positive relation between MUAC and BMI.

Conclusion: Obesity existed (2.9%) alongside under-nutrition (thinness) in the studied population. This is a wake up call for all healthcare policy makers and professionals.

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PREVALENCE OF DOUBLE-BURDEN MALNUTRITION AND EFFECT OF OVER-NUTRITION ON BLOOD PRESSURE AMONG ADOLESCENTS JOS NIGERIA

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Childhood/adolescent obesity is a major public health problem associated with a number of comorbidities.

Objective: To identify the current burden of this problem and stimulate community level actions for prevention.

Methods: Cross-sectional study of 344 adolescents recruited during a new session clinical examinations from a private school. Blood pressure, weight and height were measure using standard techniques; and body mass index (BMI) calculated using the formula $\text{weight}(\text{kg})/\text{height}(\text{m}^2)$.

Result: Mean age of the subjects was 13.02 ± 2.2 yrs. Females were 171 (49.7%). Mean

BMI for females was 28.4 ± 11.9 (range 12.9 - 63.7) and for males, 23.8 ± 9.3 (range 12.1 - 37.8).

Using BMI-for-age (bmifa) 43.3% of females were obese, while 31.2% of males were obese. Highest number of obesity was seen in 17year old females (8/9, 88.9%), and 12years old males, (15/38, 83%). Obesity was least in the 14year olds of both gender (16% in female and 5% in males).

Using bmifa, 8% (29/344) of the subjects were thin, of which 68.9% (20/29) were males. Thinness was more in the 14year old males (35%, 7/20).

Mean systolic blood pressure was 104.4 ± 11.1 (range 70-140). Fifteen (4.3%) had SBP above cut off points for age, height percentile and sex. Of this, 20% (3/15) occurred in overweight subjects, and 0.06% (1/15) in obese subject. Significant difference in SBP existed with increasing age ($p = 0.000$) and gender ($p = 0.04$).

Conclusion: This study highlights the important emerging trend of obesity in adolescent in our environment and its association with high blood pressure.

Diabetes

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METABOLIC PROFILE INFLUENCE ON HbA1c IN DIAGNOSING DIABETES MELLITUS

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Aims: To evaluate the optimum HbA1c cut-off for lowering number of people with undiagnosed T2DM.

Materials and methods: Population-based screening for glucose metabolism impairments among 661 adults in Moscow Country was conducted in 2009. HbA1c was determined in 39 subjects with GMI. T2DM was diagnosed according to WHO 1999/2006 criteria. Receiver operating characteristics (ROC) analysis was performed to assess best predictive cut-off HbA1c for diagnosing T2DM.

Results: Based on OGTT and HbA1c, 15% and 28% people had T2DM. Area under ROC curve (AUROC) was 0.727 (95% CI 0.490-0.964, $p=0.080$, sensitivity 66.7%, specificity 78.8%) using ADA-recommended HbA1c cut-off $\geq 6.5\%$. Best predictive HbA1c in this cohort was 6.3% (AUROC 0.750, $p=0.054$, sensitivity 83%, specificity 67%). 33.0% of undiagnosed T2DM had HbA1c levels $< 6.5\%$ (CI 95%: 0%; 71%) and 17% of people with T2DM had HbA1c levels $< 6.3\%$. Subjects with false negative HbA1c were predominantly with normal BMI (21.8 ± 1.6 vs 42.9 ± 7.8 , $p=0.025$), false positives were predominantly with higher BMI (31.3 ± 3.6 vs 26.5 ± 5.9 , $p=0.009$). In normal weight (BMI 18-25) individuals optimal HbA1c cut-point for detecting T2DM was $\geq 6.0\%$ (AUROC 0.750, sensitivity 50%, specificity 100%). Relative risk (RR) of T2DM was 7 (95% CI 1.18 - 42.9) with HbA1c values 6.0-6.4%, than those with < 6.0 in normal weight individuals.

Conclusion: Choosing the HbA1c strategy rather than the OGTT strategy leads to diagnose more diabetes, although the consistency of both diagnostic criteria is low. The optimal HbA1c cut-point to detect T2DM was lower than HbA1c of 6.5% in normal weight individuals.

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SIGNIFICANT DIFFERENTIAL METABOLIC EFFECTS OF ROSUVASTATIN AND PRAVASTATIN IN HYPERCHOLESTEROLEMIC PATIENTS

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Objects: We hypothesized that rosuvastatin and pravastatin may have differential metabolic effects in hypercholesterolemic patients.

Methods: This was a randomized, single-blind, placebo-controlled, parallel study. Age, gender, and body mass index were matched. Fifty-four patients were given placebo, rosuvastatin 10 mg, or pravastatin 40 mg, respectively once daily for 2 months.

Results: Rosuvastatin and pravastatin therapy significantly changed lipoprotein levels and improved flow-mediated dilation after 2 months when compared with baseline ($P < 0.001$) or placebo treatment ($P < 0.001$ by ANOVA). Rosuvastatin therapy significantly increased insulin levels (mean % changes; 28%, $P=0.005$) and HbA1c levels (1%, $P=0.038$) and decreased plasma adiponectin levels (9%, $P=0.010$) and insulin sensitivity as assessed by QUICKI (2%, $P=0.007$) when compared with baseline. By contrast, pravastatin therapy significantly decreased insulin levels (8%, $P=0.042$) and HbA1c levels (1%, $P=0.019$) but significantly increased plasma adiponectin levels (36%, $P=0.006$) and insulin sensitivity (3%, $P=0.005$) when compared with baseline. In addition, these effects of rosuvastatin were significant when compared with pravastatin ($P=0.002$ for

insulin levels by ANOVA on Ranks, $P=0.003$ for adiponectin, $P=0.003$ for QUICKI, and $P=0.010$ for HbA1c by ANOVA).

Conclusions: Despite causing comparable changes in lipoprotein and endothelium-dependent dilation, rosuvastatin and pravastatin therapy had differential metabolic effects in hypercholesterolemic patients that may be clinically relevant.

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A COMPARATIVE STUDY ON LIPID PROFILES AND SERUM VISFATIN CONCENTRATIONS IN PATIENTS WITH TYPE II DIABETES AND HEALTHY INDIVIDUALS

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Background: Increase in adipose tissue, particularly visceral adipose, is completely relying on metabolic syndrome. Visfatin is a new adipocytokine which is largely secreted by visceral adipose tissue and similar effects with insulin. It acts synergistically with insulin and activation of insulin receptors without any change or competition with it.

Methods: This was a comparative-descriptive study on 45 to 65-year-old women with type II diabetes who had at least passed five years after onset of it and had no disease complications who merely had consumed glucose-lowering drugs. The blood of the women, with the same age range, was taken and the required factors were collected. The subjects CPR was +++ and higher were excluded from the study.

Results: In this study, there was no significant difference between the two groups in terms of BMI, WC, HC, WHR and age. Mean age of the patients in diabetic and healthy group was 53.6 ± 4.3 and 51.7 ± 5 . Average level Visfatin in both diabetic and healthy groups were 4.3 ± 1.06 and 3.15 ± 0.74 ($p < 0.001$). Average LDL level in two groups were 100.7 ± 24.3 and 111.5 ± 5.1 ($p = 0.013$). Average HDL level in two groups were 42.2 ± 8.4 and 35.1 ± 4.8 ($p < 0.001$). Average cholesterol level in two groups were 196.8 ± 50.4 and 178.6 ± 11 ($p = 0.043$).

Conclusion: The comparison of these two groups indicated that the value of cholesterol, HDL, TG and Visfatin was higher in diabetic group than healthy group while LDL value was lower.

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PULSE WAVE VELOCITY IN NORMAL NON DIABETIC FILIPINO SUBJECTS WITH POSITIVE FAMILY HISTORY OF DIABETES

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Purpose: To show that Pulse Wave Velocity (PWV) is adversely affected in non diabetic Filipino subjects with positive family history (FH) of diabetes.

Method: PWV determined indirectly with BPULS apparatus using left external carotid and left dorsalis pedis arteries as "central" and "peripheral" points respectively. Pulses of said arteries picked up by infrared sensors and recorded simultaneously with single lead ECG. Time delay between two pulses measured. Shorter time delay or faster PWV indicates decreased arterial elasticity.

Materials: 223 Filipino subjects studied. Males - 100; Females - 123; Age - 17 - 75 yrs. Subjects with hypertension and increased waist circumference excluded from study (total - 125). Of remaining 98, 34 had positive FH of diabetes 64 had none.

Results: Average PWV Time of subjects with positive FH of diabetes - 0.135 sec. (0.041 - 0.184 sec.); subjects without history - 0.140 sec. (0.09 - 0.209).

Subjects with positive FH of diabetes have significantly lower PWV Time. $p < 0.005$.

Discussion: Decreased arterial elasticity closely associated with endothelial dysfunction - the initial change in the arterial wall leading to atherosclerosis. Stiffened arterial wall is therefore a high risk factor in the development of cardiovascular disease (CVD). Our study shows that subjects with positive FH of diabetes have decreased arterial elasticity so they are not only at high risk to inherit the diabetes of their parents but are also more prone to develop CVD.

Conclusion: Subjects with positive FH of diabetes have decreased arterial elasticity making them high risks to develop CVD.

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THE CLINICAL SIGNIFICANCE OF BLOOD PRESSURE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS TO DELAY THE PROGRESSION OF ARTERIAL AGING

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Objective: Arterial stiffness, as assessed by the baPWV is associated with arterial aging and has been consistently linked to cardiovascular disease. The factors of reducing the progression of brachial-ankle pulse wave velocity (baPWV), an index of arterial stiffness in the patients with type 2 diabetes mellitus (DM) have not yet been fully established.

Methods: Among 478 patients who underwent two times baPWV measurements (i.e. at baseline and one year later) in the Medical Department of St. Vincent's Hospital from November 2009 to June 2011, 339 subjects with type 2 DM over the age of 50 (M:F = 148:191; mean age, 62.1 ± 7.7 years) who were diagnosed without peripheral artery disease were enrolled in this study.

Results: The baPWV at baseline increased in a linear manner along with the age ($\beta = 22.8$, $t = 10.855$, $p < 0.0001$, $R^2 = 0.258$). After one-year follow-up, baPWV had progressed (Δ baPWV $\geq 0\%$, relative to baseline) in 194 (57.2%) of 341 subjects, whereas it had not progressed (Δ baPWV $< 0\%$) in the remaining 145 subjects (42.8%). In multivariate logistic regression analysis, the change of systolic blood pressure (Δ SBP) [Odds Ratio = 1.053, 95% confidence interval (CI) 1.018-1.090, $p = 0.003$] and the change of diastolic blood pressure (Δ DBP) (Odds Ratio = 1.065, 95% CI 1.011-1.121, $p = 0.017$) were associated with the progression of baPWV during follow-up.

Conclusions: We noted that the variation of blood pressure was associated with the progression of the vascular aging of the large- to middle-sized arteries in patients with type 2 DM.

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LIRAGLUTIDE IMPROVED MARKERS OF INSULIN RESISTANCE, ENDOTHELIAL DYSFUNCTION, INFLAMMATION AND OXIDATIVE STRESS IN METFORMIN-TREATED UNCONTROLLED OBESE TYPE 2 DIABETIC PATIENTS

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Background: Excessive abdominal fat is related with insulin resistance, inflammation, endothelial dysfunction and oxidative stress in obese patients with type 2 diabetes mellitus (T2DM). Treatment with liraglutide (a GLP-1 receptor agonist) reduces visceral fat, but its effect on the mentioned conditions is largely unknown. We studied the effect of adding liraglutide to obese T2DM patients uncontrolled with metformin, on the following circulating markers: Adiponectin, Tumor Necrosis Factor- α (TNF- α), C-Reactive Protein (CRP), Asymmetric

Dimethylarginine (ADMA), and 8-iso-prostaglandin F₂ α (8-PGF₂ α), and the association with changes in body mass index (BMI) and waist circumference (WC).

Methods: 19 T2DM patients with HbA_{1c} $> 7.0\%$ and both global (BMI > 30 kg/m²) and central (WC $> 94/102$ cm, women/men) obesity, on treatment with diet, exercise and metformin, received additional treatment with s.c. liraglutide once a day, initially with 0.6 mg, increased to 1.2 mg after 2 weeks if the tolerance was adequate. BMI, WC, systolic blood pressure (SBP), HbA_{1c}, Adiponectin, TNF- α , CRP, ADMA and 8-PGF₂ α were measured at baseline and after 10 weeks.

Results: Two patients withdrew due to nausea/vomiting. In the 17 patients that completed the protocol BMI, WC, SBP, HbA_{1c}, TNF- α , CRP, ADMA and 8-PGF₂ α were reduced (by 4.6%, 8.7%, 4.2%, 14.4%, 11.9%, 38.1%, 26.6% and 33.3%, $p < 0.05$) and Adiponectin was increased (by 23.3%, $p = 0.021$). In a multivariate analysis, changes in the studied markers were significantly correlated with reduction of WC but not of BMI.

Conclusions: Liraglutide improved markers of insulin resistance, inflammation, endothelial dysfunction and oxidative stress in these patients, in association with reduction in WC.

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MECHANISMS OF RAPID IMPROVEMENT IN GLUCOSE HOMEOSTASIS AFTER BILIOPANCREATIC DIVERSION IN SUBJECTS WITH TYPE 2 DIABETES

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The biliopancreatic diversion with duodenal switch (BPD/DS) is an efficient treatment for severe obesity and type 2 diabetes (T2D) with 95% resolution occurring 3-5 days after the surgery. Four major anti-diabetic mechanisms could be involved: increase in incretins plasma level, caloric restriction, reduced dietary lipid absorption and/or improvement in lipid intolerance. We recruited 9 T2D and 9 non-TD2 obese subjects undergoing BPD/DS. Blood samplings were taken at fasting and every 30 minutes during 3 hours after a standard meal test performed before and 3, 4 and 5 days following surgery to measure glucose, insulin, non-esterified fatty acids (NEFA), triglycerides (TG) and incretins. The postprandial glycemic excursion was improved as soon as day 3 after the surgery and continued to improve up to day 5. Insulin levels were significantly reduced after surgery to the same extent in both groups indicating similar improvement in insulin sensitivity. NEFA were similar and increased significantly in both groups. TG levels were higher in T2D participants and declined only in the latter group after surgery. GIP levels were similar in both groups but declined more in diabetic participants. Total caloric and fat intake were similar in diabetic and non-diabetic participants but was profoundly reduced after surgery. We performed a matched caloric restriction for 3 days in T2D subjects and found similar improvement in plasma glucose levels.

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THE HYPOGLYCEMIC EFFECT OF NTU-SLR-A, ISOLATED FROM HERBAL MEDICINE, IN NORMAL AND DIABETIC MICE

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Objective: This study explores the hypoglycemic effects of NTU-SLR-A, a terpene derivative isolated from herbal medicine in cell and mice.

Methods: For these studies, we employed mouse mitogenic C2C12 and hepatocellular carcinoma (Hep3B) cells. Also, ICR mice were divided into three groups, with streptozotocin-induced (T1DM), diet-induced diabetic (T2DM), and normal mice. Mice in each group were treated with vehicle, NTU-SLR-A, or other active agents.

Results: In this study, NTU-SLR-A was shown to increase the glycogen content or decrease the plasma glucose concentrations in a dose-dependent manner in cell or mice. The hypoglycemic effects of NTU-SLR-A in normal and T2DM mice were associated with the increases of the plasma insulin levels; whereas the insulin levels remained unchanged in T1DM mice. NTU-SLR-A not only attenuated the elevation of plasma glucose induced by an intraperitoneal glucose tolerance test, but also increased glycogen synthesis. Moreover, the elevated protein level of phosphoenolpyruvate carboxykinase (PEPCK) due to the dysfunction of insulin signal pathway in the liver of T1DM mice were reversed after the treatments with NTU-SLR-A twice a day for seven days.

Conclusions: Our study proved that the mechanisms contributing to the hypoglycemic effects of NTU-SLR-A include the insulin-dependent and the insulin-independent pathways. NTU-SLR-A was shown to increase the glucose utilization in peripheral tissues, to reduce the hepatic gluconeogenesis, or to activate the insulin pathway and therefore contribute to the lowering of plasma glucose. Thus, this compound may shed light on the treatments of diabetic disorders.

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PREDICTION OF MACROVASCULAR COMPLICATIONS ACCORDING TO THE CAROTID INTIMA-MEDIA THICKNESS IN PATIENTS WITH TYPE 2 DIABETES

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We investigated to find out the value of age-normalized carotid intima-media thickness (IMT) which can serve as the best index for predicting future macrovascular complications in type 2 diabetic patients.

The subjects were 1,080 type 2 diabetic patients without history of macrovascular complications whose carotid IMT were measured. Occurrences of macrovascular complications were investigated using an electronic medical record system and paperweight phone-call. If the event were confirmed, we collected relevant hospital data.

For the average 37 months, 885 patients were identified as having cardiovascular disease. Major adverse cardiovascular events (MACE), myocardial infarction, stroke, cardiovascular death, and all-cause mortality have occurred in 68, 13, 29, 10, and 61 patients. Considering the hazard ratio of MACE and number of the patients, the cutoff point of the mean and maximal carotid IMT to foresee any possible occurrence of MACE was designated at 0.850 mm and 1.000 mm. According to the cut off point of the mean carotid IMT, the hazard ratios of MACE, myocardial infarction, stroke, and all-cause mortality were 2.31 (CI: 1.36-3.94), 6.19 (CI: 1.28-30.06), 2.85 (CI: 1.06-7.65) and 2.34 (CI: 1.30-4.22). Also according to that of the maximal carotid IMT, the hazard ratios of MACE and myocardial infarction were 2.05 (CI: 1.23-3.44) and 4.19 (CI: 1.08-16.22).

This study shows that the carotid IMT is useful test to preestimate a possible occurrence of macrovascular complications in type 2 diabetic patients. It allows us to predict that a patient with a mean IMT higher than 0.850mm is at the high risk of having macrovascular complications in the future.

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PREVALENCE OF DYSLIPEDEMIA AND ABDOMINAL OBESITY AMONG PERSONS WITH DIABETES IN THE NORTHEAST OF THAILAND

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Objective: We assessed the prevalence of dyslipidemia and abdominal obesity among adults with type 2 diabetes mellitus (T2DM) living in the Northeast of Thailand.

Methods: A total of 320 subjects with type 2 diabetes were selected by systematic random sampling from the 2011 lipid survey of people with diabetes conducted by the Krasung District Public Health Office, Buriram Province, Thailand. Fasting blood samples were taken for the determination of total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C). Body mass indices (BMIs) were calculated, and waist circumferences (WCs) measured.

Results: The mean (SD) age of the diabetes subjects was 59.5 (10.9) years, and 78% were female. The prevalence of abnormal TG (≥ 150 mg/dl) was 43%, and that of high TC (≥ 200 mg/dl) was 22%. LDL-C > 100 mg/dL was found in 37% of the subjects whereas low HDL-C (< 40 mg/dL in men and < 50 mg/dL in women) was found in 63%. The subjects categorized as overweight (BMI 23.0 - 24.9 kg/m²) and obese (BMI ≥ 25.0 kg/m²) were 20.6% and 32.4%, respectively. About half (52%) of the subjects showed abdominal obesity (WC > 90 cm in men or > 80 cm in women). With normal WC individuals as a reference, individuals with abdominal obesity had an odds ratio of 2.02 (95% CI 1.26 to 3.25) for hypertriglyceridemia.

Conclusion: High prevalence rates of hypertriglyceridemia, low HDL-C and abdominal obesity were identified among T2DM patients; therefore intensified efforts in the treatment for these parameters are warranted.

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SARDINE PROTEINS IMPROVE GLYCAEMIA, HbA1c, GLUCOSE INTOLERANCE AND REDOX STATUS, IN TYPE 2 DIABETIC RATS

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Objectives: This study was undertaken to investigate the effect of purified sardine proteins on glycaemia and redox status, in type 2 diabetic rats induced with high fat (HF, 30% lipids) diet associated with intraperitoneal injection of streptozotocine.

Methods: Diabetic rats (n=24) weighing 320 ± 25 g were assigned into 4 groups and were fed casein (CAS) or sardine proteins (SP) combined with 30% or 5% lipids, for 4 weeks. Plasma glucose, glycated hemoglobin (HbA1c), insulin, thiobarbituric reactive substances (TBARS), hydroperoxides and antioxidant enzyme activities (SOD, CAT, GPx, Gred) were determined. Glucose tolerance test was performed.

Results: The results showed that glycemia decreased along the experiment with SP combined with HF diet or not. HbA1c and plasma glucose decreased whereas plasma insulin was 1.65-fold higher in SP vs CAS. In HF-SP vs HF-CAS, HbA1c and plasma glucose were decreased. The glucose tolerance test revealed that glucose intolerance was higher in HF-CAS vs CAS, from T0 to T120 min, while with HF-SP vs HF-CAS was lower. In SP vs CAS, TBARS,

carbonyls and hydroperoxides were reduced whereas SOD, CAT, GPx and Gred were increased. In HF-SP vs HF-CAS, TBARS, carbonyls and hydroperoxides decreased while SOD, CAT, GPx and Gred increased significantly. HF diet with CAS or SP increased TBARS and hydroperoxides and decreased SOD, CAT and GPx compared to 5% lipids diet.

Conclusion: SP attenuate hyperglycemia, intolerance glucose HbA1c and oxidative stress induced by diabetes. Thus, sardine proteins might be effective to improve some disorders induced by diabetes.

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BILIOPANCREATIC DIVERSION SURGERY FOR TYPE 2 DIABETES MELLITUS: ACUTE EFFECT ON INSULIN SENSITIVITY, GLUCOSE HOMEOSTASIS AND ABDOMINAL OBESITY

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Objectives: Bariatric and metabolic surgeries are associated with improvement in type 2 diabetes mellitus (T2DM). We examined the acute effect of biliopancreatic diversion (BPD) procedure on insulin sensitivity, glucose homeostasis and abdominal obesity.

Methods: Twenty grade I and II obese type 2 diabetic premenopausal women underwent BPD. None were on insulin therapy. Evaluations were taken before and one month after surgery. The waist circumference and sagittal abdominal diameter were assessed. Subcutaneous and visceral abdominal fat were determined by ultrasound. The dynamic tests applied to assess insulin sensitivity included the oral glucose tolerance test [index: oral glucose insulin sensitivity index (OGIS)] and the hyperglycemic clamp test [indexes: glucose infusion rate (GIR), insulin sensitivity index (ISI)]. Homeostasis model assessment insulin resistance index (HOMA-IR) and glycated hemoglobin were also determined.

Results: Compared to baseline, there was a postoperative reduction, respectively, in waist circumference (117.5 ± 11.0 vs 107.1 ± 10.3 cm), sagittal abdominal diameter (26.2 ± 3.1 / 23.4 ± 3.0 cm), subcutaneous abdominal fat (38.1 ± 9.7 / 35.5 ± 7.9 mm) and visceral abdominal fat (71.4 ± 26.8 / 54.1 ± 17.4 mm); $p < 0.05$ for all. Impaired insulin sensitivity ameliorated significantly postoperatively: HOMA-IR (4.5 ± 2.9 / 1.6 ± 1.3), OGIS (300.8 ± 60.9 / 412.1 ± 76.6), GIR (1.9 ± 0.8 / 3.5 ± 1.6 mg.kg.min) and ISI (8.7 ± 7.3 / 19.7 ± 16.5 mg.kg.min/ uU/L); $p < 0.01$ for all. Fasting glucose (135.9 ± 39.5 / 99.8 ± 19.6 mg/dl; $p < 0.01$) and glycated hemoglobin (7.2 ± 1.3 / 6.1 ± 1.1 %; $p < 0.01$) improved after surgery.

Conclusions: BPD procedure caused acute reduction in abdominal obesity, mainly in the visceral fat; significant improvement in impaired insulin sensitivity assessed by different methods; and amelioration on the glycemic control of T2DM in women with grade I and II obesity.

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EFFECT OF METFORMIN ON THE INCIDENCE OF TYPE 2 DIABETES IN CHILDREN WITH IMPAIRED GLUCOSE INTOLERANCE

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Objective: To determine whether metformin and diet and exercise interventions in children with IGT may reduce T2D incidence.

Material and methods: The sample included 536 children. IGT was found in 79 (14.8%). The study evaluated the effects of an iso-caloric diet and an exercise program with metformin 850 mg or placebo twice daily. Follow-up evaluations were conducted at 1-year intervals over a 5-year period. The primary outcome was incident T2D. An adjusted parametric model was used; cumulative risk by survival analyses included Cox's proportional hazard analysis and Breslow test. Significance was $p < 0.05$.

Results: 52 patients participated (23 boys and 29 girls), mean age 11.9 ± 2.6 years; 75% were obese (>95 BMI percentile), the rest were overweight; 1.8% displayed hypertension. 28 individuals were randomized to metformin treatment and 24 to diet and exercise. Baseline characteristics, except BMI (higher in metformin group) were similar between groups. After 5 years of follow-up, of 39 obese and 13 overweight children, 4 had normal weight, 23 were overweight and 25 were obese. The percent weight change was significantly higher in the metformin group. The cumulative incidence of diabetes was 32.7%: 7 (25%) in metformin group and 10 (41.7%) in diet and exercise. Conversion to NGT occurred in 28 of 52 (53.87%): 21 (75%) with metformin, vs 7 (29%) with diet and exercise ($p < 0.05$).

Conclusions: In pediatric patients the reversion from IGT to NGT was almost 3 times as frequent in the metformin group. Metformin reduced the incidence of T2D, regardless of BMI.

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OBESITY, GLUCOSE AND SWEETENERS: A DFT ANALYSIS OF ELECTRONIC STRUCTURES, REACTIVITY AND 'GLYCATING' PROPERTIES

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Objectives: Obesity is a major risk factor for many serious chronic diseases. Many experts claim that sugar addiction is a major factor in obesity. It was also observed that obesity prevalence increases with the increase of the consumption of non-nutritive sweeteners! But one aspect that has not been studied is the ability of sweeteners to bind to proteins as do glucose and then to generate AGEs. In this study, we examine the electronic properties and molecular conformations of a series of 15 commercialized sweeteners. We calculate the energy profiles of the reaction paths (sweeteners-Lysine) leading to Schiff bases then to Amadori products.

Methods: Calculations were carried out by the PM6 and DFT methods using the B3LYP (6-311G**) functional. All stationary points were fully characterized (true minima or transition state) and confirmed by the IRC procedure. Reactivity is discussed in terms of global indices and functions of Fukui, using the NPA analysis.

Results: We show that all sweeteners are very hard acids (HSAB theory). The

calculations of the energetic profiles of the reaction paths [sweetener-lysine] show that:

- The glycation of lysine by glucose is almost immediate in basic medium and is highly exothermic. With fructose, aspartame and Neotams the reaction is much easier in acid medium. A similar calculation shows that the interaction Steviol-lysine is unlikely to occur.

Conclusions: The interaction [sweetener-Lysine] is the same as that occurs with glucose and then leads, inevitably, to AGEs, but with the steviol, Maillard reaction is unlikely to occur.

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PATIENTS WITH TYPE 2 DIABETES AND WEIGHT REDUCTION NATIONAL PROGRAM IN SLOVENIA

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Introduction: Intentional weight reduction decreases incidence of cardiovascular disease. It is especially important in patients with diabetes, who are at increased cardiovascular risk. In Slovenia, family practitioners are obliged to perform a 5-year screening examination of the population for the evaluation of cardiovascular risk factors, including obesity. The aim of this report was to evaluate outcomes of the national weight management program on the basis of results from one-centre.

Methods: Overweight and obese subjects participated in a 12-week lifestyle weight loss program consisting of group-based workshops and group physical activity. Weight and waist circumference changes during the program and 3 months after the program were analyzed with the paired and independent samples t-test, as appropriate.

Results: From 173 subjects included (women N=139; age 59±11 years; BMI 33.0±5.0 kg/m²; waist circumference 105±12 cm) 72% completed the program. In all subjects, weight and waist circumference decreased for 3.5±3.4 kg and 5±4 cm, respectively. In a subgroup of subjects with diabetes type 2 (N=33; age 60±9 years; BMI 35.3±5.2 kg/m²; waist circumference 109±11 cm) weight and waist circumference decreased significantly less than in patients without diabetes (2.3±3.4 vs. 3.8±3.3 kg and 3±3 vs. 5±5 cm, respectively, for both P<0.05). HbA_{1c} decreased from 7.1±1.2 to 6.6±0.8%, p=0.04.

Conclusions: During this 12 week program, weight loss and reduction of waist circumference was less successful in patients with type 2 diabetes compared to subjects without diabetes. However, metabolic control has improved significantly. The long-term efficacy of the national weight reduction program remains to be evaluated.

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LIPID ACCUMULATION PRODUCT INDEX (LAP) IS ASSOCIATED WITH TYPE-2 DIABETES MELLITUS AMONG WOMEN WITH HYPERTENSION

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Objective: To evaluate the independent association between abdominal obesity detected by Lipid Accumulation Product Index (LAP) and type 2 diabetes mellitus among subjects with hypertension.

Methods: A cross-sectional study was carried out among subjects aged 18 to 83 years, with hypertension (blood pressure ≥ 140/90 mmHg, average of six measurements by an automatic device, or use of antihypertensive drugs). Measurements of weight (kg) and height (m) were performed in order to calculate Body Mass Index (BMI, kg/m²). Waist circumference (WC, cm) plus triglycerides levels (mmol/l) were used to calculate Lipid Accumulation Product Index (LAP, cm.mmol/l). Type-2 diabetes mellitus was diagnosed by fasting blood glucose ≥ 126 mg/dL, glycated hemoglobin ≥ 6.5%, or use of anti-diabetic drugs. ANCOVA and modified Poisson Regression were used for multivariate analysis.

Results: In total, 427 participants aged 57.8 ± 11.9 years were enrolled, 66% women, 33% with type-2 diabetes, with on average of 154.2 ± 25.5 systolic BP and 89.2 ± 14.9 mmHg of diastolic BP, BMI 30.5 ± 5.7 kg/m², and (ln)LAP 4.1 ± 0.7 cm.mmol/l. Diabetic subjects were older and had higher BMI (31.3 ± 5.4 vs. 30.1 ± 5.9, P = 0.03), and (ln)LAP (4.3 ± 0.6 and 3.9 ± 0.6, P < 0.001). Multivariate analysis showed that higher LAP quartiles were associated with increased risk of type 2 diabetes among women (RR 2.9 95%CI 1.7 - 5.1), independently of age and BMI, but there was no association among men.

Conclusions: LAP Index is independently associated with type-2 diabetes mellitus among women with hypertension.

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A HEALTH PROMOTION PROGRAM TO PREVENT PROBLEMS RELATED TO DIABETIC FOOT (HPPDF) IN BRAZIL

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Diabetes, a diet related non-communicable chronic disease affects approximately 12% of Brazilian population. The aim of this study was to determine the impact of a HPPDF focused to diabetic foot patients on glycaemia levels and the prevention of diabetic foot problems. This is a pre-test-post-test study design of unique cohort. From the total population of 143 diabetic patients who attended to the Basic Unit of Health (BUH) of Ladario County, Mato Grosso do Sul, Brazil during 2004, 30 of them had the complications of the diabetic foot and participated in the HPPDF. This was developed three times per week by a multiprofessional team (physicians, nutritionists, psychologists, pedicurists and physical trainers) between February (pre-test) and December 2004 with three post-test periods, May (post-test1), September (post-test2) and December (post-test3). During the pre-test and the post-test periods, glycaemia levels and the status of diabetic foot were assessed. Data analysis included Wilcoxon-Mann-Whitney test and Pearson correlation coefficients and were processed by means of the Statistical Analysis System (SAS). Results showed that glycaemia significantly decreased from 234,7 mg/dl to 196,7 mg/dl between the pre-test and the post-test3 periods (p < 0.001), respectively. Younger patients had a greater HPPDF acceptance as well as health improving since an inversely and significantly correlation was observed between age and glycaemia levels. The quality of the diabetic foot improved between pre-test and post-test3 periods. These findings point out the significant impact of HPPDF on glycaemia and the status of diabetic foot and may be useful as a model for diabetes prevention.

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FLOW MEDIATED DILATATION (FMD) OF BRACHIAL ARTERY IN GESTATIONAL DIABETES MELLITUS (GDM)V. Jain¹, P. Singh¹, A. Bahl², S. Chopra¹¹OBGYN, ²Cardiology, Post Graduate Institute of Medical Education & Research, Chandigarh, India

Objectives: Diabetes mellitus is associated with endothelial dysfunction. However the relationship between endothelial function and GDM is controversial. This study was performed to evaluate endothelial function in GDM and to correlate it with severity of hyperglycemia.

Methods: In a cross sectional prospective study 40 pregnant women with GDM and 41 gestation matched normoglycemic control pregnant women were studied. GDM was defined as glucose intolerance with onset or first recognition during pregnancy. Smokers, women with prepregnancy diabetes, hypertension, collagen vascular disease, heart disease, multiple pregnancy or fetal death at the time of recruitment were excluded. Assessment of endothelial function was done by measuring FMD of brachial artery. Three cases were excluded due to persistent hyperglycemia at 6 weeks postpartum.

Results: The mean age and parity of cases and controls was comparable. The mean FMD in GDM group & in normoglycemic group was $15.93 \pm 11.21\%$ and $18.10 \pm 7.62\%$ respectively. The difference was not statistically significant ($p=0.32$). We analysed the relation of FMD with the degree of hyperglycemia. The mean FMD was $18.51 \pm 10.4\%$ in GDM patients who required medical nutrition therapy (MNT) and $10.56 \pm 11.2\%$ in patients who needed both MNT and insulin for optimal sugar control and the difference was statistically significant ($p=0.042$). The difference of mean FMD between normoglycemic group and in patients who needed MNT and insulin was also statistically significant ($p=0.01$).

Conclusions: We conclude that women with GDM who have mild hyperglycemia show no endothelial dysfunction. Women requiring insulin for blood sugar control have evidence of endothelial dysfunction.

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PROTECTIVE EFFECTS OF A NOVEL SALMON PEPTIDE HYDROLYSATE ON A MOUSE MODEL OF OBESITY-LINKED INSULIN RESISTANCE AND ATHEROSCLEROSISG. Chevrier¹, P. Mitchell¹, P. St-Pierre¹, K. Bellmann¹, G. Pilon¹, A. Doyen², F. Hasan³, C. Roblet², L. Bazinet², T. Gill³, A. Marette¹¹Centre de Recherche de l'Institut Universitaire de Cardiologie et de Pneumologie de Québec, ²Département des Sciences des Aliments et de Nutrition, Université Laval, Québec, QC, ³Department of Process Engineering and Applied Science, Dalhousie University, Halifax, NS, Canada

Introduction: Previously our laboratory has found that fish proteins reduce inflammatory mediators in visceral fat and that a salmon protein hydrolysate also influenced fat mass and insulin sensitivity in high fat high sucrose (HFHS)-fed obese rats. Given these results, we screened in-vitro the bioactivity of peptidic fractions isolated from salmon fillets after hydrolytic digestion, purification and separation by sizes using ultrafiltration. Our experiments have shown that fractionated peptides of < 1 kDa improve insulin-stimulated glucose uptake in L6 myocytes, decrease glucose production of FAO hepatocytes and reduce inflammation in macrophages.

Objective: Investigate the potential effects of salmon peptides (SPs) on the metabolic syndrome in a mouse model of obesity-linked insulin resistance and atherosclerosis and determine the molecular mechanisms.

Results: LDLr^{-/-}/ApoB^{100/100} mice were fed either a standard chow diet or a HFHS diet. Other groups of HFHS-fed mice were also supplemented with either 10% SPs, an omega-3-rich fish oil, or both for 6 months. We have found that

adding SPs to the HFHS diet significantly reduced fasting hyperinsulinemia and glucose intolerance after only 3 months of treatment. When used in combination both SPs and fish oil almost fully protected HFHS-fed animals from glucose intolerance, without any effects on weight gain or adipose tissue mass. Pyruvate tolerance tests also revealed that SPs reduced gluconeogenesis, suggesting that the liver is a major site of SPs' action.

Conclusion: These results will help us conduct a clinical study to see if these SPs improve biochemical features of the metabolic syndrome in humans.

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CONSUMPTION OF VITAMIN D- OR VITAMIN D-CALCIUM-FORTIFIED YOGURT DRINK IMPROVED GLYCEMIC CONTROL AND LOWERED WAIST CIRCUMFERENCE IN TYPE 2 DIABETICS

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Background: Low serum concentrations of 25-hydroxyvitamin D and high waist circumference (WC) have been associated with impaired glucose tolerance and diabetes.

Objective: This study aimed to compare the effects of daily intake of vitamin D- or calcium-D-fortified yogurt drink on glycemic status in subjects with type 2 diabetes (T2DM).

Design: Ninety diabetic subjects were randomly allocated to three groups to receive either plain yogurt drink (PY; containing no vitamin D and 150mg calcium /250mL), vitamin D-fortified (DY; containing 500 IU vitamin D and 150mg calcium/250mL) or vitamin D- calcium-fortified (DCY; containing 500 IU vitamin D and 250mg calcium/250mL) yogurt drinks twice a day for 12 weeks. Fasting serum glucose (FSG), glycated hemoglobin (HbA1c), homeostasis model assessment of insulin resistance (HOMA-IR), serum lipid profile and percent of fat mass (FM) were assessed at the baseline and after intervention period.

Results: In both DY and DCY groups mean serum 25(OH)D3 improved ($+32.8 \pm 28.4$ and $+28.8 \pm 16.1$ nmol/L, respectively, for both $p < 0.001$) but those of FSG (-12.9 ± 33.7 mg/dL, $p=0.015$ and -9.6 ± 46.9 mg/dL, $p=0.035$, respectively) and HbA1c ($-0.4 \pm 1.2\%$, $p < 0.001$, and $-0.4 \pm 1.9\%$, $p < 0.001$, respectively), HOMA-IR (-0.6 ± 1.4 , $p=0.001$, and -0.6 ± 3.2 , $p < 0.001$, respectively), WC (-3.6 ± 2.7 and -2.9 ± 3.3 , respectively, for both $p < 0.001$) and body mass index (-0.9 ± 0.6 kg/m², $p < 0.001$, and -0.4 ± 0.7 kg/m², $p=0.005$, respectively) decreased significantly compared to PY group.

Conclusions: Daily intake of vitamin D-fortified yogurt drink, either with or without added calcium, improved glycemic status and lowered WC in T2DM patients.

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WAIST CIRCUMFERENCE IS MORE IMPORTANT THAN BODY MASS INDEX FOR PATIENTS WITH TYPE 2 DIABETES

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*Internal Medicine, St Olavs Hospital, Orkdal Hospital, Orkanger, Norway***Objectives:** To evaluate whether waist circumference or Body Mass Index was most important for patients with type 2 diabetes.**Methods:** Cohort study of 190 patients (116 men and 74 women) intensively treated at a hospital. The audit evaluated changes in medical treatment metabolic risk factors, and general and abdominal obesity, and evaluated the cut-off limits of ATP-III and IDF.**Results:** The patients underwent intensified treatment with statins, metformin, and insulin and number of antihypertensive drugs ($p \leq 0.001$). At end of the study, 161 patients were abdominally obese according to the cut-off limits of ATP-III, and were treated with a higher dose of statins ($p=0.006$) than 29 abdominally lean patients, and they had also higher triglycerides ($p=0.002$), and lower HDL cholesterol ($p = 0.002$). The cut-off limits of IDF gave no statistical significance. In multiple linear regression analysis, waist circumference - but not BMI and follow-up- was significantly associated with number of antihypertensive drugs ($r^2=0.08$) and the levels of HDL cholesterol ($r^2=0.08$). In linear regression analysis, the dose of insulin (IU/kg/d) was associated with waist circumference ($p=0.001$, $r^2=0.05$).**Conclusions:** It is clinically relevant to include regular measurements of waist circumference in the follow-up of patients with type 2 diabetes.

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PREVALENCE OF GLUCOSE METABOLISM DISORDERS IN PEOPLE WITH INCREASED RISK OF T2DM IN MOSCOW COUNTY

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*Endocrinology, Moscow Regional Research Clinical Institute named by M.F. Vladimirovskiy, Moscow, Russia***Aim:** Aim of study was to estimate real prevalence of T2DM and early glucose metabolism disorders in people with increased T2DM risk.**Methods:** The FINDRISK questionnaire was used to identify persons with increased T2DM risk. Risk score value 12 was selected as cut-off point. Study included 1,018 people, 86.5%(881) women and 13.5%(137) men. Weight, height, waist circumference were measured. Diagnosis of T2D, IGT, IFG was made based on a standard oral glucose tolerance test (OGTT). Relative risk of T2D, impaired glucose tolerance (IGT), impaired fasting glucose (IFG) is calculated with varying class of obesity and waist level by Cox-regression analysis.**Results:** T2D was detected in 24.4% of subjects, with 4.2%T2D identified at the 2-hour point in OGTT. Early disturbances of glucose metabolism were recorded in 27.1%, including: 16.3% with IGT, 8.5% with IFG, and 2.3% with IGT + IFG. 59.7% were obese ($BMI > 30 \text{ kg/m}^2$). 92.4% shown abdominal obesity (waist $> 94 \text{ cm}$ in males and $> 80 \text{ cm}$ in females). Mean value of waist in T2D group was $103.0 \pm 13.7 \text{ cm}$ in women and $103.4 \pm 11.6 \text{ cm}$ in men, with IGT - $99.8 \pm 13.1/105.8 \pm 14.6 \text{ cm}$, respectively, with IFG- $99.9 \pm 14.1/99.4 \pm 10.2 \text{ cm}$, IGT+IFG- $106.5 \pm 13.9/96.5 \pm 3.5 \text{ cm}$.Risk of T2D was increased in women with obesity class 1 ($RR=2 [1.03-3.9]$, $p=0.04$) compared with normal BMI, and risk of T2D was greater in women with waist $\geq 80 \text{ cm}$ ($RR=2.8[1.06-7.7]$, $p=0.04$). In men, marked pattern was not detected.**Conclusion:** High prevalence of T2D (24.4%) and early glucose abnormality

(27.1%) was detected in individuals with increased T2DM risk. FINDRISK scale useful screening tool to detect these people.

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DEFECTIVE INTESTINAL AMPK SIGNALING UNDER CONDITIONS OF INSULIN RESISTANCE AND DIABETES CONDITIONSS. Spahis¹, A. Bendjoudi Ouadda², E. Harmel², M. Elchebly², M. Laville³, E. Delvin², E. Ziv⁴, E. Levy²¹Nutrition, ²Montreal University, Montreal, QC, Canada, ³Université de Lyon-1, Lyon, France, ⁴Hadassah Hospital, Jerusalem, Israel**Introduction:** Emerging evidence supports the link between insulin resistance (IR), type 2 diabetes (T2D) and aberrant intestinal lipid and lipoprotein metabolism. However, the abnormalities in intestinal signalling pathways were not systematically investigated in these metabolic disorders.**Research design and methods:** The aims of the present study were to determine whether aberrant AMP-activated protein kinase (AMPK) status and insulin signalling pathways characterize the intestine of IR and T2D *Psamomys obesus* sand rat, an animal model of metabolic syndrome.**Results:** Concomitant with their enhanced lipogenesis as well as their higher efficiency in *de novo* TG synthesis, apolipoprotein B-48 biogenesis and TG-rich lipoprotein assembly in conditions of IR and T2D, intestinal tissues exhibited:(a) a downregulation of AMPK signalling pathway essentially typified by a decrease in AMPK α -Thr172 phosphorylation, AMPK α protein mass and gene expression of the isoforms AMPK α 1 and AMPK α 2;

(b) a reduction in acetyl CoA carboxylase (ACC)-ser79 phosphorylation without alterations in total ACC expression, suggesting a rise in activity of both ACC1 (responsible for fatty acids (FA) synthesis) and ACC2 (responsible for the inhibition of FA oxidation);

(c) a decline in the gene and protein expression of carnitine palmitoyl transferase-1, supporting an inhibition of β -oxidation;(d) a trend of lessening of a second signalling pathway portrayed by the diminution of the Akt and glycogen synthetase kinase-3 β phosphorylation; and

(e) an activation of the stress-responsive p38-mitogen-activated protein kinase exemplified by its augmented phosphorylation.

Conclusions: These data emphasize the role of AMPK and insulin signalling defects in intestinal lipoprotein overproduction.

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FOXO1 IMPAIRS WHEREAS STATIN PROTECTS ENDOTHELIAL FUNCTION IN DIABETES THROUGH RECIPROCAL REGULATION OF KRÜPPEL-LIKE FACTOR 2

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Endothelial dysfunction is an initial critical factor in the pathogenesis of diabetic vascular complications. Krüppel-like factor 2 (KLF2) is implicated as a key molecule maintaining endothelial function. We investigated the role of a forkhead transcription factor, FOXO1, and HMG-CoA reductase inhibitor in KLF2 regulation in hyperglycemic conditions. FOXO1 expression was increased by 190% ($p < 0.05$), whereas KLF2 and eNOS expression were decreased by 60% ($p < 0.05$) and by 70% ($p < 0.05$) in human umbilical vein endothelial cells incubated in 30 mM glucose for 24 h, all of which were completely reversed by FOXO1 siRNA. Atorvastatin (1 mM) inhibited FOXO1 not only by increasing phosphorylation by 170% ($p < 0.05$) but also by degrading FOXO1 protein by 70% ($p < 0.05$). Atorvastatin also restored KLF2 expression suppressed in high glucose conditions similar to the control level ($92.3 \pm 3.4\%$, $p = 0.1$), which was totally blocked by co-incubation with mevalonate. A chromatin immunoprecipitation analysis demonstrated that glucose and atorvastatin reciprocally regulated KLF2 at transcription level by modulating binding of FOXO1 to its promoter regions at -609 and -754bp. The endothelium-dependent vasodilation with acetylcholine were significantly decreased in OLETF rats ($23.4 \pm 22.8\%$ of the LETO rats, $p < 0.05$), which was significantly improved both by atorvastatin ($67.3 \pm 0.5\%$, $p < 0.05$) and by adenovirus-mediated overexpression of KLF2 ($61.4 \pm 15.4\%$, $p < 0.05$). In conclusion, KLF2 suppression by FOXO1 may be a plausible mechanism of diabetic endothelial dysfunction. The findings of this study suggest implication of intensive statin treatment in preventing diabetic vascular dysfunction.

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POSTPRANDIAL METABOLISM IN OBESE WOMEN WITH TYPE 2 DIABETES DURING RAMADAN FASTING

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Background: Postprandial hyperlipidemia is a common feature in type 2 diabetes; our purpose was to assess the effect of diet composition during Ramadan fasting on anthropometric and postprandial lipemia among 125 patients with type 2 diabetes.

Methods: The study was scheduled over two periods: before (T0) and during (T1) Ramadan 2011, in Hassani Abdelkader University Hospital, Ex Gambetta Diabetes Centre in Sidi-Bel-Abbes city, and a private cabinet in Oran city. 125 patients diagnosed with type 2 diabetes were selected. The nutrient intake was evaluated by means of a 3-days food record during the two periods. Anthropometric parameters: weight, height, waist and hip circumferences, body mass index (BMI), and waist-hip ratio (WHR) were recorded. The measure of fasting and prandial serum glucose, lipid components (total cholesterol, triglycerides, HDL-cholesterol, LDL-cholesterol) were used to present the biological results.

Results: A significant weight loss (-2.45% $p < 0.0001$) correlated to the decrease of meal frequency was found. Unbalanced values have been noticed with an increase of postprandial glycemia (10.8% : $p < 0.0001$) and lipid disorders marked by a decrease of HDL-c rate (< 40 mg/dL) and an increase in TC (> 250 mg/dL), LDL-C (> 130 mg/dL) and triglycerides (> 300 mg/dL). A high consumption of fat food and a lack of medication monitoring adapted to the needs of patients who want to fast safely can be the main cause of such disorder.

Conclusion: Ramadan fasting will constitute a real challenge for patients with

type 2 diabetes who want to fast particularly if appropriate instructions concerning diet and medication regimen are missed.

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THE OUTCOMES OF DIABETES MELLITUS TYPE 2 IN THE PATIENTS WITH OBESITY AT THE BACKGROUND OF SOMATIC PATHOLOGY

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2361 case records and autopsy protocols for 2009-2011 were analyzed for the research. In 1131 (47,8%) case records there was a diagnose of diabetes mellitus. The average age came to $69,37 \pm 8,0$ years of age, the males and females ratio was 753 (66,4%) and 376 (33,5%) accordingly.

The causes of death were the following: acute cerebrovascular accident - 167 (14,7%), acute myocardial infarction - 176 (15,5%), postinfarction cardiosclerosis - 124 (10,9%), state after the acute cerebrovascular accident - 119 (10,5%), chronic obstructive pulmonary disease - 109 (9,6%), 1st degree chronic renal insufficiency - 106 (9,3%), thromboembolia of the pulmonary artery - 133 (11,7%), hepatic cirrhosis - 74 (6,5%), cancer - 62 (5,4%), others - 58 (5,1%).

Obesity of various degrees was diagnosed by the clinicians in 563 (47,7%) persons.

In all the cases there was a large range of comorbidity: hypertension - 976 (86,4%), arterial sclerotic vascular disease - 815 (72,1%), BPH - 276 (73,4%), myoma (muscular tumor) - 317 (42,0%), ICD - 237 (20,9%), gallstone disease - 426 (37,7%), nodular goiter - 289 (25,5%).

Hypoglycemia was first diagnosed in hospital in 372 (33,2%) persons, the average indices at admittance being $13,1 \pm 2,5$ mmol/L (from 8,4 up to 17,3 mmol/L).

The antihyperglycemic therapy was received by 842 (74,5%) persons, from whom 524 (62,2%) received the therapy in the tablet form. It should be pointed out that during the evaluation of the glycaemic profile at the background of the pre-arranged therapy, the glycemia indices were higher: 11,1 mmol/L were detected in 348 (66,4%) cases. At the same time the reasons for hospitalization in 93 (8,3%) persons were hypoglycemic states with the symptoms of cerebral edema, the glycemia level being from 1,3 up to 2,9 mmol/L. Among them 56 (60,1%) had received maximum doses of Sulfonylurea preparations, in 28 (30,6%) cases hypoglycemia was associated with renal insufficiency (failure).

Thus, the presented data show the signification of the associated disturbances observed in the patients with diabetes mellitus in the frame of hyper and hypoglycemia, namely: with arterial sclerotic vascular disease, arterial hypertension. Besides, a very important indication is the choice of the diabetes mellitus therapy method for the optimum glycemia control, considering the age and the clinical course of the disease.

Ectopic Fat

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INDEPENDENT AND COMBINED EFFECTS OF ABDOMINAL MUSCLE ATTENUATION AND VISCERAL ADIPOSE TISSUE TO CARDIOMETABOLIC RISK: THE INSPIRE ME IAA STUDY

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Computed tomography (CT) has been used to assess ectopic fat depots including visceral adipose tissue (VAT), and muscle attenuation (MA, associated with intra-muscular fat); however, the specific contributions of each depot to cardiometabolic risk (CMR) are not well characterized.

Objective: To quantify the respective associations of abdominal MA and VAT with CMR.

Methods: Physicians recruited 4355 (48.1% women) patients from 29 countries for the INSPIRE ME IAA study. MA and VAT were determined using CT and plasma parameters were measured in the fasting state and after an oral glucose tolerance test (OGTT). Multivariable linear regression analyses were performed separately by sex including MA, age, race, BMI, and the recruiting physician's specialty.

Results: MA was modestly and negatively associated with total cholesterol (men), HDL-cholesterol (men), apolipoprotein A1 (men), fasting glucose (men), 120 min post-OGTT glucose (men), HbA1c (men), adiponectin (men and women), C-reactive protein (men), and plasminogen activator inhibitor-1 (PAI-1, men) while it was positively associated with fasting insulin (women), and 30min post-OGTT insulin (men and women). After inclusion of VAT and MA*VAT interaction, MA was significantly associated with adiponectin (men and women), C-reactive protein (men), and PAI-1 (men) for any given level of VAT. There was a significant MA*VAT interaction for triglycerides (men and women), HDL-cholesterol (men and women), LDL-cholesterol (men), fasting insulin (men and women), 30min post-OGTT insulin (men), apolipoprotein B (women), and PAI-1 (men and women).

Conclusion: MA was associated with CMR factors independently and in association with VAT and may represent an additional marker of ectopic fat.

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THE IMPACT OF THE METABOLIC SYNDROME ON GENES DIFFERENTIALLY EXPRESSED IN EPICARDIAL ADIPOSE TISSUE

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Background: The thickness of epicardial adipose tissue (EAT) has been associated with the metabolic syndrome (MetS) and coronary artery disease (CAD). We recently demonstrated that the transcriptional profiles of EAT and mediastinal fat (MAT) explanted from men with CAD were similar compared to subcutaneous fat.

Objective: Compare genes differentially expressed in EAT in patients with and without the MetS.

Methods: Using qPCR, we measured the expression of four genes (ADORA1, ADORA2A, LIPE, and PTGDS) in three adipose depots of 25 men undergoing coronary artery bypass grafting surgeries. Eleven patients had the MetS defined by the ATPIII criteria. T-tests were used to assess significance differences in gene expression between groups.

Results: The expression of ADORA1 was significantly higher in EAT compared to MAT in both patients with and without the MetS, but the magnitude was much greater in patients with the MetS (fold change = 4.7 vs 2.6, respectively). The expression levels of PTGDS were significantly higher in EAT compared to MAT, but only in patients with the MetS. PTGDS levels were significantly lower in MAT of patients with the MetS. None of the genes were differentially expressed in EAT of patients with and without the MetS.

Conclusion: The MetS amplified the differences observed in gene expression between EAT and MAT. The increased expression of ADORA1 and PTGDS is likely to be cardioprotective against the atherogenic metabolic changes observed in the MetS. Larger cohort of patients are needed to understand the impact of the MetS on the biology of EAT.

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INCREASED ADIPOSE TISSUE IL-1 β IN OBESITY MAY LIMIT ADIPOSE TISSUE EXPANDABILITY AND CONTRIBUTE TO ECTOPIC HEPATIC FAT ACCUMULATION

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Introduction: Adipose tissue increases expression and secretion of IL-1 β in obesity, but the role of this cytokine in adipose tissue adaptation to obesity, and the association with ectopic fat accumulation hasn't been well characterized.

Methods: IL-1 β -knockout(KO) mice on high fat diet were used, and body composition and hepatic ectopic fat assessed by CT and histology.

Results: KO mice gained weight similarly to wild-type(WT) mice in response to high fat diet(HFF). However, they remained insulin sensitive on HFF, as indicated by fasting insulin and HOMA-IR which were not statistically different from chow-fed WT mice, and ITT markedly improved compared to HFF-WT. CT scans revealed that KO mice had expanded adipose tissue mass in both intra-abdominal and sub-cutaneous tissues. At 16 weeks epididymal fat pad was nearly 2-fold larger in KO mice ($p < 0.01$) compared to WT. Conversely, liver weight was ~30% decreased in the KO mice ($p < 0.001$) compared to WT on HFF. Higher adipose mass correlated in HFF with lower liver mass ($p = -0.773$, $p < 0.001$). Histological examination (H&E and oil-red-O staining) of the liver revealed markedly attenuated lipid accumulation in the KO compared to WT mice. Adipose tissue histology revealed markedly diminished adipose tissue inflammation, which corresponded to ~75% decrease in F4/80 mRNA levels, and decreased IL-6 and TNF α expression. Adipocyte size distribution was similar between KO and WT mice on HFF.

Conclusions: Increased IL-1 β in adipose tissue in HFF contributes to adipose tissue inflammation, limits adipose tissue expandability by adipocyte hyperplasia, thereby potentially contributing to hepatic ectopic fat accumulation.

Epidemiology

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THE HEALTH OF MEN IN NORTHERN BRITISH COLUMBIA: RESULTS OF A CARDIOVASCULAR RISK FACTOR SCREENING SURVEY

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Type 2 diabetes (T2D) is a well-established risk factor for cardiovascular disease (CVD). Higher rates of T2D are attributable to unhealthy lifestyle factors and a number of clinical and metabolic risk factors. There is paucity of research which investigated the association of lifestyle risk factors and metabolic markers amongst adult men in northern British Columbia. Using a face-to-face interview questionnaire, we assessed the relationships between age, body mass index (BMI), and a number of CVD risk factors in a convenience sample of 123 eligible men recruited from communities across northern BC in the winter of 2011. In regards to the metabolic risk factors measured through screening blood tests (lipid profiles; blood glucose) responses to the questionnaire were dichotomized into high and low risk categories. These dichotomized variables were subsequently used to determine if significant associations existed with each of the age category variable and a standard BMI categorical variable. There were significant linear relationships between the categorical BMI variable and a number of metabolic risk factors, as well as smoking history. Age did not show the same significant relationship with CVD risk factors. Our findings provide compelling evidence that northern BC men possess a number of clinical, metabolic, and lifestyle risk factors associated with high CV risk. Future studies should examine other sociodemographic variables including occupation status, education attainment level, and ethnicity, and other psychosocial determinants including knowledge, attitudes, and perceptions (KAP) related to T2D and CV risk profile in adult men working and living in northern BC, Canada.

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OVERWEIGHT, OBESITY AND ABDOMINAL OBESITY (AO): DETERMINANTS FOR AN IMPORTANT PUBLIC HEALTH PROBLEM IN COLOMBIA, 2010

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Excess weight is an important public health problem. The 2010 National Nutrition Survey in Colombia was used to identify key food and nutrition problems. Descriptive cross-sectional study. Population: adults 18-64 years (n=89,164) with weight, height and abdominal circumference; subsample with food frequency, IPAQ and weight self-perception. The prevalence (95%CI) of excess weight was 51.2% (50.2%-51.7%); 34.6% (34.2%-35.1%) overweight (BMI ≥25 and < 30 mg/kg²) and 16.5% (16.2%-16.9%) obesity (BMI ≥30 kg/m²); higher in women (55.2%) (54.6%-55.8%) than men (45.6%) (44.9%-46.4%), especially for obesity (20.1% (19.7%-20.6%) and 11.5% (11.2%-12%); all socioeconomic levels >45%, higher in urban areas. The prevalence of AO was 39.8% (39.1%-40.6%) men and 62% (61.4%-62.65%) women, increasing with age, from 58-64 years 60.7% (58.5-62.8) men and 84.9% (83.4%-86.3%) women; higher in men with more education and women with less education; higher in urban men and rural women. With normal BMI and AO: 7.6% men (6.5%-7.5%) and 25.6% (24.8%-26.4%) women. Few met physical activity guidelines during leisure time: normal BMI 22.2% (20.9%-23.6%) and obese 16.3% (14.6%-18.2%), and with AO 17.0% (15.9%-18.2%) versus without AO 23.4% (22%-24.8%); low daily intake of fruit 62.5% (60.7-39.3), vegetables (34.5%) (32.8%-36.2%) and high intake of energy-dense food. Given the magnitude of the AO problem, measuring weight circumference (ideally in early ages) should become regular clinical practice and together with the analyses of feeding practices, regular physical activity, weight self-perception, with the

analysis of physical activity guide appropriate preventive or therapeutic measures to reduce the risk of cardiovascular diseases.

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THE POSITIVE ASSOCIATION BETWEEN OBESITY AND URETHORRHEA AMONG IRANIAN PEOPLE

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Objective: Our goal was to explore the association between obesity and urethrorrhea in Iranian men and women.

Methods: Data from the National Health Survey considered in this investigation. A logistic model included 21634 people between 20 and 65 years of age. Height and weight were actually measured rather than self-reported.

Results: After adjustment for age, sex, economic index, workforce status, education level, marital status, place of residence, smoking status, systolic blood pressure and cholesterol, urethrorrhea odds ratio was 1.16(95% CI: 1.02-1.32) for obese people.

Conclusion: A fundamental policy shift is required to widen responsibility for the prevention of obesity in Iran.

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PREVALENCE OF OVERWEIGHT AND OBESITY AND THEIR CORRELATES- A CROSS SECTIONAL STUDY AMONG MEDICAL STUDENTS OF NORTH INDIA

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Background: Obesity is perhaps the most prevalent form of malnutrition. it is a risk factor for number of non-communicable diseases. It is a matter of time before same mortality rate will be seen in developing countries as those prevailing 30 years ago in industrialized countries.

Objectives:

1. To find out the prevalence of overweight and obesity.
2. To determine its correlates.

Materials and methods: In this cross-sectional study, participants were medical students from 3rd to 5th semesters. Total number of participants was 240 comprising of 150 male and 90 female students. A pretested questionnaire was given to them and complete the details, followed by examination. BMI was used to categorize the students into underweight, normal, overweight and obese groups as per the recent WHO classification. A BMI for Overweight was taken at the level of 25 Kg/m² and above respectively.

Results: Among males, 30 (20.0%) were overweight while 9 (6.0%) were found to be obese and 6 (4.0%) were underweight. Among 90 girls, 21 (23.3%) were overweight, 10 (11.1%) obese and (7.7%) were found to be underweight. High calorie intake was noticed in 45 (30.0%) male students and lack of physical activity was observed in 25 (16.7%) male students. Among female students, high calorie intake and lack of physical activity was found in 31 (34.4%) and 20 (22.2%) students respectively.

Conclusions: These findings have enormous significance for developing societies emerging from poverty and continuing to bear the double burden of both form of malnutrition in their populations.

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ASSOCIATIONS BETWEEN DIETARY PATTERNS AND CARDIOVASCULAR DISEASE RISK FACTORS AMONG THE INUIT OF NUNAVIK

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Objective: To assess the association between major dietary patterns and cardiovascular disease (CVD) risk factors, including plasma lipids, inflammatory markers, glycemic markers and blood pressure among Inuit from Nunavik.

Methods: A total of 666 Inuit residents from Nunavik, Quebec, aged 18 years and older were included in the analyses. Clinical measurements and plasma samples were collected in 2004 aboard the Canadian Coast Guard Ship Amundsen, which visited the fourteen villages of Nunavik. Participants also completed an interviewer-administered food frequency questionnaire (FFQ).

Results: Principal component analysis of the FFQ data revealed three major dietary patterns in the Inuit population, namely the traditional, western and healthy patterns. Multiple linear regression analysis adjusting for sex, age, waist circumference, and other potential confounders showed that the traditional pattern was positively associated with total cholesterol (C; $\beta = 0.13$), LDL-C ($\beta = 0.11$), apolipoprotein-B100 ($\beta = 0.02$) and HDL-C ($\beta = 0.04$) concentrations as well as with LDL peak particle size ($\beta = 0.40$), but inversely associated with diastolic blood pressure ($\beta = -0.87$; all $P \leq 0.02$). The western dietary pattern was associated only with diastolic blood pressure ($\beta = 0.84$, $P < 0.05$), while the healthy pattern was inversely associated with interleukin-6 concentrations ($\beta = -0.03$, $P < 0.05$). None of the dietary patterns was associated with glycemic markers.

Conclusions: Identified patterns reflect the dietary transition occurring among the Inuit population of Nunavik. Our data indicate that major dietary patterns are independently associated with key CVD risk factors in the Inuit population.

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CHANGES IN ABDOMINAL OBESITY AND CARDIOMETABOLIC RISK IN RURAL AND URBAN BLACK ADULTS IN SOUTH AFRICA

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Objective: To investigate changes in waist circumference (WC) over 5 years in rural and urban black South African adults, predictors of change in WC and associated cardiometabolic risk.

Methods: Longitudinal study (848 women and 432 men), aged >35 years at baseline. Anthropometric measurements were done in 2005 and 2010. Dietary intakes were measured by food frequency questionnaire and physical activity by Baecke questionnaire. Fasting blood glucose, lipids and C-reactive protein (CRP) were measured.

Results: At baseline 50.9% of women and 6.6% of men were abdominally obese, based on cut-off points of WC >80 cm for women and >94 cm for men. Abdominal obesity increased significantly over 5 years to 56.8% of women and 7.8% of men. Effect sizes for the increases were small, with the greatest increase in WC in urban women. There were no significant differences between body composition of rural and urban men at baseline or after 5 years of follow-up, whereas urban women had a significantly greater WC than rural women at baseline and after 5 years. Urban participants had significantly higher energy and fat intakes than rural ones. The most significant predictor of change in WC in women was fat intake. Abdominally obese participants had significantly higher

fasting blood glucose, CRP, total and LDL-cholesterol and significantly lower HDL-cholesterol than those with normal WC.

Conclusion: Abdominal obesity is high among African women, it increases further with age and high fat intakes, concomitant with a decline in physical activity in rural areas and is associated with metabolic risk.

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OBESITY: A PARADOX IN THE MORTALITY OF THE ELDERLY?

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Objectives: The effect of body mass index (BMI) on mortality amongst the elderly may be different from younger adults. Thus, this study aims to determine the relationship between BMI and its 5-year changes on all-cause and cause-specific mortality in the elderly.

Methods: During 1992-4, the BMES recruited 3654 residents aged ≥ 49 years in Sydney, Australia. Of these, 2335 (75% of survivors) returned for follow-up at 5 years. We included 2216 subjects who had completed both baseline and 5-year examinations. We initially examined the relationship between baseline BMI and mortality nonparametrically using cubic spline. Cox and competing risk models were subsequently used to assess associations of baseline BMI and its 5-year changes with all-cause and cause-specific mortality.

Results: Amongst subjects without pre-existing disease such as hypertension, diabetes, angina, AMI and stroke, the relationship between baseline BMI and all-cause mortality was U-shaped, with the underweight and obese groups being predisposed to have a greater risk of death. In particular, obesity was associated with CHD (hazard ratio (HR) 2.78, 95% confidence interval (CI): 1.34-5.77) and cancer (HR 1.90, 95% CI: 1.08-3.12) deaths in this subgroup. For subjects with pre-existing disease, however, an inverse relationship was observed, with the underweight having a lower risk of death. Five-year reductions in BMI were associated with subsequent all-cause, cancer and CHD deaths.

Conclusions: Obesity affects all-cause, CHD and cancer mortality only amongst the elderly without pre-existing disease. Besides, BMI loss, a marker of disease severity was associated with major causes of mortality in the elderly.

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UTILITY OF THE NICE OBESITY GUIDELINES: ASSOCIATIONS WITH CARDIOVASCULAR DISEASE RISK FACTORS IN AN ENGLISH POPULATION

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Objectives: To explore the utility of combined categories of body mass index (BMI) and waist circumference (WC) in association with coronary heart disease (CHD) risk factors.

Design: Health Survey for England (HSE) 2006 is a national cross-sectional survey of men and women in England.

Participants: Over 5000 non-institutionalised adults aged ≥ 35 years

Main outcome measures: Hypertension, diabetes, cholesterol, HDL cholesterol, glycated haemoglobin, Framingham risk score, fibrinogen and C-reactive protein were used. The following four NICE categories of BMI and WC were used:

i) no risk (up to normal BMI: < 25 and low/high WC: < 102 & < 88 cm in men and women respectively),

ii) increased risk (normal BMI & very high WC: > 102 & 88 cm in men and women respectively or obese I (BMI: 30-35) & low WC: < 94 & 80 cm in men and women or overweight (BMI: 25-30) and high WC),

iii) high risk (overweight & very high WC or obese I & high WC) and iv) very high risk (obese I & very high WC or obese II/III (BMI ≥ 35 with any levels of WC).

Results: The odds and β coefficients of CHD risk factors were highest for those in the 'very high risk category' than those in 'no risk category'. Moreover, a gradient between the NICE categories and the risk factors was observed, the odds increased with the increase in risk category.

Conclusions: The current NICE definitions of obesity show predictive validity for a range of CHD risk factors.

Gender Differences

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WAIST CIRCUMFERENCE AND WAIST-FOR-HEIGHT ARE RELATED WITH BLOOD PRESSURE IN ADOLESCENTS: DIFFERENCE BETWEEN GENDERS THROUGH A MULTILEVEL ANALYSIS

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Objective: To analyze the effect of waist circumference (WC) and waist-to-height (WH) in of systolic (SBP) and diastolic (DBP) blood pressure in adolescents from two observational studies.

Design: Two Cross-sectional studies (CSS).

Patients and methods: Adolescents from two CSS performed in Europe (n=3183; HELENA study) and Brazil (n=991; BRACAH study). Participants had valid data on waist, height, SBP and DBP. The effects of the anthropometric indicators on SBP and DBP were analyzed through multilevel linear regression, adjusted for confounders (age and physical activity level) and stratified by gender.

Results: Mean waist circumference for girls was 71.9, while for boys it was 75.7 ($p < 0.001$). Boys showed higher SBP than girls (123.6 against 113.8, $p = 0.001$).

Variables	SBP (mmHg) β^*	context explication	DBP (mmHg) β^*	context explication
Boys WC (per 1 cm increase) Helena	0.55	0.4%	0.21	0.5%
Boys WC (per 1 cm increase) Bracah	0.54	0.4%	0.24	0.5%
Boys WH (per 0.1 cm increase) Helena	7.53	1.0%	3.17	0.5%
WH (per 0.1 cm increase) Bracah	9.14	1.0%	4.06	0.5%
Girls WC (per 1 cm increase) Helena	0.47	2.1%	0.20	2.1%
Girls WC (per 1 cm increase) Bracah	0.28	2.1%	0.22	2.1%
Girls WH (per 0.1 cm increase) Helena	6.18	1.0%	2.90	3.4%
Girls WH (per 0.1 cm increase) Bracah	4.05	1.0%	3.61	3.4%

[Association between anthropometrics and BP by sex.]

* p-value < 0.001 for all analysis.

Conclusions: The WH has greater effect on blood pressure levels independent

of sex than the waist circumference. On the other hand the magnitude of the effect is greater among boys.

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ANTHROPOMETRY AND BODY COMPOSITION CHARACTERISTICS OF ADOLESCENTS IN BOARDING SECONDARY SCHOOLS IN UMUAHIA, ABIA STATE, NIGERIA

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Objectives: To compare anthropometry, BMI and body composition of adolescent boys and girls in boarding secondary schools in Umuahia, Abia State, Nigeria.

Methods: A cross sectional survey of 416 adolescents (208 boys and 208 girls) aged 11-18 years was conducted in six randomly selected boarding secondary schools in Umuahia. Weight, height, arm circumference were measured. Body composition parameters (body fat (kg and %) and Lean body mass) were determined using skinfold thickness measurements. Body mass index was calculated as weight (kg)/height (m²). Stunting and underweight were calculated using 2000 CDC reference. Overweight and obesity were assessed using WHO BMI classification. Percentages, means (\pm SD), and t-test were used for data analysis.

Results: The mean weight of the boys and girls was similar ($P > 0.05$). Girls were significantly shorter (157.42 ± 7.84 cm) than boys (159.31 ± 7.42 cm) ($P < 0.05$). Mean BMI was 18.87 ± 2.72 kg/m² for boys and 19.24 ± 2.67 kg/m² for girls. Using BMI classification, 2.4% and 0.96% of boys and girls, respectively were overweight. Percent body fat was significantly higher in girls (21.81 ± 3.46) than boys (16.38 ± 2.01). Conversely, LBM was higher in boys (40.31 ± 8.90 kg) compared to girls (37.24 ± 6.73 kg) ($P < 0.05$). The prevalence of underweight (WAZ < -2SD) was 55.5% in girls and 56.5% in boys. Similarly, stunting (HAZ < -2SD) was 50.5% and 52% in boys and girls, respectively ($P < 0.05$).

Conclusion: The girls possessed more body fat than the boys. However, there were high levels of underweight and low prevalence of overweight/obesity in both groups. The results underscore the need for nutrition intervention programs in boarding schools in Umuahia.

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DO CURRENTLY RECOMMENDED WAIST CIRCUMFERENCE MEASUREMENT SITES MATCH WHAT INDIVIDUALS FIND MOST INTUITIVE AND EASY TO SELF MEASURE?

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Objectives: To determine whether the most intuitive waist circumference (WC) site is differentially associated with systolic blood pressure (SBP) than technician- or self-measured waist at common clinical sites.

Methods: Participants self-measured their WC without instruction, and then at five different sites (umbilicus, iliac crest, midpoint, last rib and minimal waist) using pictorial and printed instructions. Subsequently, a technician measured the same five sites.

Results: 32 men (age: 19.8 ± 2.0 years, BMI: 23.6 ± 3.2 kg/m²) and 46 women (age: 20.4 ± 3.4 years, BMI: 23.0 ± 5.7 kg/m²) participated. Men intuitively self-measured their WC at the umbilicus (46.4%) and iliac crest (42.9%), and considered self-assessment of all the waist sites to be of a similar difficulty. Women intuitively self-measured at the umbilicus (54.6%) and minimal waist (22.7%) and considered these sites to be the easiest to measure (umbilicus 22.7%, minimal waist 43.2%). SBP was correlated with all self and technician measured WC sites in women ($p < 0.05$), and approached statistical significance for all measurements except the iliac crest in men ($p < 0.10$). In both sexes, the

strength of the correlations between SBP and WC did not differ between any self or technician measurements.

Conclusions: Although the iliac crest and midpoint are recommended by several organizations, in practice these might be the most difficult and unintuitive sites to actually measure in women. As all WC sites predict SBP similarly, our preliminary results suggest that the minimal waist may be the most optimal waist site for self measurement as it is the most intuitive and its ease of measure.

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GENDER DIFFERENCES OF DIETARY FOOD PATTERNS ON BODY COMPOSITION AND BLOOD LIPOPROTEIN PROFILE IN MALAYSIAN ADOLESCENTS - A POPULATION-BASED STUDY

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Dietary food pattern analysis has been increasingly used to capture the complexities of diet and of diet-related disease outcomes in adults, but data is scant for adolescents. The objectives of the study was to assess gender-specific impacts of dietary food patterns on body composition and blood lipoprotein profile of 442 adolescent boys and girls aged 12 to 19 years-old in Malaysia. Dietary pattern analysis was determined using validated FFQ and total body fatness was assessed by DXA. Three dietary patterns were identified from principal component analysis as healthy, western-based diet and typical-diet patterns. Gender-specific multivariate analyses in dietary patterns showed that high westernized dietary pattern, characterized by high animal and processed foods was significantly associated with BMI, waist circumference, waist-to-height ratio (Wht), DXA-derived total fat mass (TFM) levels in both boys and girls, and significantly associated with high levels of total cholesterol (TC) and LDL-cholesterol in boys, after adjusting for all potential known confounding factors. On the contrary, higher intake of healthy-diet pattern rich in fruits, vegetables and dairy products was significantly inversely associated with BMI, Wht and TFM levels and TC, triglycerides and LDL-cholesterol in girls. Similar patterns were found in boys, except for lipoprotein profile. These findings suggest that higher intake of healthy dietary pattern was inversely related to lower body adiposity, total cholesterol, triglycerides and LDL-cholesterol levels, while high intakes of westernized dietary pattern was associated with higher levels of body adiposity, total cholesterol and LDL-cholesterol in these adolescents, which may consequently lead to adverse health outcomes.

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GENDER DIFFERENCES ON LIPID METABOLISM IN AN OBESE POPULATION

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Aim of study was to analyze gender differences on lipid metabolism in an obese population.

Clinical assessment plus plasma oxidized LDL (oxLDL) and homocysteine (tHcy) was performed in 172 obese subjects (40M/132F; mean age 48.6±12.3/53.2±12.5 yrs).

Obese males showed some significant differences in lipid metabolism compared with females; in fact, t-chol levels were lower and triglycerides were higher (203.5±42.6 vs 222.2 ±45.9 mg/dL, p=0.006; 133.1± 77.6 vs 107.8 ±65.6 mg/dL, p=0.019; respectively). No significant differences were observed when HDL-c and oxLDL levels were compared, although a relevant percentage in both groups showed abnormal results.

tHcy was significantly higher in males than in females (12.1±3.1 vs 10.5 ±4.4 microM; p< 0.0001) and most males showed tHcy above 10 microM (82.5% in males vs 36.8% in females; p < 0.0001).

OxLDL significantly correlate with t-chol and LDL-cl (r=0.59, p< 0.0001; r=0.6, p< 0.0001) while inverse relationship, not significant, was observed with HDL-c.

Waist circumference and BMI showed no correlations with oxLDL, and between oxLDL and positive family history for cardiovascular diseases.

In our study some gender differences were maintained lacking the favourable gap observed in non obese women; many obese subjects showed pathological changes in HDL-c and ox-LDL, regardless of gender, and these lipid profiles increases risk for cardiovascular diseases, in addition to homocysteine.

In conclusion, pathophysiological derangement in obesity have a role in unfavourable changes observed in lipid profile of obese women, increasing the risk for cardiovascular disease, which would become similar to that of their male peers.

Genetics

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INTERACTION BETWEEN *PPA γ* AND *SREBP-2* GENES INCREASES NON-ALCOHOLIC FATTY LIVER DISEASE RISK IN ASIAN INDIANS IN NORTH INDIA

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Background: Non-alcoholic fatty liver disease (NAFLD) includes a spectrum of liver disorders characterized mainly by accumulation of hepatic fat in absence of significant alcohol consumption. We investigated the association of C161T and Pro12Ala polymorphisms of peroxisome proliferator-activated receptor- γ (*PPAR*- γ) and G1784C of the sterol regulatory element binding protein (*SREBP-2*) genes with clinical and biochemical parameters in Asian Indians from north India.

Methods: In a sex and age-matched case-control study, a total of 335 overweight/obese subjects comprising 162 NAFLD cases and 173 controls were enrolled. Clinical, biochemical and anthropometric parameters were measured by standard protocols. Polymerase chain reaction and restriction fragment length polymorphisms were performed to identify individual genotypes, and the association of these polymorphisms with biochemical parameters was assessed.

Results: Frequency of the alleles Ala (Pro12Ala) and T (C161T) of *PPAR*- γ , and C (G1784C) of *SREBP-2* genes was significantly higher in NAFLD subjects than controls ($p < 0.05$). The Ala/Ala and T/T genotypes of *PPAR* γ and C/C genotype of *SREBP-2* were associated with higher liver enzymes in NAFLD patients as compared to controls. Using a stepwise logistic regression model after adjusting for age and sex, the odds ratio for NAFLD for the three polymorphisms was 1.84 (95% CI: 2.05- 4.19, $p=0.05$).

Conclusions: Ala/Ala and T/T genotypes of *PPAR* γ and C/C genotype of *SREBP-2* genes were associated with risk for the development of NAFLD in Asian Indians from North India.

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FTO POLYMORPHISM CARRIERS HAD BETTER ANTHROPOMETRIC AND INFLAMMATORY RESPONSE TO AN INTERVENTION ON LIFESTYLE

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Introduction: FTO 9939609 (T/A) polymorphism has been associated with obesity and comorbidities but its association with response to intervention is scarcely investigated.

Objective: To assess whether the FTO T/A polymorphism was associated with changes in metabolic variables and inflammatory markers in Brazilian individuals at high cardiometabolic risk submitted to an intervention on lifestyle.

Methods: 138 individuals (66.7% women, 56.5 \pm 11.6yrs, 30.3 \pm 5.6 kg/m²) were evaluated at baseline and after a 9-month intervention for healthy diet, physical activity and stress management. FTO genotyping was performed using ASPCR; Hardy-Weinberg equilibrium was tested. Individuals with at least one variant allele (TA/AA) were grouped and compared to those with the reference genotype (TT). Association of genotypes with ≥ 1 SD change on clinical variables was analyzed by logistic regression.

Results: The frequency of the A allele was 42.5%. At baseline, mean blood pressure of the A allele carriers was lower (108 \pm 14 vs 113 \pm 15mmHg; $p=0.048$) and had a lower decrease (-1.8 \pm 11.7% vs -6.4 \pm 12.7%; $p=0.017$) than the TT group. Only A allele carriers decreased waist circumference and post-challenge plasma glucose and increased Apo A1 levels after intervention. Decreases in fasting plasma glucose levels (-4.8 \pm 13.3% vs 0.6 \pm 13.4%; $p=0.025$) and C-reactive protein concentration (-24.4 \pm 0.26 vs 2.0 \pm 0.33%; $p=0.034$) were greater

in variant carriers. Plasma glucose change was associated with the presence of the variant allele (OR 0.325, 95%CI 0.111-0.957, $p=0.041$), independently of sex and age.

Conclusion: The FTO T/A polymorphism may facilitate favorable responses to intervention on lifestyle in Brazilians at high cardiometabolic risk.

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ASSOCIATION OF TNF- α PROMOTER GENE G-308A POLYMORPHISM WITH METABOLIC SYNDROME, INSULIN RESISTANCE, SERUM LEPTIN AND TNF- α LEVELS IN ADULT POPULATION

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Background: Tumour necrosis factor alpha (TNF- α) is a multifunctional proinflammatory cytokine. The polymorphism at position -308 in the promoter region of TNF- α has been shown to increase transcription of the gene.

Methods: The G- 308A TNF- α polymorphism has been studied in 269 subject with Metabolic Syndrome according to NCEP ATP III criteria (Age 31.91 \pm 6.05; BMI 28.1 \pm 5.09) and 272 healthy control without Metabolic Syndrome (Age 30.96 \pm 7.01; BMI 22.98 \pm 4.36). The G-308A variant was detected by PCR amplification and *Nco*-1 digestion. Furthermore Insulin Resistance, Serum Leptin and TNF-alpha levels were also measured in both the groups.

Results: Homozygous mutant genotype (AA) (GG v/s GA+AA) ($p < 0.001$: OR=3.24: 95% CI= 2.15-4.89) and mutant allele (A) ($p < 0.001$: OR=3.04: 95% CI= 2.08-4.43) of the G-308A TNF- α polymorphism was significantly less frequently observed in the control population as compared to study group. Furthermore, on dividing the subjects into two groups according to the absence (homozygous for the wild type G allele) (TNF-1 allele) or presence of the mutant A (TNF-2) allele, significantly high levels of TNF- α ($p=0.001$, OR=1.80, 95%CI=1.25-2.60) and Leptin ($p=0.003$, OR=2.19, 95%CI=1.43-3.36) were observed in TNF-2 group as compared to TNF-1 group. Whereas, there was a non-significant tendency toward insulin resistance in the TNF-2 group.

Conclusions: Our results suggest that the G-308A mutation of the TNF- α gene is likely to play an important role in the development of metabolic syndrome and metabolic abnormalities.

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THE RELATIONSHIP BETWEEN SNP RS1137101 VARIATION IN LEPR GENE AND OBESITY IN CHINESE ELEMENTARY SCHOOL CHILDREN

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Objective: The aim of the study was to investigate the relationship between SNP rs1137101 polymorphism in the LEPR gene and obesity in Chinese children.

Methods: 1682 elementary school children in Shanghai China had height, weight and waist circumference measured and provided blood samples for DNA extracting and genotyping. The associations between SNP rs1137101 and BMI, waist to height ratio (WHtR), obesity prevalence were analyzed by general linear model, logistic regression or Chi-square test.

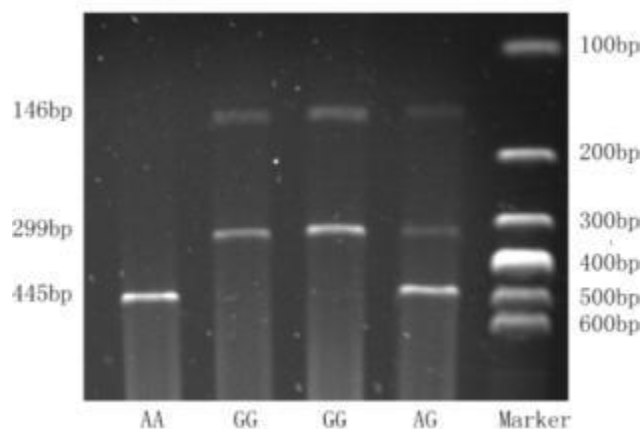
Results: The prevalence of overweight and obesity combined was 18.6% and the prevalence of obesity was of 8.7%. The frequencies of genotypes AA, AG, GG and alleles A, G for LEPR SNP rs1137101 were 0.012, 0.224, 0.764 and 0.14, 0.86 respectively. These frequencies comply with the Hardy-Weinberg law ($\Sigma X^2 = 1.301$, $P > 0.05$). The odds ratios of high WHtR (more than the median),

overweight were 1.31 (95% CI: 1.02-1.69), 1.43(95% CI: 0.9-2.12 in children with AA/AG alleles. There is no statistically significant association between LEPR SNP rs1137101 polymorphism and BMI based obesit.

Genotypes	Low WHtR	High WHtR	OR	P value	OR a	P value
	(n=676)	(n=695)			(95%CI)	
AA/AG	143 (44.4%)	179 (55.6%)	1.29	0.045	1.31 (1.02-1.69)	0.038
GG	533 (50.8%)	516 (49.2%)			1.00	

a : Logistics age, gender and school had been adjusted.

[Association of LEPR SNP rs1137101 variation with W]



[Genotyping of the polymorphic alleles in the LEPR]

Conclusions: Allele A carriers for LEPR SNP rs1137101 in Chinese children may be potential to develop central obesity.

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Hypertension

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GENERAL AND CENTRAL OBESITY, COMBINED ORAL CONTRACEPTIVE USE AND HYPERTENSION IN CHINESE WOMEN

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Background: Asians have different body fat distributions and disease characteristics compared with Caucasians. The purpose of this study was to evaluate general and central obesity, combined oral contraceptive (COC) use and their joint effects on the risk of hypertension in Chinese women.

Methods: A case-control study including 1,760 women (878 hypertensive cases and 882 normotensive controls) was conducted in China. Body weight, height, waist circumference (WC), blood pressure, serum lipids and apolipoproteins were measured. History of contraceptive use and relevant factors were investigated. Odds ratio (OR) with 95% confidence interval (CI) was estimated for hypertension-related factors under unconditional logistic regression model.

Results: Our study showed that increased body-mass index (BMI), increased WC and COC use were risk factors for hypertension with an OR (95% CI) of 2.19 (1.69-2.83), 1.46 (1.13-1.88) and 1.26 (1.02-1.56), respectively. Compared with WC, BMI was more strongly associated with hypertension risk (OR 3.40, 95% CI 2.28-5.05, for highest versus lowest quartile) and was a better predictor for blood pressure. COC users had a 1.39-fold (OR 1.39, 95% CI 1.14-1.69) increased risk compared with the non-users, while stopping COC was associated with a 36% reduced risk (OR 0.64, 95% CI 0.42-0.98). The risk increased dramatically in combination of COC use with a BMI ≥ 28 kg/m² or WC ≥ 90 cm (OR 8.02, 95% CI 5.05-12.74; OR 5.76, 95% CI 3.65-9.12, respectively).

Conclusions: General and central obesity, COC use and their joint effects significantly increased the risk of hypertension in Chinese women.

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IMPLICATIONS OF ABDOMINAL OBESITY ON NOCTURNAL HYPERTENSION IN ADOLESCENTS

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Objective: To determine the abdominal obesity (AO) effects on nocturnal blood pressure (BP) in adolescents.

Methods: A prospective study that included 621 subjects from Maracaibo, Venezuela was conducted. The data was composed of 264 males and 357 females, mean-age: 14.6 \pm 1.7 years; all of them underwent 24-h ambulatory BP monitoring (ABPM) to obtain awake and sleep BP. Nocturnal hypertension (NH) was defined as sleep BP \geq 95th percentile and awake BP < 95th for age and gender. Age, gender, waist circumference (WC) and office BP were registered. Adolescents with WC \geq 90th percentile were considered as AO. The ANOVA was used to study the effect of AO on nocturnal BP. Chi square was used to estimate the association between AO and NH.

Results: The AO prevalence was 6.4 % (n=40) in all adolescents, 9.5% (n=25) in males and 4.2% (n=15) in females (p < 0.008). The nocturnal BP in adolescents with AO was higher than in those without AO (109.13 \pm 8/59.73 \pm 6 vs. 101.64 \pm 8/57.21 \pm 5 mmHg, p < 0.003). Ninety-eight (15.8%) subjects had NH, and there was a NH prevalence of 37.5% (n=15) in AO adolescents. It was showed a statistically significant association between AO and NH (p=0.0001).

The logistic regression analysis showed that AO was the risk factor for NH (OR=3.600; 95% CI= 1.822-7.113).

Conclusions: This study showed significantly increased nocturnal BP in adolescents with AO. ABPM seems to add important clinical information to the assessment of AO patients due to the importance of NH as risk of cardiovascular disease.

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EFFECT OF A LIFESTYLE MODIFICATION PROGRAM: RELATIONSHIPS BETWEEN VISCERAL ADIPOSITY, CARDIORESPIRATORY FITNESS AND BLOOD PRESSURE IN VISCERALLY OBESE MEN

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Background and aims: Individuals with high levels of visceral adipose tissue (VAT) and/or low cardiorespiratory fitness (CRF) have a higher blood pressure (BP) compared to fit and lean individuals. We evaluated the respective contributions of VAT, CRF on the BP response to a 3-yr lifestyle modification program.

Patients and methods: A total of 74 sedentary men with abdominal obesity (mean age: 48.5 \pm 8.1 years, mean waist circumference: 107 \pm 9 cm) underwent a 3-yr lifestyle modification program.

Results: The magnitude of VAT loss after 3-yr was negatively correlated with the change in CRF (r=-0.66, p< 0.0001). In order to sort out the respective contributions of VAT vs. CRF changes to BP response, 3 groups of participants were compared: Group 1 (non-responders): non-responders for both VAT and CRF, Group 2 (partial responders): decrease in VAT and no change in CRF, and Group 3 (full responders): decrease in VAT and increase in CRF. Resting systolic BP was significantly decreased in groups 2 and 3 compared to group 1 (group 1: +4 \pm 9 mm Hg, group 2: -5 \pm 7 mm Hg, group 3: -6 \pm 8 mm Hg, p=0.0003) while diastolic BP decreased significantly in group 3 compared to group 1 (group 1: -2 \pm 7 mm Hg, group 2: -6 \pm 8 mm Hg, group 3: -9 \pm 5 mm Hg, p = 0.0061).

Conclusions: Results suggest that VAT loss contributes significantly to the reduction in BP in visceraally obese men involved in a long-term lifestyle modification program.

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INCREASED PREVALENCE OF METABOLIC SYNDROME AMONG KOREAN HYPERTENSIVE POPULATION

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Purpose: The implication of metabolic syndrome (MetS) in hypertensive population has not been known. The prevalence and the risk factors of MetS among hypertensive population were investigated.

Method: The first to the fourth Korean National Health and Nutrition Examination Survey (KNHANES) held from 1998 to 2008, nationally representative cross-sectional survey, were analyzed. MetS was defined following NCEP-ATP III guideline.

Results: In general population, MetS prevalence was about 27%, however, it was doubled in hypertensive population, reaching almost 60%. This trend was consistent through the first to the fourth KNHANES. Moreover, although the prevalence of hypertension as well as MetS among general population has been slightly decreasing both, MetS prevalence among hypertensive population continues to rise which is more obvious among younger patients than the general population both in men and in women. In multivariate analysis, high BMI, menopause, smoking and daily alcohol intake were suggested as independent risk factors of MetS in hypertensive population. Finally, the presence of MetS was associated with increased prevalence of target organ damage, such as stroke, coronary artery disease and chronic renal disease.

Conclusion: MetS prevalence among hypertensives was much higher than expected. Moreover, MetS increased target organ damage in hypertensives. Investigation of metabolic status when initiating hypertension control could help establishing more effective overall risk control.

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OLMESARTAN/AMLODIPINE ELICITED LOWER SYSTOLIC BLOOD PRESSURE VARIABILITY THAN OLMESARTAN/HYDROCHLOROTHIAZIDE IN CENTRALLY OBESE NON-DIABETIC HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME (OLAS TRIAL)F.J. Martinez-Martin¹, H. Rodriguez-Rosas²¹*Outpatient Hypertension Clinic, University Hospital Dr. Negrin,*²*Endocrinology and Nutrition, Clinica San Roque, Las Palmas de Gran Canaria, Spain*

Background and objectives: Visit-to-visit systolic blood pressure variability (SBPV) is an independent risk factor for target organ damage in hypertensive patients, particularly for stroke and renal events. Thus, reducing SBPV should be considered as a target of antihypertensive therapy. Central obesity is associated to higher SBPV. The OLAS trial compared olmesartan/hydrochlorothiazide vs. olmesartan/amlodipine in patients with metabolic syndrome. We sought to study the effects of these treatments on SBPV and their relationship with markers of metabolic and organic damage.

Methods: The OLAS study included 120 non-diabetic patients with stage I-II hypertension (SBP 140-179 mmHg) and metabolic syndrome (2005 IDF definition, implying central obesity). They were randomized to olmesartan 20 mg/amlodipine 5 mg or olmesartan 20 mg/hydrochlorothiazide 12.5 mg. Patients not reaching the SBP target (< 140 mmHg) received a double dose of the initial treatment after 13 weeks; doxazosin was added after 26 weeks if needed. Additional visits were performed at 39, 52, 65 and 78 weeks. 106 patients completed the protocol, with 6 on-treatment BP measurements: their SBPV was indexed by the variation coefficient (VC: SBP s.d./mean SBP).

Results: The VC was 0.115±0.041 in the olmesartan/hydrochlorothiazide group and 0.092±0.038 in the olmesartan/amlodipine group (p=0.003, CI 95% 0.008-0.038, t-test). The changes in adiponectin, CRP, albumin excretion, cystatin C,

asymmetric dimethylarginine and 8-iso-PGF2α were significantly correlated with SBPV independently of the mean blood pressure.

Conclusions: In these patients, olmesartan/amlodipine elicited lower SBPV than olmesartan/hydrochlorothiazide, in association with a positive impact in markers of metabolism, inflammation, renal damage, endothelial dysfunction and oxidative stress.

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BRAZILIAN ADOLESCENTS WITH NORMAL BODY MASS INDEX AND ABDOMINAL OBESITY HAD HIGHER SYSTOLIC BLOOD PRESSURE THAN THOSE WITHOUT ABDOMINAL OBESITY

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Objective: To evaluate the association of normal body mass index (BMI) and abdominal obesity with systolic (SBP) and diastolic blood pressure (DBP) in adolescents from a population-based sampling from southern Brazil.

Methods: Adolescent boys and girls, aged 12 to 19 years were interviewed at home, using standardized questionnaires, in a cross-sectional study. Weight (kg) and height (m) were measured, and BMI (kg/m²) for age and sex was calculated. Waist circumference (WC,cm) was used to identify abdominal obesity (AO), and it was analyzed for the upper vs. other tertiles. Blood pressure was measure four times using an oscillometric device and the average was categorized at the 95Percentile. Data were expressed as mean ±SD or percentages. The associations of normal BMI and AO with SBP and DBP were analyzed using the GLM, adjusted for age and sex.

Results: Participants (n=612) aged 15.1 ±1.8 years were enrolled, 52% women, with 73.6 ±9.3 WC for boys and 71.1 ±10.1 for girls (P=0.008), and BMI of 21.4 ±4.0. For systolic BP, adolescents with normal BMI and AO had on average 116 vs. 107 mmHg (no AO), while those with overweight and AO had 112 vs. 99 mmHg (no AO), and those with obesity had 120 mmHg; (P< 0.0001). For diastolic BP, the associations lost their statistical significance after the adjustment for age and sex.

Conclusions: Normal body mass index and abdominal obesity increase markedly systolic blood pressure among adolescents, independent of age and sex, but the association was not independent for diastolic blood pressure.

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CYSTATIN-C, BUT NOT MICROALBUMINURIA, WAS ASSOCIATED WITH LOSS OF RENAL FUNCTION IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME AND CENTRAL OBESITYF.J. Martinez-Martin¹, H. Rodriguez-Rosas²¹*Outpatient Hypertension Clinic, University Hospital Dr. Negrin,*²*Endocrinology and Nutrition, Clinica San Roque, Las Palmas de Gran Canaria, Spain*

Introduction/objectives: The OLAS trial compared olmesartan/amlodipine vs. olmesartan/hydrochlorothiazide in hypertensive patients with metabolic syndrome (2005 IDF definition, implying central obesity). Olmesartan/amlodipine reduced cystatin-C (marker of renal dysfunction) more than olmesartan/hydrochlorothiazide, but the effects on albuminuria were similar. The objective of this study was to assess if early changes on both markers could predict long-term decline of renal function.

Patients/methods: 120 patients with metabolic syndrome and stage I-II hypertension but without diabetes mellitus, overt albuminuria or clinical renal failure were randomly assigned to olmesartan 20 mg/amlodipine 5 mg vs. olmesartan 20 mg/hydrochlorothiazide 12.5 mg; if the target systolic blood pressure (140 mmHg) was not reached, the doses were doubled after 13 weeks, and doxazosin was added after 26 weeks. Fasting plasma cystatin-C and morning urine albumin/creatinine ratio were measured at baseline and week 26;

glomerular filtration rate (eGFR) was estimated by MDRD-4 formula at baseline and weeks 13,26,52,65,78,104,130 and 156.

Results: 91 patients completed the 3-year follow-up. Blood pressure control was similar in both groups. The decline in eGFR was slower in the olmesartan/amlodipine group (1.4 vs. 4.7 ml/min/1.73 m² per year, CI 95% 1.3-4.5 for the difference, $p = 0.007$, t-test), and less patients in this group progressed to eGFR < 60 ml/min/1.73 m² (4 vs. 13, $p=0.031$, log-rank test). Multiple correlation and multivariate logistic regression analysis showed that the early changes in cystatin-c but not in albuminuria predicted renal function decline.

Conclusions: The olmesartan/amlodipine combination resulted in better preservation of renal function, associated with an early reduction in cystatin-c

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CLINICAL CHARACTERISTICS AND TARGET-ORGAN DAMAGE IN ASIAN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME

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Objective: The metabolic syndrome consists of abdominal obesity, insulin resistance, glucose intolerance, hypertension, and dyslipidemia. The prevalence of metabolic syndrome (MS) in Korea is continuously increasing. Hypertension is a component of metabolic syndrome and has intimate relations with pathophysiology and clinical importance. The aim of this study is to evaluate clinical and chemical characters in hypertensive patients with MS.

Methods: We reviewed medical records of patients with hypertension in BORAMAE Medical center. Only the patients with metabolic syndrome were included. Anti-hypertension medications were classified according to their action mechanism. The prevalence of target-organ damage was evaluated, including left ventricular hypertrophy, heart failure, coronary artery disease, albuminuria, renal failure, carotid atheroma, arterial stiffness, cerebrovascular disease.

Results: Of 155 patients with MS, 66% was obese, 46% had high triglyceride, 61% had low HDL-cholesterol, 62% was glucose intolerance. ACE inhibitor and angiotension II receptors blocker (ARB) were used in 86 patients, beta blocker in 34 patients, calcium channel blocker in 86 patients, diuretics in 25 patients. The prevalence of disease related with target-organ was 31, 28, 15, 16 events respectively for heart, kidney, peripheral vessels, brain. 5% of total patients showed left ventricular hypertrophy, 7% showed heart failure, 10% showed coronary artery disease. 9% of total patients showed microalbuminuria, 14% showed decrease glomerular filtration rate.

Conclusion: The hypertensive patients with MS showed multiple target-organ damage and need proper management on hypertension, diabetes, dyslipidemia, obesity.

Insulin Resistance

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EFFECTS OF L-CARNITINE SUPPLEMENTATION WITH OR WITHOUT MODERATE AEROBIC TRAINING ON INSULIN RESISTANCE IN OBESE WOMEN

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Objectives: The aim of this study was to evaluate the effects of L-carnitine supplementation with or without moderate aerobic training on insulin resistance in obese women.

Material and method: In this randomized controlled clinical trial, 40 obese women (mean age: 35.45 yr) were assigned to 4 groups (n=10) as follows: 1: L-carnitine supplementation group (CAR), 2: aerobic training + placebo group (EXR+PLA), 3: L-carnitine supplementation + aerobic training group (CAR+EXR) and 4: placebo group (PLA). CAR and CAR+EXR groups consumed 2 g daily L-carnitine for 8 weeks and placebo groups (EXR+PLA and PLA) consumed placebo. Subjects of EXR+PLA and CAR+EXR groups underwent 8-week aerobic training protocol. Anthropometric measurements and serum fasting glucose, insulin and HOMA-IR were measured before and after interventions.

Results: Interventions had no significant effects on body weight, BMI and abdominal obesity indexes in all groups. Serum fasting levels of glucose, insulin and HOMA-IR significantly decreased in CAR, EXR+PLA and CAR+EXR groups ($p < 0.05$). Reduction in insulin resistance were more relevant in CAR+EXR group ($p < 0.001$).

Conclusions: The results indicated beneficial effects of L-carnitine supplementation and aerobic training on lowering insulin resistance in obese subjects. Cumulative effects of these two approaches may contribute to lowering risk of many chronic diseases in obese women.

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DIETARY PATTERNS ARE ASSOCIATED WITH INSULIN RESISTANCE IN CHINESE ADULTS WITHOUT KNOWN DIABETES

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Objective: The objective was to examine the association between dietary patterns and insulin resistance in Chinese adults without known diabetes.

Design: The study subjects were 1070 Chinese adults aged 18 years old and above in Jiangsu Province participating in the 2006 wave of the China Health and Nutrition Survey (CHNS). Usual dietary intake was assessed by using a validated food frequency questionnaire. Dietary patterns were identified by factor analysis using a principal component analysis method. Insulin resistance was defined as the highest quartile of the homeostasis model assessment for insulin resistance (HOMA-IR) scores.

Results: We derived four dietary patterns in our population by factor analysis: the Western, North-river, Traditional, and Alcoholic pattern. After adjusted for potential confounders, the western pattern was significantly associated with greater odds of insulin resistance (p for trend=0.039), while a significant negative association was found between the Alcoholic pattern and insulin resistance in Chinese adults (p for trend=0.030). There was a 43% decrease of the odds after adjustment for all covariates in the highest quartile of the

Alcoholic pattern, compared to the lowest quartile (adjusted OR 0.57, 95% CI: 0.33-0.97). We also observed that a significant decreasing trend of HOMA-IR level and prevalence of insulin resistance across quartiles of the Alcoholic pattern after adjustment (p for trend < 0.001).

Conclusion: Dietary patterns were significantly associated with insulin resistance in Chinese adults without known diabetes.

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IMPACT OF INSULIN RESISTANCE ON PROGRESSION OF LEFT VENTRICULAR HYPERTROPHY IN PATIENTS WITH AORTIC STENOSIS: SUBSTUDY OF THE ASTRONOMER TRIAL

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Background: We had reported that metabolic syndrome was associated with increased prevalence of concentric left ventricular hypertrophy (LVH) in patients with aortic stenosis (AS). Insulin resistance (IR) could be a mediator of this association. The objective of this substudy was to examine the association between IR and LVH progression in AS patients.

Methods: Among 269 patients randomized in ASTRONOMER, 253 had an echocardiographic follow-up (3.4 ± 1.2 yrs). LV mass was indexed by 2.7 power of height (LVMI). As an estimate of global LV hemodynamic load, we calculated the valvulo-arterial impedance [$Z_{va} = (\text{Systolic Blood Pressure} + \text{Mean Gradient}) / \text{Stroke Volume index}$].

Results: There was an increase in LVMI among patients ($n=134$) without LVH ($p < 0.0001$) but not in those with pre-existing LVH ($p=0.12$). In the former subset, annualized LVMI progression was higher in patients with $\text{HOMA} > 1.25$ (median value) compared to those with $\text{HOMA} < 1.25$ (2.49 ± 0.53 vs. $0.03 \pm 0.53 \text{ g.m}^{-2.7}.\text{yr}^{-1}$, $p=0.001$). 39% of patients with $\text{HOMA} > 1.25$ developed LVH compared to 10% with $\text{HOMA} < 1.25$ ($p=0.0002$). On multivariable analysis adjusted for age, hypertension, AS severity and Z_{va} , the predictors of faster LVMI progression were aortic valve calcification ($p=0.03$) and HOMA index ($p=0.02$). HOMA index was a predictor of Z_{va} progression ($p=0.003$). After further adjustment for the latter variable, HOMA index remained a predictor of LVMI progression ($p=0.02$).

Conclusion: This study reports that IR is a predictor of faster LVH progression in AS patients. Given that the most prevalent form of IR is associated with visceral obesity, the findings provide strong impetus for the elaboration of interventional studies targeting visceral obesity.

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INTERACTION OF IL-18 WITH OSTEOPONTIN IN OBESE INDIVIDUALS: IMPLICATIONS FOR INSULIN RESISTANCER. Ahmad¹, A. Al-Mass¹, M.M. Hammad², N. Zghoul¹, C. Lehe¹, S. Dermime¹¹Immunology & Innovative Cell Therapy Unit/Biomedical Research,²Biochemistry & Molecular Biology Unit/Biomedical Research, Dasman Diabetes Institute, Kuwait, Kuwait

Background/Objective: Osteopontin (OPN) and IL-18 are known to have potent inflammatory functions and both participate in a wide range of biological processes linked to immunological disorders. Since an interaction between OPN and IL-18 is suggested in inflammatory diseases, we investigated whether: (i) their levels were simultaneously elevated in obese individuals; and (ii) their levels associated with blood glucose and BMI.

Subjects and Methods: PBMCs and plasma samples were isolated from 77 individuals including lean (controls) as well as overweight and obese, with or without diabetes. Plasma concentrations of OPN and IL-18 were measured by ELISA. OPN and IL-18 mRNA expression in PBMCs was quantified by RT-PCR.

Results: As compared with lean controls, obese individuals showed significantly higher plasma concentrations of OPN (lean 2171 ± 203 pg/ml vs. obese 2865 ± 101 pg/ml; $P = 0.002$) and IL-18 (lean 308 ± 45 vs. obese 629 ± 96 ; $P = 0.01$). OPN showed a significant positive correlation with BMI ($r = 0.49$; $P < 0.001$) and blood glucose level ($r = 0.49$; $P = 0.03$). Similarly, IL-18 positively correlated with BMI ($r = 0.45$; $P = 0.005$) and blood glucose level. Interestingly we observed a strong association between OPN and IL-18, only in obese individuals ($r = 0.57$; $P = 0.001$).

Conclusions: These findings represent the first observation that plasma OPN and IL-18 are simultaneously increased in overweight/obese individuals which may trigger the development of obesity-associated insulin resistance.

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UP-REGULATION OF TOLL LIKE RECEPTORS EXPRESSION IN OBESE INDIVIDUALS AND THEIR RELATION TO INSULIN RESISTANCER. Ahmad¹, A. Al-Mass¹, C. Lehe¹, A. Hasan¹, F. Al-Ghimlas², S. Dermime¹¹Immunology & Innovative Cell Therapy Unit/ Biomedical Research, ²Fitness and Rehabilitation Center, Dasman Diabetes Institute, Kuwait, Kuwait

Introduction/Background: Obesity-associated chronic low-grade tissue inflammation is an important factor in the development of obesity-related pathologies. The cause and stimulus of persistent inflammatory activation in obesity is largely unknown. Toll like receptors (TLRs) are pattern recognition receptors and their activation lead to the increased transcription of pro-inflammatory cytokines, chemokines, and reactive oxygen species which may aggravate pathology in obese individuals. Therefore, the aim of this study was to investigate whether TLRs could contribute to the progression and induction of diabetes in obese individuals.

Methods: Peripheral blood and adipose tissue samples were collected from healthy as well as overweight and obese individuals, with or without diabetes. The expression of TLRs (TLR2, TLR4 & TLR5) was quantified by Immunohistochemistry, Flow Cytometry and RT-PCR. Proinflammatory cytokines (IL-1b & IFN-g) were quantified by RT-PCR/ELISA.

Results: Obese and overweight individuals showed significantly increased expression of TLR2 and TLR4 in monocytes and adipose tissue as compared with the lean individuals ($P < 0.05$). Interestingly, we found a remarkably higher expression of TLRs in obese and overweight individuals with type 2 diabetes ($P < 0.05$). Increased expression of TLR4 correlated with BMI ($r = 0.74$; $P = 0.001$). However, there was no significant difference in the expression of TLR5 between lean and overweight/obese individuals. Moreover, a notable association of TLRs with the blood glucose /HbA1C was observed.

Conclusion: Our findings suggest that the elevated expression of TLRs 2 and 4, and associated cytokines in overweight/obese individuals may play a role in obesity-associated inflammation and insulin resistance.

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CORRELATION BETWEEN CENTRAL OBESITY AND HOMA INDEX AMONG PATIENTS WITH CORONARY HEART DISEASEV. Guattini¹, L. Zanuzzo¹, V. Bertoni², L. Petry³, R. Souza³, T. Pinto³, C.H. Piovesan¹, J. Leivas³, P. Pimentel Filho³, A. Marcadenti^{1,2,3}¹Instituto de Cardiologia - Fundação Universitária de Cardiologia, IC-FUC,²Instituto de Educação e Pesquisa - EIP/HMV, ³Hospital Nossa Senhora da Conceição, HNSC, Porto Alegre, Brazil

Objectives: To evaluate correlations between abdominal obesity and HOMA (homeostatic model assessment) Index among patients with coronary heart disease.

Methods: A cross-sectional study was carried out among inpatients aged 18 to 85 years, with coronary heart disease admitted in a tertiary hospital. Waist-hip ratio (WHR) and Body Mass Index (BMI - kg/m²) were calculated with standardized measurements of waist (WC, in cm) and hip (in cm) circumferences, weight (kg) and height (m). Fasting blood glucose (mmol/L) and insulin levels (μU/mL) were measured after a fast of 12 hours in order to calculate HOMA-IR (insulin resistance) and HOMA-beta (beta-cell function). Data were expressed as mean ±SD or percentage. Pearson correlation was used to assess the objectives.

Results: Among 22 participants 64% were men, aged 61.2 ± 14.9 years, 14% were current smokers, BMI 27.4 ± 4.6 kg/m², WHR 0.97 ± 0.07 , WC 97.8 ± 10.4 cm and fasting insulin 30.3 ± 50.1 μU/mL. There were statistically significant positive correlations between WHR and fasting insulin ($r = 0.71$, $P = 0.003$), HOMA-IR ($r = 0.65$, $P = 0.02$), and HOMA-beta ($r = 0.64$, $P = 0.02$), but no correlations with BMI and waist circumference were detected among participants.

Conclusions: There is a positive correlation among waist-to-hip ratio, fasting plasma insulin and HOMA Index in subjects with coronary heart disease.

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INSULIN RESISTANCE IN HYPOTHYROIDISMP. Lali¹, A. Jain¹, D.K. Dhanwal², L. Chandra¹¹Biochemistry, ²Medicine, Maulana Azad Medical College, New Delhi, India

Objectives: Thyroid hormones are involved in metabolic regulations which are altered in thyroid hypo-function. The present study was designed,

(1) to find out occurrence of insulin resistance in hypothyroid patients, and

(2) to compare insulin resistance in sub- clinical and overt thyroid hypo-function.

Methods: One hundred eighteen patients with the diagnosis of hypothyroidism based on their clinical and thyroid function test profile were included in this cross sectional hospital based descriptive study with their informed consent. HOMA-IR as an index of insulin resistance was calculated for each subject from their fasting plasma glucose and serum insulin levels. Autoimmunity against thyroid was evaluated by estimating anti TPO antibodies.

Results: HOMA-IR as an index of insulin resistance was comparable in overt (5.8 ± 3.24) and subclinical hypothyroidism (6.27 ± 3.87) but was above the reference range for this population. Hypothyroid anti TPO positive cases has high TSH compared to negative cases in both overt hypothyroidism and subclinical hypothyroidism.

Conclusions: Hypothyroidism induces insulin resistance but the degree of

insulin resistance is not dependent on severity of thyroid hypo-function however is associated with autoimmunity against thyroid.

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FISH OIL PREVENTS DEXAMETHASONE (D)-INDUCED LIVER INSULIN-RESISTANCE BUT NOT PERIPHERAL INSULIN RESISTANCE (IR) IN HEALTHY VOLUNTEERS

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We studied the effects of fish oil (FO) on insulin sensitivity in D-induced IR in healthy humans.

Methods: 16 males were studied. The first 2 tests, at D0 and D15, aimed to study the effects of D. The 3rd test at D36, after 3 w of FO (1.5 g EPA+DHA) (n=8) or placebo (controls, n=8). The 2 groups received 2 mg/d of D at D35 and D36. Each test included of a 3-step (S) hyperinsulinaemic euglycaemic clamp (insulin rate: S1: 0.2; S2: 0.4; S3: 1 mU /kg/min). Insulin sensitivity was estimated from rate of glucose disappearance (Rd) and hepatic glucose production (HGP) (6,6-d2-glucose; hot clamp); CHO (Gox) and lipid (Lox) oxidations were determined by indirect calorimetry and lipolysis by d5-glycerol flux (Ra glycerol).

Results: D decreased Rd (S1: 1.92±0.12 vs 2.33±0.16; S2: 2.33±0.17 vs 4.41±0.52; S3: 5.66±0.43 vs 9.38±0.65 mg/kg/min; all p< 0.01), increased HGP at S1: 1.06±0.11 vs 0.64±0.13; p< 0.05, decreased Gox (S1:2.26±0.12 vs 2.75±0.20; S2:2.40±0.14 vs 3.20±0.17; S3:3.29±0.15 vs 4.52±0.21 mg/kg/min; all p< 0.01), increased Lox (S1:0.92±0.05 vs 0.68±0.06; S2:0.88±0.05 vs 0.53±0.07; S3:0.58±0.06 vs 0.22±0.06 mg/kg/min; all p< 0.01) and increased Ra glycerol (S1:1.92±0.36 vs 1.22±0.18; S2:1.5±0.28 vs 0.87±0.11; S3:1.05±0.18 vs 0.81±0.10 µmol/kg/min; all p< 0.01). FO+D did not alter Rd vs D, increased inhibition of HGP by insulin at S3: 0.03±0.02 vs 0.67±0.37 mg/kg/min;p< 0.01), increased Lox at S3:0.71±0.08 vs 0.47±0.07 mg/kg/min;p< 0.05), decreased Gox at S3:2.66±0.38 vs 3.55±0.28 mg/kg/min;p< 0.05) and increased Ra glycerol at S2:1.4±0.34 vs 1.22±0.30 µmol/kg/min;p< 0.05)

FO increased lipolysis and Lox and increased liver insulin sensitivity.

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EFFECTS OF FISH OIL (FO) ON METABOLIC ALTERATIONS INDUCED BY CARBOHYDRATE (CHO) OVERFEEDING (O) IN HEALTHY VOLUNTEERS

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We assessed if FO could prevent metabolic alterations induced by a 4-day CHO overfeeding.

Methods: 32 volunteers randomized in 2 groups: one without O (C) and one with overfeeding (O). Group C absorbed its usual diet. Group O absorbed 175% of Daily Energy Expenditure (DEE=1.4 x REE) over 4 d (74% CHO, 17% fat, 9% proteins). Group C was studied once. Group O participated 6 w apart into 2 periods of O. 8 received 3g/d of FO (1.7g/d of EPA + DHA), the other 8, 3g/d of paraffin oil (P). Parameters: glucose Infusion Rate (GIR) during a hyperinsulinaemic euglycaemic clamp, mean blood pressure (MBP), cutaneous endothelium dependent and independent vasodilatation (CEDV and CEIV) by laser-doppler.

Results: Comparison of O (n=16) vs. C (n=16). Basal: O increased basal insulinemia (+ 17%; p< 0.05), plasma triglycerides TAG (+ 293%; p< 0.0001), decreased HDL cholesterol (- 30%; p< 0.001) and NEFA (- 61%; p< 0.0001). Vasodilatation was not altered by O.

During clamp: O decreased GIR (- 15%; p< 0.05); NEFA were less inhibited (+ 282%; p< 0.0001). MBP was increased (+ 4%; p< 0.05).

Comparison of O + FO (n=8) vs. O + P (n=8): P had no effect. Basal: FO decreased TAG (- 25%; p< 0.05), MBP (- 3%; p< 0.0001) and increased CEDV (+ 17%; p< 0.05). During clamp: FO increased GIR (+ 14%; p< 0.01), and decreased MBP (- 5%; p< 0.0001).

Conclusion: FO partially prevented metabolic alterations induced by short term CHO overfeeding.

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FISH OIL DECREASES FOOD INTAKE (FI) AND MINIMIZES INSULIN RESISTANCE (IR) IN ZUCKER FA/FA RATS

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Our goal was to study the effects of FO (7% w/w) on FI and development of IR in Zucker fa/fa obese rats. These rats are deficient for the leptin receptor gene and become spontaneously obese and insulin resistant overtime.

5-week old male Zucker obese fa/fa (n=24) and lean Fa/Fa (n=24) rats were fed over 9 wk either a control diet containing 8 % of fat as corn oil (CO diet) or a n-3 diet containing 7% FO and 1% CO (FO diet). FI was measured every day and body weight gain every week. Insulin sensitivity was assessed by oral glucose tolerance test (OGTT) at D0, wk4 and wk9 of diet and hyperinsulinemic-euglycemic clamp at wk9 of diet.

FO decreased FI and weight gain (P< 0.05) in fa/fa rats but not in lean rats. During OGTT, AUC of glycemic response was not altered by FO but AUC of insulinemic response was decreased by 25% (P< 0.05). During clamp, FO did alter neither peripheral glucose utilization rate nor glucose transport in tissues but hepatic glucose production was more inhibited by hyperinsulinemia (P< 0.05). To further explore the mechanisms sustaining the decrease of food intake we studied paired-fed fa/fa rats and, after 9 wk of diet, glucose and insulin carotid infusion toward the brain was performed over 48h followed by 24h NaCl 9‰. The same decrease in FI was induced by glucose and insulin in CO and FO rats.

Conclusion: FO decreased both FI and weight gain and minimized liver insulin resistance.

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INSULIN RESISTANCE IS ASSOCIATED WITH DISRUPTED RENAL PHOSPHORUS HOMEOSTASIS IN STAGE 3-5 CHRONIC KIDNEY DISEASE PATIENTS

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Introduction: Pre-clinical studies suggest insulin impacts on renal phosphorus (PO₄) handling, by increasing renal PO₄ re-absorption at the proximal tubule sodium-phosphate co-transporter.

Objective: To study the relationships between insulin resistance (IR), fibroblast growth factor-23 (FGF-23) (biomarker indicating disrupted renal phosphorus homeostasis) and coronary artery calcification (CAC).

Design: Cross-sectional study of 72 stage 3-5 pre-dialysis CKD patients. Diabetic patients treated with insulin were excluded.

Results: Age 64 ± 14 yrs, 56% male, BMI 30.8 ± 10 kg/m² and eGFR 25.9 ± 13 ml/min/1.73m². Median HOMA-IR: 2.19 (inter-quartile range (IQR) 1.19 - 3.94), and median HbA1C: 5.9 (IQR 5.5 - 6.3). Median CAC: 112 Agatston units (IQR 7 - 512). While PO4 levels were not elevated, (PO4 1.26 ± 0.24) FGF-23 levels were markedly increased (median FGF-23 132 RU/ml (IQR 58-309) and vitamin D levels were low (median 25 hydroxy- vitamin D: 55 nmol/l, IQR 45 - 70). Comparing CKD patients with similar levels of eGFR, vitamin D, and PO4, those with greater HOMA-IR had significantly higher FGF-23 levels (179 vs 109; $P=0.02$), and 40% higher log CAC scores (2.1 vs 1.6; $P=0.05$). Also, FGF-23 was positively correlated with other markers of IR: abdominal waist circumference ($r = 0.3$; $P=0.003$) and BMI ($r = 0.23$; $P=0.02$).

Conclusions: Insulin resistant CKD patients demonstrated a greater disruption in renal phosphorus homeostasis (higher FGF-23) and had increased CAC severity. These findings support the biological plausibility for a novel consequence of IR in the regulation of renal phosphorus handling and studies are needed to explore this potential relationship.

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INTERLEUKIN-10 IMPROVES GLUCOSE TOLERANCE BY INHIBITING THE EXPRESSION OF GENES INVOLVED IN GLUCONEOGENESIS AND LIPOGENESIS IN THE LIVER

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Background and objectives: Insulin resistance is associated with obesity-induced chronic low-grade inflammation with increased gluconeogenesis and lipogenesis in the liver and accumulation of macrophage in abdominal adipose tissue. In the current study we examined the effects of the anti-inflammatory IL-10 in obesity-induced insulin resistance.

Methods: C57BL/6J mice were fed with high fat diet to induce insulin resistance. The mice were then intraperitoneally injected with either Adenovirus expressing human IL-10 (Ad-hIL-10) or control vector. Glucose tolerance were checked by Intraperitoneal Glucose and Insulin Tolerance Test (IP-GTT and -ITT). Insulin signaling were examined by immunoblot analysis. Expression of the gluconeogenic & lipogenic genes were analyzed by Real Time PCR. The number of macrophage in abdominal fat tissue were examined by Immunohistochemistry and Flowcytometry.

Results: Obesity clearly induced insulin resistance as shown by increased blood glucose and insulin levels and inhibited insulin signaling in the liver and skeletal muscle. In addition, the number of macrophage in abdominal fat tissue was significantly higher in obese mice. In contrast, blood glucose and insulin levels during IP-GTT/ITT were lower in Ad-hIL-10 injected mice. Improved insulin signaling were observed in skeletal muscles and livers of Adh-IL-10-injected mice. Expression of the gluconeogenic genes (G6Pase and PEPCK) as well as the transcription factor gene for lipogenesis (SREBP1c) were lower in the liver of IL-10-overexpressing mice. The effects were confirmed in HepG2 cell lines.

Conclusion: Overexpression of IL-10 was capable of recovering the obesity-induced insulin resistance which was associated with suppressed expression of gluconeogenic and lipogenic genes in the liver.

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PPAR γ AGONISM REDUCES CIRCULATING BRANCHED-CHAIN AMINO ACID LEVELS BY STIMULATING THEIR OXIDATION IN ADIPOSE TISSUE

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Introduction : Branched-chain amino acids (BCAA) have emerged from metabolomics studies as predictors of the future development of diabetes. Their circulating levels increase with obesity and they promote insulin resistance through chronic mTor activation.

Aims: We investigated the effects of rosiglitazone, a PPAR γ agonist, on circulating BCAA levels and on their metabolism.

Methods: Sprague-Dawley rats were fed a regular (chow), high fat (HF) or high fat supplemented with BCAA (HF/BCAA) diet and treated with rosiglitazone (15 mg/kg/day) for 14 days. Insulin sensitivity was measured by glucose and insulin tolerance tests and adipose tissues were harvested to assay enzymatic activities and gene expression.

Results: The increase in circulating BCAA levels under the HF/BCAA diet (25%, $P = 0.004$) was abolished in rosiglitazone-treated rats. PPAR γ agonism also reduced BCAA serum levels in rats fed the chow (-25%, $P < 0.0001$) and the HF (-22%, $P = 0.004$) diets. Rats from groups with the highest circulating BCAA levels (HF and HF/BCAA) were the least sensitive to insulin. In white adipose tissue, rosiglitazone upregulated the expression of enzymes responsible for BCAA degradation such as BCKDHA (91%, $P = 0.03$), BCKDHB (104%, $P = 0.04$), DBT (177%, $P = 0.01$) and DLD (204%, $P = 0.01$).

Conclusion: The insulin-sensitizing properties of PPAR γ agonists could be due, in part, to their ability to reduce the high levels of circulating BCAA levels associated with obesity through enhancement of their degradation in adipose tissue.

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RSK IS A NOVEL REGULATOR OF INSULIN ACTION IN HEPATIC AND MUSCLE CELLS THROUGH IRS-1 S1101 PHOSPHORYLATION

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The mTORC1-S6K1 pathway is activated by insulin and nutrient excess (e.g. amino acids [AA]), which leads to the inhibition of the PI3K-Akt pathway via inhibitory serine phosphorylation of IRS-1, notably on serine 1101(S1101). However, in the absence of AA, insulin still promote IRS-1 S1101 phosphorylation by other kinases that remain to be fully characterized. We have now uncovered a new negative feedback loop arising from the MEK-ERK pathway and mediated by activation of p90 ribosomal S6 kinase (RSK). Using an antibody that detects a phosphorylation site (S221) located in the activation segment of RSK, we found that insulin activate RSK1. Computational analyses revealed that S1101 within IRS-1 falls into the consensus motif of RSK1. Furthermore, RSK1 inhibition using either the pharmacological inhibitor BI-D1870 or adenoviral expression of a dominant negative (DN) RSK1 mutant showed that RSK1 promotes the phosphorylation of IRS-1 on S1101 but not on S636/639. Accordingly, expression of the DN-RSK1 mutant also improved insulin action on muscle glucose transport and glucose production in hepatic cells. Importantly, RSK1 inhibition did not impede insulin's ability to activate the mTORC1-S6K1 pathway indicating that RSK1 does not promote S1101 phosphorylation by activation of this pathway. Finally, we found a close correlation between the activation of RSK1 and the phosphorylation of IRS-1 S1101 in high-fat fed obese insulin-resistant mice. We propose that RSK1 is a novel regulator of insulin signaling and glucose metabolism by promoting IRS-1

S1101 phosphorylation. This work could lead to new therapeutic strategies to alleviate insulin resistance in obese patients.

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SERUM LIPID LEVELS AND OBESITY PARAMETERS IN RELATION TO THE HOMA-IR INDEX IN ADOLESCENTS; RESULTS FROM BRAMS-BRAZILIAN METABOLIC SYNDROME STUDY

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Introduction: Childhood obesity represents a major contributor to the adult obesity epidemic and it is associated with an increased risk for several metabolic complications, such as insulin resistance (IR).

Objective: We compared the serum lipid levels and the anthropometric parameters of central obesity and general obesity across quartiles of HOMA-IR, in adolescents with different levels of adiposity.

Methods: Two hundred thirty five adolescents (10-18 years) were studied. Waist circumference (WC), sagittal abdominal diameter (SAD) and body mass index (BMI) were assessed. Dosages: fasting glucose, insulin, total cholesterol and its fractions and triglycerides. Homeostasis model assessment insulin resistance (HOMA-IR) was determined. $p < 0.01$ was considered significant statistically.

Results: For both genders, all the obesity parameters increased in a linear fashion across quartiles of HOMA-IR. A similar pattern was observed for the HDL-cholesterol and triglycerides levels (table 1). Total cholesterol and LDL-cholesterol did not modify across the quartiles of HOMA-IR.

Conclusion: Both total and central obesity are main determinants of insulin resistance. Hence, insulin resistance is closely related to atherogenic dyslipidemia among childhood subjects.

Variables	Girls				Boys			
	Quartile 1 (n=30)	Quartile 2 (n=30)	Quartile 3 (n=29)	Quartile 4 (n=30)	Quartile 1 (n=25)	Quartile 2 (n=25)	Quartile 3 (n=24)	Quartile 4 (n=24)
WC (cm) *	70.0 ± 10.8	73.8 ± 12.0	82.7 ± 14.9	89.9 ± 16.7	67.8 ± 10.2	76.8 ± 12.3	90.2 ± 14.2	101.0 ± 18.9
SAD (cm) *	15.7 ± 2.4	16.5 ± 2.4	18.1 ± 3.2	19.2 ± 3.9	15.1 ± 2.5	16.4 ± 2.8	18.7 ± 3.6	22.3 ± 5.2
BMI (kg/m ²) *	19.9 ± 4.2	22.3 ± 4.3	25.3 ± 5.8	27.9 ± 8.0	18.9 ± 3.4	22.1 ± 4.7	26.8 ± 5.1	31.8 ± 8.8
HDL-cholesterol (mg/dl) *	49.6 ± 11.7	54.7 ± 10.5	45.2 ± 9.8	45.6 ± 8.8	53.8 ± 15.3	49.0 ± 12.4	44.6 ± 11.2	40.2 ± 6.5
Triglycerides (mg/dl) *	72.9 ± 31.1	78.8 ± 21.5	95.3 ± 32.7	104.2 ± 44.7	71.1 ± 44.1	72.8 ± 40.7	108.5 ± 56.6	114 ± 52.8

[Anthropometric parameters and lipid profile in rel]

Supported by CNPq

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ASSOCIATION OF PHYSICAL ACTIVITY, CARDIORESPIRATORY FITNESS, AND ABDOMINAL OBESITY WITH INSULIN RESISTANCE IN OBESE ADULTS

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Objectives: The independent associations between abdominal obesity and objective measures of cardiorespiratory fitness (CRF) and physical activity (PA) with insulin resistance is unknown.

Methods: We studied 147 sedentary, abdominally obese adults, 52 men (WC 116.4 ± 9.20 cm, age 54.3 ± 7.7y) and 95 women (WC 107.2 ± 10.95 cm, age 52.45 ± 7.4y). PA was evaluated by accelerometer (intensity and volume) and CRF by a maximal treadmill exercise test. The homeostasis model of assessment (HOMA-IR) was determined to calculate insulin resistance. Visceral adipose tissue (VAT) was measured by magnetic resonance imaging. Waist circumference was measured at the iliac crest. Analysis revealed no significant interactions for gender thus all analyses collapsed across gender.

Results: Associations were observed between HOMA-IR and WC ($r=0.55$, $p < 0.05$), VAT ($N=105$, $r=0.43$, $p < 0.05$), CRF ($r=-0.21$, $p < 0.05$) and BMI ($r=0.53$, $p < 0.05$). Both PA intensity and volume were not associated with HOMA-IR ($p > 0.10$). WC remained associated with HOMA-IR independent of CRF ($p < 0.05$). However, CRF remained a significant correlate of HOMA-IR after statistical control of VAT ($r=0.25$, $p < 0.05$).

Conclusion: Waist circumference is associated with HOMA-IR independent of objectively measured CRF and PA in obese adults. However, both VAT and CRF are related to HOMA-IR independent of each other. PA by Accelerometry is not associated with HOMA-IR in sedentary obese adults.

Interventional Cardiology

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EXCELLENT FEMORAL OUTCOMES IN VERY LARGE SERIES OF MORBIDLY OBESE PATIENTS UNDERGOING VASCULAR PROCEDURES USING PERCLOSURE DEVICE WITH NO INFECTION

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Background: Morbidly obese (BMI of >35) have a high risk of femoral access complications. Perclose is associated with high infection rate but in previous studies the access was often tried and Perclose deployed by trainees rather than the designated operator. Radial artery access has become extremely preferred in the obese because it is a forgiving approach.

Methods: Our hospital participates in the American College of Cardiology/National Cardiovascular Data Registry (ACC/NCDR) and I analyzed my data only on all the morbidly obese who underwent procedures from 01/01/2006 to 01/31/2012. The complication definitions are ACC/NCDR based. Infection was separately analyzed. All access attempts and Perclose deployment were done only by the operator who was experienced with Perclose and was American Board Certified and not by trainees or any other staff member.

Results: I did a total of 684 patients and Perclose on 515 (75%) with the results as below in the table. The total, overall femoral and the radial (36) patients also showed each individual complication to be below 1%.

Perclose Femoral access number	Mortality	Embolism	Pseudoaneurysm	Dissection	Occlusion	Fistula formation	Bleeding	Infection
515	0%	0%	0%	0%	0%	0%	0.4%	0%

[Excellent Perclose outcomes in morbidly obese]

Conclusions: Femoral Access in morbidly obese patients using Perclose is extremely safe in the hands of operators with extensive experience in the use of this device. This is the largest consecutive series of morbidly obese patients undergoing femoral access and Perclose closure and the excellent results argue to stay with this approach in some patients and not radial access for everyone.

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EXCELLENT FEMORAL OUTCOMES IN MORBIDLY OBESE WHEN ALL ACCESS ATTEMPTS AND CLOSURE DEVICES ARE DONE BY EXPERIENCED CARDIOLOGISTS ONLY

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Morbidly obese (BMI of >35) have a high risk of femoral access complications but in previous studies, the access was often tried by trainees rather than the designated operator. Radial artery has become preferred access in the obese because it is more forgiving not being an end artery and easier to compress. This may favor radial access especially with inexperienced operators with higher risk of arterial damage.

Methods: Our hospital participates in the American College of Cardiology/National Cardiovascular Data Registry (ACC/NCDR) and we analyzed our data in only the morbidly obese patients who underwent procedures from 01/01/2006 to 01/31/2012. No patients were excluded. The complication definitions are ACC/NCDR based. All access attempts were made by the designated operators who were American Board Certified in interventional cardiology (our definition of experienced operator) and not by trainees or any other staff member.

Results: We did a total of 3748 patients with over 92% by femoral approach

with the results as below in the table. Only 267 of these were done through the radial approach but with each individual complication below 1% again.

Total cases	Mortality	Bleeding	Dissection	Occlusion	Thrombosis	Pseudoaneurysm	Embolism	Fistula
3748	0.4%	0.4%	0.1%	0%	0%	0%	0%	0%

[Excellent femoral results by experienced operators]

Conclusions: Femoral access in morbidly obese patients is extremely safe in the hands of operators with extensive experience. This very large series of morbidly obese patients undergoing femoral access and the excellent results obtained argue to stay with this approach in some patients and not radial access for everyone.

Obesity

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CHANGES IN KNEE PAIN AND PERCEIVED NEED FOR SURGERY AFTER DIETARY WEIGHT LOSS IN OBESE WOMEN DIAGNOSED WITH KNEE OSTEOARTHRITIS

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Introduction: Obesity increases the incidence of many chronic conditions, including osteoarthritis (OA). An increased biomechanical load due to excessive body weight intensifies deterioration of the cartilage and causes vary degrees of stiffness, swelling and pain.

Objectives: This pilot study had two main objectives, the first aimed to investigate whether weight loss is associated with a reduction in perceived need for Total Knee Replacement (TKR) surgery due to decrease in knee pain and improvement in function. The second aimed to identify what percentage of weight loss is associated with reduction in knee pain to a point where the need for surgery could be prolonged or alleviated. 34 subjects were recruited into the study.

Designs: Women between 40 and 65 years old with morbid obesity (BMI ≥ 35) and osteoarthritis of the knee were pre-selected. If participants passed study criteria the WOMAC, SF-36, 6MWT and TUG were obtained from baseline and subjects were enrolled into a 6 month weight loss program.

Results: Repeated measures ANOVA revealed that at 6 weeks the mean body weight reduction was 9.5%, followed by a significant reduction ($p=0.015$) in WOMAC scores. However, by 3 months of diet a significant reduction of 16.5% in body weight corresponded to a significant decrease of 37% in knee pain and 50% in perceived need for surgery.

Conclusion: These results suggest that an initial loss of 16.5% of body weight for obese women was significant enough to reduce pain and postpone their intent to have surgery in 50%.

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CLINICAL CHARACTERISTICS, DIETARY INTAKE AND REGULARITY OF EATING BEHAVIOR IN JAPANESE FEMALE OBESE PATIENTS WITH OVULATORY DYSFUNCTION

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Objectives: To determine clinical characteristics, dietary intake and regularity of eating behavior among Japanese female obese patients with ovulatory dysfunction.

Methods: We examined fasting serum leptin, estradiol (E2), dietary intake and regularity of eating behavior in two groups, one was control group that was Japanese women with regular menstrual cycle and other was ovulatory dysfunction group that was patients with ovulatory dysfunction. Further, the two groups were divided into average weight (AW: 18.5 kg/m² - 25.0 kg/m²), and overweight (OW: 25.0 kg/m² \leq) respectively. All subjects were recruited at the Outpatient Clinic. Their dietary intakes were recorded for three consecutive weekdays. The average of the three days was calculated as one day.

Results: A total of 161 participants were included in the analyses. The number was 17 in control AW group, 11 in control OW group, 44 in ovulatory dysfunction AW group and 89 in ovulatory dysfunction OW group. Leptin concentrations were correlated with body mass index (BMI) in four groups. No significant differences in E2 level among four groups. Energy intake in OW group was higher than that in AW group in control and ovulatory dysfunction groups. Ovulatory dysfunction group reported higher n-3 fatty acids/n-6 fatty acids ratio

on dietary intake compared to control group ($p < 0.05$). Ovulatory dysfunction group had higher irregularity of eating behavior ($p < 0.05$) than control group.

Conclusions: Clinical characteristics, dietary intake and regularity of eating behavior in Japanese female obese patients with ovulatory dysfunction were different from those of Japanese women with regular menstrual cycle.

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CALCIUM PLUS VITAMIN D SUPPLEMENTATION FACILITATED BODY WEIGHT AND FAT LOSS IN VERY-LOW CALCIUM CONSUMERS

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Background: Recent studies provided inconsistent results for the beneficial effect of calcium supplementation on weight management in overweight or obese adults.

Objective: To test the hypothesis that calcium supplementation can enhance weight and fat loss during energy restriction in overweight or obese subjects with very-low habitual calcium consumption.

Design: Fifty-three overweight or obese college students aged 18 to 25 y were randomly assigned in a randomized, open-label, parallel groups, controlled clinical trial for a period of 12 weeks to receive either an energy-restricted diet (~500 kcal/d) supplemented with one tablet/d of calcium+vitamin D supplement (600 mg elemental calcium and 125 IU vitamin D/tablet) or energy restriction of 500 kcal/d alone.

Results: Eighty-one percent of participants (6 men; 37 women) completed the study. After 12 weeks of energy restriction, a significant reduction was observed in all anthropometric variables in both groups. Significant greater decrease was observed in the calcium+D group in changes with body weight loss (5.06 ± 2.88 vs 3.41 ± 1.88 kg; $P < 0.05$) and fat loss (3.39 ± 1.93 vs 1.81 ± 1.22 kg; $P < 0.01$) compared with that in the control group. Subjects in the calcium+D group also exhibited a greater reduction in visceral fat mass and visceral fat area ($P < 0.01$ for both) compared with those in the control group. No significant difference was detected in changes in lean mass ($P > 0.05$).

Conclusion: Calcium plus vitamin D supplementation for 12 weeks facilitated weight and fat loss during energy restriction in overweight or obese subjects with very-low habitual calcium consumption. This study was registered on ClinicalTrials.gov. (NCT01447433).

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ARGININE 16 GLYCINE POLYMORPHISM IN BETA 2-ADRENERGIC RECEPTOR GENE IS ASSOCIATED WITH OBESITY, HYPERLIPIDEMIA AND HYPERLEPTINEMIA IN SAUDIS**M.H. Daghestani***Zoology Department, King Saud University, Riyadh, Saudi Arabia*

Background: Functional polymorphisms have been identified in Arg16Gly and Gln27Glu in the gene encoding the Beta2-adrenergic receptor (2AR). Several studies in different populations have shown an association between codon 16 polymorphism of the 2AR gene and obesity.

Aim: We conducted a case-control investigation to determine the association between 2AR gene polymorphisms at codon 16 and obesity in Saudi individuals.

Subjects and methods: The study group included 329 non-related individuals [males: 109 (33.1%) and females: 220 (66.9%)], age ranging from 18 to 36 years. Metabolic parameters such as glucose, triglycerides, cholesterol, HDL- and LDL-cholesterol, insulin, and leptin were analyzed and anthropometric measurements including body mass index (BMI) were obtained. The polymorphism of Arg16Gly at codon 16 in 2AR gene was genotyped by polymerase chain reaction (PCR), followed by DNA sequencing. The subjects were divided into three groups (normal weight, overweight and obese) based on their BMI. The levels of the metabolic parameters and frequency of Arg16Gly polymorphism were calculated separately for each group.

Results: Overweight and obese subjects had a significantly higher frequency of Gly16 compared with normal weight subjects; however, no difference in frequency was observed between male and female subjects. The subjects carrying Gly16 allele regardless of BMI had greater total fat mass, waist and hip circumference, W/H ratio, cholesterol, triglyceride, LDL-cholesterol and plasma leptin, compared to those with the wild type allele.

Conclusions: These findings suggest that Arg16 Gly polymorphism in 2AR gene is associated with the development of obesity and influences lipid and leptin levels in Saudi populations.

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MITOCHONDRIAL DYSFUNCTION OF ENDOTHELIAL PROGENITOR CELLS FROM PERIPHERAL BLOOD IN OBESITY**A.W. Shi, X.R. Guo, X.F. Shen***Nanjing Medical University, Affiliated Nanjing Maternity and Child Health Care Hospital, Nanjing, China*

Objective: To explore the functions of endothelial progenitor cells (EPCs) and mitochondrial functions of EPCs from peripheral blood in obesity.

Methods: Human EPCs were isolated and cultivated from human peripheral blood and characterized. Cell proliferation, migration and in vitro vasculogenesis were assayed using the MTT assay, modified Boyden chamber, and in vitro vasculogenesis detection respectively. The mitochondrial morphology and functions were also observed. The levels of mitochondrial number, mitochondrial morphology and ROS were also assayed using fluorescence PCR, electron microscope fluorescence probe DCFDA (2',7'-Dichlorofluorescein diacetate) respectively.

Results: EPCs from peripheral blood of obesity had lower EPCs functions of migration and vasculogenesis in vitro compared with control. Mitochondrial functions of EPCs had also changed. Morphological of EPCs mitochondria became smaller and condensed, and some appeared hollow and absent of cristae. Mitochondrial membrane potential and production of intracellular ATP had decreased, as well as accumulation of significant amounts of reactive oxygen species (ROS).

Conclusion: The results showed that obesity had decreased EPCs adhesion,

migration and in vitro vasculogenesis. Obesity had resulted in an abnormal morphology, a decrease in mitochondrial number and mitochondrial membrane potential and an increase in ROS levels. Our results indicated that mitochondrial dysfunction of EPCs might be responsible for the decreased function of EPCs in obesity.

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DOES AGE INFLUENCE OBESITY-RELATED HEALTH RISK?**K.L. Canning, J.L. Kuk***Kinesiology & Health Science, York University, Toronto, ON, Canada*

Objectives: To investigate the effect of age on the relationship between obesity and health risk associated with different metabolic conditions.

Methods: A sample of 9,414 adults, from the Third National Health and Nutrition Examination Survey was used. Cardiovascular disease (CVD), type II diabetes (T2D), hyperlipidemia and hypertension were categorized using measured metabolic risk factors, physician diagnosis or medication use. Individuals were categorized by age (years) (young: 18-40, middle: 40-65, old: 65-75, very old: ≥75) and standard BMI cutoffs. Middle aged, normal weight was the referent group.

Results: In females, the odds for CVD increased across all age and BMI categories. In males, the odds for CVD increased across all age and BMI categories except in old and very old wherein BMI was not associated with CVD. Odds of T2D increased across age and BMI categories, but the strength of the association was weakened in the very old group. The odds for hyperlipidemia increased across age and BMI categories however within the old and very old groups, the ORs were lower, and the association between BMI and hyperlipidemia was not as robust. For hypertension, the odds increased across all age and BMI categories wherein the association between obesity and hypertension was more pronounced with age.

Conclusions: The health risk associated with different metabolic conditions increases across all age and BMI categories. However, a weaker association was observed in very old individuals who were overweight or obese for CVD, T2D and hyperlipidemia, whereas a stronger association was observed with hypertension.

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OBESITY INCREASES THE RISK FOR CKD: IS THERE A DIRECT OR INDIRECT ROLE?**L. Nandagopal, R. Krishnamoorthi, P. Gunasekaran, T. Vettese***Internal Medicine, Wayne State University, Detroit Medical Center, Detroit, MI, USA*

Introduction: Obesity is traditionally believed to increase the risk for Hypertension (HTN) and Diabetes Mellitus (DM) and thereby lead to Chronic Kidney Disease (CKD). However, recent studies suggest obesity as an independent risk factor for CKD.

Objective: To investigate if obesity is an independent risk factor for CKD.

Methods: We analyzed the limited access dataset of the National Ambulatory Medical Care Survey (NAMCS 2005 to 2009) for ambulatory care visits. Patients above 20 years were included. Patients were classified into subgroups based on the WHO definition of obesity and prevalence of CKD was calculated. We then adjusted for presence of HTN/DM. Statistical analysis was done using multivariate logistic regression.

Results: Among 1,19,973 patient visits, 1393 CKD patients had details on BMI. Patients with BMI >25 had a higher risk for CKD (table). However, after adjustment for HTN/DM, the odds ratio became insignificant (table).

BMI	Odds Ratio before adjusting for HTN/DM	Adjusted Odds Ratio
< 25	1	1
25-30	1.19 (1.003 - 1.42)	1.01 (0.86 - 1.21)
30-35	1.50 (1.23 - 1.82)	1.10 (0.90 - 1.35)
35-40	1.50 (1.12 - 2.00)	1.02 (0.76 - 1.36)
>40	1.52 (1.07 - 2.15)	0.97 (0.69 - 1.38)

[Risk of CKD in Obesity]

Conclusion: The increased risk for CKD with BMI>25 appears to be mediated through increased risk for Hypertension and Diabetes. Our results did not suggest an independent role for obesity in CKD. Given the limitations of our retrospective design, future prospective studies are needed to establish a primary association between obesity and CKD.

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ASSOCIATION OF SERUM LEPTIN CONCENTRATION WITH DIFFERENT LEVELS OF ADIPOSITY MEASURES, LIFESTYLES AND INSULIN RESISTANCE

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Objective: To compare the association of various adiposity measures with leptin, and to examine the role of leptin in insulin resistance in Chinese men and women.

Methods: A total of 1234 subjects (572 men and 662 women) aged ≥ 18 y was sampled by the procedure. Adiposity measures included BMI, waist circumference, hip circumference, WHR, upper arm circumference, triceps skinfold and body fat percentage. Serum leptin concentrations were measured by an ELISA method. The homeostasis model (HOMA-IR) was applied to estimate insulin resistance.

Results: All adiposity measures were significantly correlated with serum leptin concentrations in both men and women. In men, BMI was the variable which was most strongly correlated with leptin, whereas triceps skinfold was most sensitive for women. More importantly, serum leptin levels among the insulin resistant subjects were almost double compared to the subjects who had normal insulin sensitivity at the same level of adiposity in both men and women, after controlling for potential confounders, regardless of subject's adiposity status. In addition, HOMA-IR increased significantly across leptin quintiles after adjustment ($p < 0.0001$).

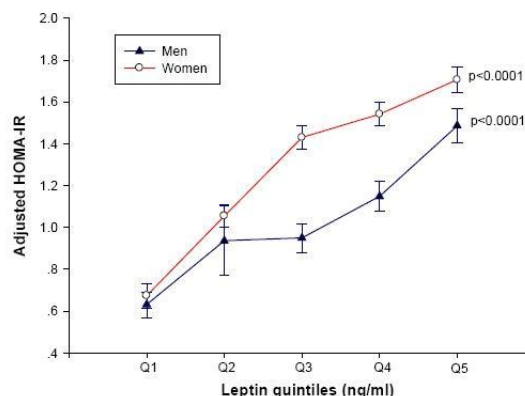


Figure 1 The association between HOMA-IR and serum leptin concentrations in men and women after adjustment for age, BMI, total energy intake (quintile), physical activity (quintile) and smoking status (yes/no). Geometric means \pm SEM.

[Figure 1]

	Men			Women		
	IR -	IR +	P	IR -	IR +	P
BMI categories						
Normal	0.59 \pm 0.08	1.90 \pm 0.24	<0.0001	5.23 \pm 0.06	11.12 \pm 0.13	<0.0001
Overweight	2.43 \pm 0.10	5.03 \pm 0.15	<0.0001	10.06 \pm 0.06	16.48 \pm 0.09	<0.0001
Obesity	4.85 \pm 0.14	7.87 \pm 0.08	0.004	12.20 \pm 0.23	24.20 \pm 0.23	0.052
WC categories						
Normal	0.75 \pm 0.07	2.76 \pm 0.19	<0.0001	5.31 \pm 0.06	11.43 \pm 0.14	<0.0001
Central obesity	3.33 \pm 0.11	6.44 \pm 0.11	<0.0001	9.68 \pm 0.06	17.67 \pm 0.09	<0.0001

[Table 1]

Conclusions: There is a significant association between HOMA-IR and serum leptin concentrations in Chinese men and women, independently of adiposity levels. This may suggest that serum leptin concentration is an important predictor of insulin resistance and other metabolic risks irrespective of obesity levels. Furthermore, leptin levels may be used to identify the cardio-metabolic risk in obese and overweight population.

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MORBID OBESITY AND OXIDATIVE STRESS. COMPARATIVE STUDY OF CASE-CONTROL

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Introduction: Oxidative stress is related to multiple pathologies, including arterial hypertension, diabetes and dyslipidemia, which integrate the so-called metabolic syndrome that is closely associated with morbid obesity.

The aim of this paper is to evaluate and quantify the presence of oxidative stress in non surgically treated morbidly obese patients compared with non-obese patients without any other pathology.

Materials and methods: Main metabolites in oxidative stress are studied and compared in two groups: Group A: control group of non obese patients with no comorbidities (ASA I) and group B with morbid obese patients.

The studied variables were: MDA blood concentration, 8-oxo-dG in blood and the urine elimination, GSH in blood and the relationship between GSSG/GSH in blood.

Results: There were no differences between control group (n=50) and morbidly obese group (n=50) related to age and gender. Mean values of BMI in both groups were 22.31 and 50.35 respectively.

The mean values of all metabolites studied were higher in group B compared to A, with statistically significant differences ($p < 0.01$).

Discussion: The levels of all metabolites implied in oxidative stress are higher, with statistical significance, in the group of morbidly obese patients compared to a group of non obese non morbid population.

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OBESITY IS ASSOCIATED WITH ABORTION AMONG IRANIAN WOMEN

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Objective: To study the association between obesity and some factors and abortion in Iranian married women.

Methods: Data from the National Health Survey considered in this investigation. Multivariate statistical techniques included 1788 married women less than 50 years of age.

Results: The results are presented as odds ratios and their 95 percent confidence intervals. After adjustment for age at menarche, age at first marriage, age at first pregnancy, economic index, workforce status, education level, place of residence, smoking status and cholesterol level, abortion odds ratio was 1.33(95% CI: 1.03-1.72) for obese women.

Conclusion: Our finding may point toward a better understanding of the social and cultural mechanisms of obesity prior to pregnancy.

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THE EFFECTS OF CIRCUIT HYDRAULIC-COMBINED EXERCISE TRAINING ON BODY COMPOSITION, BLOOD PRESSURE, AND BLOOD LIPIDS IN OBESE WOMEN

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The purpose of this study was to examine the effects of a 12 week of 30 minutes of circuit hydraulic-resistance exercise training program on body composition, blood pressure, and blood lipids in obese women. The study group was comprised of 29 obese middle-aged women, with percent (%) body fat over 30. The subjects were randomly divided into two groups: control group (n=15); training group (n=14). The training group participated in 12 weeks of supervised circuit exercise training program which is whole body resistance exercise. They did 3 days per week for 30 minutes in a day. The resistance exercise program consisted of 1 set of 30 repetitions at low intensity of hydraulic-resistance machine. Each resistance exercise included walking exercise on the air-board for 1minute. They maintained an intensity of 60 to 80% of their maximum heart rate (MHR) during the exercise training. The control group was not participated in any exercise program. All of our variables were improved after the intervention. An interaction effect between time and group on body weight, BMI, % body fat, WHR, SBP, DBP, TC, TG, HDL-C, and LDL-C was observed ($p < 0.01$). In conclusion, the results of the current study suggest that moderate-low intensity circuit hydraulic-resistance exercise training program, with 12 weeks of duration, could be enough to positively influence on body composition, blood pressure, and blood lipids in obesity women.

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SHIKONIN SUPPRESSES ADIPOCYTE DIFFERENTIATION THROUGH DOWN-REGULATION OF ERK 1/2 PHOSPHORYLATION

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Objectives: The naphthoquinone pigment, shikonin is a major component of Lithospermum erythrorhizon and has been shown to have various biological functions including antimicrobial, anti-inflammatory, and antitumor effects. We investigated the effect of Shikonin on adipocyte differentiation in 3T3-L1 cells. Shikonin effectively suppressed adipogenesis as we confirmed decreased lipid droplet in 3T3-L1 cells.

Methods: To investigate the effects of shikonin on adipocyte differentiation, 3T3-L1 cells were induced to differentiate by MDI for 8days in the presence of 0-2 μ M of shikonin. Oil Red O staining was performed to determine the lipid accumulation in 3T3-L1 cells. To elucidate the inhibitory mechanism of shikonin on adipogenic transcription factors, phosphorylation levels of ERK and gene expression, were analyzed by western blotting and quantitative real time PCR. In order to further confirm that shikonin inhibits adipogenic differentiation through downregulation of ERK1/2 activity, 3T3-L1 cells treated with shikonin in the presence of FGF-2, an activator of the ERK1/2 signaling pathway.

Results: Shikonin down-regulated the mRNA and protein levels of 2 major transcription factors, PPAR α and C/EBP α and adipocyte specific gene, aP2 in a dose-dependent manner. The adipocyte differentiation was mediated by the ERK1/2 signaling pathway, which was assessed by pretreatment with the PD98059 (MEK1/2 inhibitor). Shikonin was shown to decrease the phosphorylation of ERK1/2 during the early stage of adipogenesis. We also confirmed that FGF-2 (MEK1/2 activator)-stimulated ERK1/2 activity was attenuated by shikonin.

Conclusions: These results show that shikonin inhibits adipogenic differentiation via suppression of ERK signaling pathway at the early stage of adipogenesis.

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BEING NORMAL WEIGHT, BUT FEELING OVERWEIGHT IN ADOLESCENCE MAY AFFECT WEIGHT DEVELOPMENT INTO YOUNG ADULTHOOD - A 11 YEAR FOLLOW-UP

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Objectives: To explore if self-perceived overweight in normal weight adolescents influence their weight development into young adulthood and if so, whether physical activity moderate this association.

Methods: A longitudinal study of 1196 normal weight adolescents (13-19 yrs) who participated in Young-HUNT 1 (1995-97) and eleven years later in the HUNT 3 survey (2006-08). At both surveys, self administered questionnaires, including lifestyle and health issues, were completed along with a clinical examination including standardized measurements of height, weight, and waist circumference. Linear regression analyses, with change in BMI or waist circumference (WC) at follow-up as outcome adjusted for age, age squared, sex and other relevant cofactors were performed.

Results: Our prevalence data, adjusted for age, revealed that more adolescents who perceived themselves as overweight, but who were normal weight, were classified as overweight or obese ten years later than those who perceived their weight about right at baseline.

In the adjusted linear regression models, adolescents, defined as being normal weight, but who perceived themselves as overweight had a larger weight gain into young adulthood compared to adolescents who perceived themselves as normal weight (difference in BMI: 0.66 units [CI95%: 0.1,1.2] and in WC :3.46 cm [CI95%:1.8,5.1]). The level of physical activity was not found to moderate this association.

Conclusions: This study reveals that self-perceived overweight during adolescence may affect development of weight from adolescence into young adulthood. Public health interventions addressed to prevent overweight may benefit from focusing on body shapes which do not jeopardise health and how to communicate these messages.

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CHANGES IN LIPID PROFILE PARAMETERS WITH RELATION TO BLOOD PRESSURE AND OBESITY

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Objectives: Obesity increases the risk of numerous diseases, partly through mechanical effect of the mass of extra tissues on the functions of various organs and systems and partly as consequence of changes in metabolism. It has shown that obesity, dyslipidaemia and hypertension are interrelated medical problems associated with an increased risk of numerous diseases.

Methods: A study was conducted to determine relationship of obesity with the blood pressure patterns and lipid parameters in preview of its unique local diet patterns. A total of 200 non-diabetic human subjects of either sex were included in the study. They were categorized on the basis of body mass index (BMI) as obese and non-obese. Each group was further divided into 2 subgroups; hypertensive and normotensive. Fasting lipid profile (total cholesterol, LDL-and HDL-Cholesterols and total triglycerides) in each group was determined to compare the levels among various groups.

Results: Means of all parameters, except LDL-C, were higher in females than males; among these BMI and HDL-C showed significant difference. There was a significant negative correlation of diastolic blood pressure with HDL-C in obese

subjects; all the other parameters were non-significantly correlated. In the non-obese subjects, there was a significant positive correlation between systolic (SBP) and diastolic (DBP) blood pressures and LDL-C. All other parameters were found non-significantly correlated. The analysis of variance was done in four groups.

Conclusions: BMI, SBP, DBP, LDL-C and total cholesterol had significantly different means in the above four groups, while HDL-C and total triglycerides were statistically non-significant.

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A ROLE FOR MC4R VARIANTS AND DIABETIC STATUS IN WEIGHT LOSS FOLLOWING GASTRIC BYPASS SURGERY

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Factors that influence long-term weight loss after Roux-en-Y gastric bypass surgery (RYGB) are not well defined. Melanocortin 4 receptors (MC4R) play critical roles in maintaining energy homeostasis, satiety and glucose metabolism. Rare variants of the *MC4R* comprise the most prevalent monogenetic obesity disorder. Two common *MC4R* alleles, *I251L* and *V103I*, on the other hand are negatively associated with obesity. We examined the role of *MC4R* variants in long-term weight loss after RYGB in a cohort of >1400 obese patients during a 48-month period before and after surgery. We found 80 patients with rare and common variants of *MC4R* in the RYGB cohort. Among these, 26 patients carry the *I251L* variant, 36 patients carry the *V103I* variant, and 18 patients carry rare variants. Overall, *I251L* allele carriers lost 9% more weight (~9 kg) compared to the non-carriers, continued rapid weight loss longer, regained less weight, and had lower pre-surgery HOMA-IR values. In addition, these patients resolved their type 2 diabetes faster and more completely compared to non-carriers. Weight loss was not different among patients having the *V103I* allele, any rare variant, or the reference allele. Non-diabetic reference allele carriers initially lost more weight compared to their diabetic counterparts, however this difference dissipated in the long term. Together our data support the notion that a single functional copy of *MC4R* is sufficient for Weight loss after RYGB. Carrying a copy of the *I251L* allele improves weight loss outcomes. Diabetic status has a small short-term effect on weight loss after RYGB.

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UNREVEALING A NOVEL ASSOCIATION OF CHOLESTEROL ESTER STORAGE DISEASE (CESD) AND NAFLD - A SIMILAR CLINICAL SPECTRUM WITH DIFFERENT ETIOLOGY

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Objectives: NAFLD is the most evolving global morbidity progressing to liver cirrhosis, carcinoma and transplant. Clinical Spectrum is heterogeneous with biochemical and histological diversity. CESD is a part of metabolic storage disease with an intrinsic Lysosomal Acid Lipase (LAL) deficiency, mimicking clinical overlap with NAFLD. This clinical study evaluates the clinical overlap of similar metabolic syndromes with different etiology and outcome.

Methods: Three hundred (n=300) patients with fatty liver disease with mean age 46, male/female 3:1. Patients underwent abdominal sonogram, carotid artery doppler, serum fibro sure and NASH score. Liver biopsy was performed in NASH group. Patients were divided into Group A (n=100) control-mean BMI 27.8% and no hepato-splenomegaly, Group B (n=100) NAFLD-BMI< 26%, and Group C, NASH (n=100)-BMI>30 %.

Results: The LAL levels were high in 18/25(72%) in group B, of which all were heterozygotes. 7/25(28%) in group C had elevated LAL, of which 6/7(86%) were heterozygotes while 1/7(14%) was compound heterozygotes. The carotid artery intimal thickness(29-39%), serum fibrosure, NASH score, RBP4, HOMA score, HbA1c, Triglyceride, free fatty acid, TNF alpha were 14%, < 2.21, < 0.2, 1.25, <

1.1, 5.9, 227, 0.23 and 0.5 respectively in GROUP A; 27%, < 0.4, < 0.4, 2.6, 1.6, 6.1, 247, 0.44 and 0.9 respectively in GROUP B and 40%, >0.4, >0.8, >4.5, >2.2, >6.5, >286, >0.96 and >1.2 in GROUP C. The liver biopsy in group C showed Steatosis in 60%, necroinflammation in 30% and >40% F3 (Metavir stage of fibrosis).

Conclusion: Estimated prevalence of LAL is 8.3% compared to the historical data (25/ one million), has heterogeneity with overlap with NAFLD and NASH. CESD is an integral part of Fatty liver disease.

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OUTCOMES OF PREGNANCIES AFTER SLEEVE GASTRECTOMY

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Background: Obesity increases the rate of maternal and newborn complications. For many years, sleeve gastrectomy (SG) has gained acceptance as a weight loss surgery but there is still a lack of information regarding subsequent pregnancies.

The series: Based on the information gained at follow up consultation, among 472 SG (341 primary, 131 as a revision), there were 410 females and 39 recorded pregnancies in 34 women, but data are available for 27 patients and 32 pregnancies. For those 27 patients, before SG mean age was: 29 (19-46); mean BMI: 45.2 (36.5-61), 1 had type 2 diabetes, 3 hypertension, 3 SAS, 6 an obvious fertility problems.

Results: Mean time elapsed between SG and pregnancy was: 22 months (6 - 69), mean BMI before pregnancy was 28.1 (20.3-38.9).

During the pregnancy mean weight fluctuation was + 9.6 kg (-25 to + 26). Only 2 patients were presenting vomiting after 3 months, 4 had a gestational T2D only one required insulin, 2 had hypertension, no preeclampsia, no SAS.

Neonatal outcomes: premature delivery 5 (before 37 weeks), 5 after 42 weeks, the cesarean delivery encountered in 9, 2 low birth weight (< 2.5kg), no macrosomia, 1 late miscarriage (at 18 w) and 2 intra uterine deaths (1 at 26 w, 1 at 37 w).

Conclusion: Weight loss after SG seems to resolve fertility problems and to reduce the rate of maternal and new born complications.

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ASSESSMENT OF NUTRITIONAL STATUS OF IRANIAN POSTGRADUATE STUDENTS IN UNIVERSITI PUTRA MALAYSIA, MALAYSIA

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The purpose of this study was to evaluate the prevalence of underweight, overweight, and obesity, physical activity and dietary intake among Iranian postgraduate students in Universiti Putra Malaysia. The transition period from late adolescence to adulthood is a predominantly difficult time where many behavioral and physiological changes happen. Eating behaviors, diet quality and physical activity may adjust throughout this transition resulting in a greater risk of obesity. A self administrated questionnaire addressing socio-demographic factors, dietary intake (24-hour recall) and physical activity was completed by 210 female and male students aged 22-55 years. Anthropometric factors (height, weight, waist and hip circumference and) were measured in this study. Body Mass Index (BMI), Waist Hip Ratio (WHR) was calculated for each subject. WHO classification was used for defining underweight (BMI< 18.5kg/m²), overweight (BMI=25-29.9 kg/m²) and obesity (BMI>30 kg/m²), (WHR ≥ 1.0 for male and WHR≥ 0.85 for female). The Statistical Package for the Social

Sciences (SPSS version 17) was used to analyze all the data. Results was considered to be significant when the observed significance level is < 0.05. A total of 210 Iranian students postgraduate female (53.4%) and (47.6%) male with a mean age of 30.69 ± 5.04 years were participated in this study. About 51.9% and 49% were Master and PhD students respectively. The results indicated that the prevalence of underweight, overweight and obesity were 7.1 %, 24.3% and 3.8% respectively and also about 6.7% of students were high risk in WHR. The total energy intake of the respondents was 1896±372 kcal. The calorie intake of female 1887±364 kcal was lower than male 1905±383 kcal. The total mean fat, carbohydrate and protein intake was 82 ± 22.1 g, 234±50.3 g and 62±12.9 g respectively. For physical activity result showed that about 50%, 22.4% and 26.7% had low, moderate and high physical activity level, respectively. Results also noted a statistically significant association between physical activity (r=0.155, p< 0.05), WHR (r=0.64, p< 0.01) and BMI. Moreover, there was coloration between physical activity, dietary intake and BMI. Therefore, there is an essential to improve a nutrition education program for Iranian students so that help them change their food habits and life style factors keep away from the negative health consequences of being overweight or underweight. This is an important issue for future research.

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BODY COMPOSITION IN PATIENTS WITH C OBESITY: ROLE OF DIETOTHERAPY

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Objectives: To estimate the influence of hypocaloric diet on anthropometric parameters, body composition in patients with obesity.

Methods: 300 patients with obesity were examined. At the time of initial assessment body mass index (BMI) averaged 41.9±0.4 kg/m², waist circumference (OT) - 110.6±3.2 cm, hip circumference (OB) - 117.1 ±3.3 cm, the ratio of OT / OB - 0.95±0.9. All patients received a hypocaloric diet with energy value of 1500 kcal/day. Before and after 2 weeks of dietary intervention the dynamics of the indicators of body composition using bioimpedance analysis were investigated.

Results: Average body weight had decreased from an of 114.6±1.3 to 108.8±1.2 kg (p < 0.001); BMI - from 41.9±0.4 to 39.6±0.4 kg/m² (p < 0.001); the ratio OT/OF - 0.95±0.01 to 0.93±0.01 (p< 0.01). Body fat mass had reduced from 55.5±0.8 to 51.4±0.8 kg (p< 0.001). The content of total water had decreased from 43.5±0.5 to 42.2±0.5 l (p < 0.001). Decrease in body weight positively correlated with reduce of content of body fat mass (r=0.631, p< 0.01).

Conclusions: The application of hypocaloric diet is accompanied with clinically significant decrease in body weight and fat mass in patients with abdominal obesity, thereby reducing the risk of obesity-associated diseases.

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ASSOCIATION OF FRUIT AND VEGETABLE CONSUMPTION WITH ABDOMINAL OBESITY AMONG WOMEN LIVING IN TEHRAN, IRANA. Rezazadeh¹, S. Setayeshgar², B. Ashidkhani³, N. Omidvar³

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Objectives: Abdominal obesity is one the risk factors of metabolic Syndrome. The prevalence of central adiposity has increased in Iran, especially in women. The aim of this study was to examine the association of fruits and vegetables intake with central obesity risk in women living in Tehran.

Methods: In this cross-sectional study, 460 women aged 20-50 years were selected by stratified random sampling in Tehran. Dietary intakes were characterized using validated semi-quantitative food frequency questionnaires. Weight, height and waist circumference (WC) were measured with standard methods. Central obesity was defined as WC \geq 88 cm. Multivariate logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI). All models were adjusted for age, smoking, physical activity, socioeconomic status and energy intake.

Results: The mean age of participants was 33.5 ± 9.7 y, energy intake 2672.2 ± 880.6 kcal/day, mean daily intake of fruits and vegetables 1259.5 ± 943.4 g/day, WC 84.7 ± 8.5 cm, 171 subjects (38.8%) were centrally obese. Mean daily intake of fruits and vegetables (adjusted for energy intake) was lower among subjects with central obesity compared to normal subjects ($p < 0.001$). After adjusting for confounders, being in the highest quartile category of fruit and vegetable intake was significantly associated with 48% reduced risk of being centrally obese, compared to the lower quartile (OR: 0.52 95% CI: 0.29-0.94, p -trend: $p < 0.001$).

Conclusion: It appears that fruit and vegetable intakes may have a protective effect against central obesity in the studied women. So, nutritional education in order to increase the consumption of fruit and vegetables should be conducted.

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HYPERTENSION, DIABETES AND DYSLIPIDEMIA IN MEXICAN OBESE ADULTS: RESULTS FROM A NATIONAL SURVEY

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Objective: To evaluate the associations between obesity and abdominal adiposity with: hypertension, diabetes mellitus and dyslipidemia in adults over 20 years who participated in the National Health and Nutrition Survey 2006 (ENSANUT 2006).

Methods: We analyzed the information of anthropometry and comorbidities associated with obesity and abdominal adiposity in adults of ENSANUT 2006. Obesity was categorized according to WHO classification for BMI (≥ 30 kg/m²), and abdominal adiposity by IDF (waist circumference ≥ 90 cm in males or ≥ 80 cm in females). Hypertension was classified according to JNC VII, diabetes by ADA and dyslipidemia by NCEP. The presence of risk factor was entered into the final model to explore the independent association with BMI and WC.

Results: A total of 3,884 adults aged 20 to 59 years were analyzed, 60.1% were women. The possibility of hypertension was 1.8 times higher in overweight adults ($p = 0.017$) and 3.6 times higher in adults with obesity ($p < 0.001$). In the case of diabetes, the possibility was 2.4 times higher in adults with obesity ($p = 0.025$). The possibility of hypertension, diabetes and dyslipidemia was 3.8 times higher in adults with obesity than in adults with normal BMI ($p = 0.001$). Abdominal adiposity increased 2 to 3 times the possibility of developing hypertension, diabetes and dyslipidemia.

Conclusions: Obesity and abdominal adiposity are a modifiable risk factors that increases the risk of chronic diseases such hypertension, diabetes and dyslipidemia. Timely treatment and prevention of obesity could help reduce the risk of these comorbidities.

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HIGH-SENSITIVE C-REACTIVE PROTEIN LEVEL AND RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM ACTIVITY IN PATIENTS WITH ABDOMINAL OBESITYE. Baranova¹, E. Bazhenova^{1,2}, O. Belyaeva¹, A. Berezina², T. Karonova¹, D. Kolodina¹, T. Ivanova², E. Nikolaychuk¹, N. Korelskaya¹, O. Berkovich¹, E. Shlyakhto²

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Objective: To evaluate high-sensitive C-reactive protein (hsCRP) level and renin-angiotensin-aldosterone system (RAAS) activity in patients with abdominal obesity (AO).

Materials and methods: We examined 461 patients, 371 females and 90 males, (mean age 45.1 ± 0.3) with abdominal obesity (AO) (waist circumference (WC) ≥ 94 cm in men and ≥ 80 cm in women). 66 non-obese (NO) subjects were examined too. 48.1% of patients with AO were hypertensive. PRA and AL were determined by radioimmune assay, hsCRP was evaluated by immunoturbidimetric method.

Results: PRA and AL were significantly higher in patients with AO versus NO subjects (PRA: 4.5 ± 1.1 and 0.6 ± 0.1 ng/ml/hr, $p = 0.006$; AL: 178.1 ± 11.8 pg/ml and 151.3 ± 23.5 pg/ml, $p = 0.04$), as well as hsCRP (6.5 ± 0.4 mg/l and 2.4 ± 0.4 mg/l, $p = 0.0001$). PRA and AL were significantly higher in obese patients with hypertension (HT) versus obese patients without HT (PRA: 7.2 ± 2.2 ng/ml/hr and 1.0 ± 0.1 ng/ml/hr, $p = 0.0001$, AL: 185.5 ± 19.5 pg/ml and 165.5 ± 12.6 pg/ml, $p = 0.0001$) as well as hsCRP level (7.0 ± 0.6 mg/l and 5.3 ± 0.5 mg/L, $p = 0.0001$). We revealed correlations between duration of obesity (DO) and PRA ($r = 0.2$; $p = 0.03$), DO and hsCRP ($r = 0.2$; $p = 0.01$), systolic blood pressure (SBP) and PRA ($r = 0.3$; $p = 0.0001$), diastolic BP (DBP) and PRA ($r = 0.2$; $p = 0.002$), DBP and hsCRP level ($r = 0.2$; $p = 0.0001$). WC and PRA ($r = 0.2$; $p = 0.01$), WC and hsCRP ($r = 0.2$; $p = 0.0001$).

Conclusions: High-sensitive CRP level and RAAS activity were increased in patients with abdominal obesity and hypertension. There were revealed correlations between parameters of high-sensitive CPR, RAAS and antropometric parameters, and blood pressure.

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ADIPONECTIN LEVELS IN HYPERTENSIVE AND NORMOTENSIVE PATIENTS WITH ABDOMINAL OBESITYE. Baranova¹, O. Belyaeva¹, E. Bazhenova², A. Berezina², O. Berkovich¹, E. Shlyakhto²¹IPPavlov State Medical University, ²Almazov Federal Centre of Heart, Blood and Endocrinology, Saint Petersburg, Russia**Study objective:** To evaluate serum adiponectin levels in hypertensive patients with abdominal obesity (AO).**Material and methods:** We examined 165 hypertensive patients aged 30-55 years (mean age 46,01±0,41) with AO (waist circumference above 94 cm in men and above 80 cm in women). 39,9% of patients were overweight, 60,1% were obese. 20 normotensive subjects with BMI< 25 kg/m² formed control group. Adiponectin and insulin levels were evaluated by ELISA (DRG, USA). Fasting plasma glucose was detected by standard biochemical method. To evaluate insulin resistance Homeostasis Model Assessment was used (HOMA-IR).**Results:** Serum adiponectin level in patients with abdominal obesity was 20,12±1,11 µg/ml, and it did not differ among overweight, obese patients and healthy controls (21,32±1,11 µg/ml, 19,13±0,84 µg/ml and 23,73±0,84 µg/ml, p>0,05). Plasma adiponectin levels were higher in women than in men (21,46±0,78 µg/ml and 16,75±1,04 µg/ml, p=0,001). HOMA-IR in patients with abdominal obesity was higher in patients with BMI≥30 kg/m² than in overweight subjects (6,30±0,69 vs 3,41, p=0,001) and in hypertensive patients when compared to normotensive subjects (5,82±0,67 vs 4,02, p=0,008). Correlations were seen between HOMA-IR and waist circumference (r=0,42, p=0,0001), BMI (r=0,40, p=0,0001) and adiponectin level (r=-0,21, p=0,003). Correlations were also present between adiponectin level and BMI (r=-0,2, p=0,004) and waist circumference (r=-0,3, p=0,004).**Conclusions:** Adiponectin levels don't differ between hypertensive and normotensive subjects with abdominal obesity. Adiponectin level is higher in women than in men. Insulin resistance index (HOMA-IR) is higher in obese hypertensive patients than in overweight and normotensive subjects.

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GENERAL AND CENTRAL OBESITY PREVALENCE OF WOMEN LIVING IN TEHRAN, IRAN, 2008, AND IT'S RELATION WITH FAMILY HISTORY OF OBESITYA. Rezaadeh¹, S. Setayeshgar², B. Rashidkhani¹¹National Nutrition and Food Technology Research Institute, Shahid Beheshti University of Medical Sciences and Health Services, Tehran, Iran, ²University of Saskatchewan in Saskatoon, Saskatoon, SK, Canada**Objectives:** Prevalence of obesity, especially central obesity (as a risk factor of metabolic Syndrome) has been enhanced in Iran. The aim of this study is determination of general and central obesity prevalence of women in Tehran, Iran, 2008 and it's relation with family history of obesity(F.H.O).**Materials and methods:** In this cross-sectional study 460, 20-50 years old women living in the Tehran were sampled with Stratified random sampling method. Anthropometric factors (weight, height, waist circumferences [WC]) were measured by standard method and Body Mass Index (BMI) was calculated. General obesity was defined as BMI≥30. Central obesity was defined as WC ≥ 88 cm. F.H.O was defined as having at least1 obese first degree relative (mother, father, child, sister and brother). Data were analyzed by SPSS software (version16).**Results:** The mean of women's age (year) was 33.5 ± 9.84, weight (Kg) 67.04±13.48, height (m) 1.58± 0.06, BMI(kg/m²) 26.6± 5.48 and WC (cm) 86.07±35.65. 38.5% of women were overweight and 23.3% obese and 38.8% were centrally obese. 26.5% had F.H.O. Women without F.H.O significantly (p<

0.05) had 35% less odds for general obesity (BMI≥ 30) in comparison with women with F.H.O (OR: 0.65, CI: 95%; 0.44-0.96) and 49% less odds for central obesity (wc> 88 cm) (OR: 0.51, CI: 95%; 0.35-0.76).

Conclusions: Our findings suggest that Both general and central obesity, is considerable in studied women especially in subjects with F.H.O. Performance of suitable programs for preventing of overweight and obesity in these women is necessary.

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EATING HABITS AND BMI OF ADOLESCENTS STUDYING AT THE IRANIAN SECONDARY SCHOOL IN KUALA LUMPURM. Zarei^{1,2}, M.H. Soo Lee³, F. Zarei^{2,4}, M.N. Mohd Taeb²¹Nutrition, Ministry of Health, Tehran, Iran, ²University Putra Malaysia(UPM), ³Nutrition, University Putra Malaysia, Selangour, Malaysia, ⁴Food and Drug Organization, Tehran, Iran

Nutritional status during adolescence plays an important role in the human lifecycle. The purpose of this study was to assess BMI-for-age of adolescents as well as determine the quality of their daily diets and collect information on some nutritional habits (number of meals and frequency of consuming of certain foods in the previous month). Analyses were based on 296 adolescents (150 boys and 146 girls) aged from 12 to 17 years studying at the Iranian secondary school in Kuala Lumpur. Weights and heights were measured and BMI-for-age was calculated based on WHO, 2007. A two-day dietary intake recall (one on a weekday and another during the weekend) was conducted by the investigator. The food frequency questionnaire and meal consumption questionnaire were self administered. Dietary intake between the sexes was analyzed using statistical T-test and weight status was compared using Correlation. The analysis of body weight status with dietary intake showed that there is a positive relationship with vitamin D and a negative relationship between protein, vitamin A, C, B1, B2 and niacin with body weight status (p< 0.05). Also across all the average intakes of fat, cholesterol, vitamin D, niacin, vitamin B6, B9, B12, iron, magnesium in male were higher than female. In both groups the energy, carbohydrate and protein intakes were lower than DRIs. All micronutrient intakes among respondents in both ages and sex were found to be higher than DRI, except vitamins B1, B2, C and D, zinc, folate, calcium and phosphorus. Iron intake was deficient among the females in age 14 to 17 groups. Generally their diets were also deficient in vegetables and fruits but excessive in sweets and soft drinks. By analysis food frequency, there is highly consumed of cooked oil, cooked rice, white bread, chips, sandwich, tea, meat. Only 75% of the adolescents had breakfast daily while 25% had never had breakfast. With regards to BMI, 18.6% and 23.6% of adolescents were severing thinness and thinness, while 14.5% and 11.1% were overweight and obese respectively. Almost 32.1% of adolescents were of normal weight. Distribution of BMI by gender was significantly different (p< 0.05) with more girls (16.4%) being overweight than boys (12.7%) and at the same time more males were underweight (44.7%) compared to only (41.8%) among the females. In both cases slightly more than one third was normal weight. Nutrition education is necessary for adolescents not just at this time of growth spurt but in forming good nutritional habits which will benefit them throughout life.

Pathophysiology/Basic Science/Animal Studies

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LESS VISCERAL FAT GAIN IN MICE SUBJECTED TO DIETARY INTERVENTION VIA INTERMITTENT FASTING

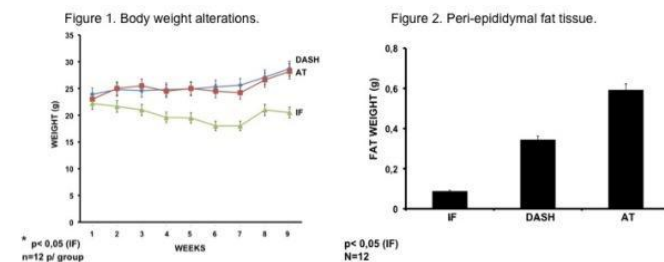
E. Sant'Anna Melo¹, F.R. Azevedo¹, L.H. Monteiro¹, A. Pastana¹, F. Soriano², H. Souza², B. Caramelli¹

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Introduction: To compare the effects of intermittent fasting, atherogenic and low fat (DASH) diets in animal model.

Methods: Six weeks-old LDL^{r/-} mice were divided into three groups receiving for 15 weeks, 5g of respective diets: Atherogenic (AT) - rich in cholesterol, saturated fat and poor in fibers; DASH - low in saturated fat, cholesterol and sodium and Intermittent Fasting (IF) - on alternate days. We analyzed water consumption, feed, urine volume and body weight. Peri-epididymal fat tissue was removed after 15 weeks and subjected to quantitative analysis.

Results: The weight change (Figure 1) was different between AT and IF ($p < 0.05$ between 11th and 15th weeks) and between IF and DASH ($p < 0.05$ at 12th week). The intake was different between DASH and IF throughout the study ($p < 0.05$). AT group showed lower feed intake and greater weight gain. The DASH group showed a higher feed intake with weight gain similar to the AT up to 9 weeks, with later weight reduction. We also observed that in addition to maintaining stable weight, IF group revealed visceral fat amount (Figure 2) six times and three times smaller than AT and DASH respectively ($p < 0.005$). No difference was seen in the urinary volume. Water intake was different between AT and IF, $p < 0.00015$.



[Body composition]

Conclusions: In this model, intermittent fasting appears to have a less atherogenic effect reflected by lower accumulation of visceral fat without compromising weight gain.

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EFFECT OF THE INTERMITTENT FASTING ON ATHEROGENIC PROCESS: APOPTOSIS REGULATION AND FUNCIONAL MARKERS

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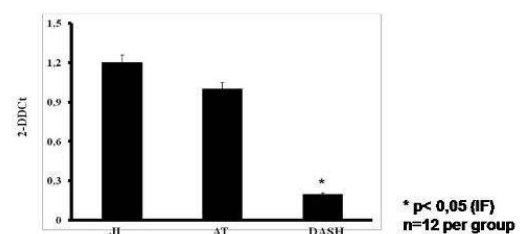
Objectives: To evaluate the effects of intermittent fasting (IF) on variables related to the atherosclerosis development.

Methods: Six weeks old LDL^{-/-} mice were divided into three groups receiving daily, for 15 weeks, 5g of diets: Atherogenic (AT) - rich in cholesterol, saturated fatty acids, DASH - low in saturated fat, cholesterol and high in fiber and IF - standard chow with micronutrients on alternate days. Blood was collected and analyzed by REAL TIME (IL6, IL10, TNF α , caspases 3, 6 and 7) and ELISA (IL6, IL10, TNF α).

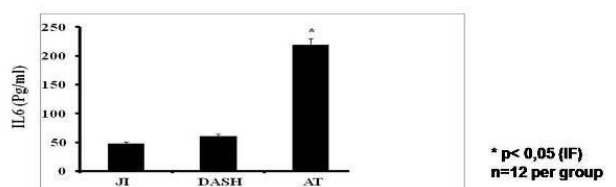
Results: Results of mRNA expression of IL-6 were different between groups, 1,2 in IF, 0,2 in DASH and 0,1 in AT (Graph 1) There was difference between IF and DASH groups, $p < 0.05$. However, it was not observed an increased protein synthesis. The mRNA analysis of caspase 6 revealed increased expression in AT group compared IF group. Caspase 6 activation in the AT group was: 0.7; 0.3 - IF; 0.6 - DASH. There was difference between IF and AT groups, $p < 0.05$. IL6 protein expression showed: 50.1 pg/ml - IF; 60.31 pg/ml - DASH and 230.54 pg/ml - AT, $p < 0.05$ (Graph 2). TNF α showed an increased protein expression in the AT compared IF: 70.49pg/ml - IF; 20.36pg/ml - DASH and 250.9pg/ml - AT, $p < 0.05$.

Conclusion: Results suggest that IF has a minor atherogenic effect compared with DASH and AT diets represented by the lower protein expression of IL-6 and caspase 6.

Graphic 1 IL6 REAL-TIME



Graphic 2 IL6 ELISA



[IL6]

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VISCERAL OBESITY, INSULIN RESISTANCE AND PROINFLAMMATORY IMBALANCE IN ENDOCRINE ACTIVITY OF ABDOMINAL FAT IN RESPONSE TO FRUCTOSE-ROLE OF KETOHEXOKINASEG. Marek¹, V. Pannu¹, D. Wymer¹, S. Carey¹, R.J. Johnson², Y. Sautin¹¹Department of Medicine, University of Florida College of Medicine, Gainesville, FL, ²Department of Medicine, University of Colorado, Denver, CO, USA

Objectives: Obesity and type 2 diabetes have been linked with the increase in consumption of sugars, especially added sugars containing fructose, such as sucrose and high fructose corn syrup (HFCS). Previous studies suggested that fructose exceeds glucose in its ability to induce metabolic syndrome. Fructose is distinct from other sugars in its initial metabolism, particularly in its phosphorylation to fructose-1 phosphate by ketohexokinase (KHK). Here we demonstrate the role of KHK in developing the metabolic syndrome in response to high fructose diets and analyze underlying molecular mechanisms in the visceral fat.

Methods: We used mice (males, C57BL/6 background) including littermate wild type control and mice lacking both isoforms of KHK (KHK-null). Human primary adipocytes from Zen-Bio were used for *in vitro* experiments.

Results: Fructose induced oxidative stress and expression of proinflammatory adipokines in adipocytes (MCP-1, IL-6, TNF- α) and reduced expression of adiponectin. This effect was blocked by the mitochondrial antioxidant mito-TEMPO. *In vivo*, high-fructose diet induced metabolic syndrome in mice including visceral obesity, insulin resistance, proinflammatory changes in the visceral fat and adipokine production, and endoplasmic reticulum (ER) stress in the visceral adipose tissue. All these manifestations of the metabolic syndrome were blocked in KHK-null mice.

Conclusions: We showed that fructose induced proinflammatory activity of the adipose tissue common for the metabolic syndrome, and that KHK is the mediator. Blocking KHK and redirecting fructose metabolism to alternative pathways is an effective way to prevent visceral obesity and insulin resistance induced by high fructose, a widespread component of Western diets.

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LONG-TERM EXPOSURE OF OBESITY INDUCED BY UNSATURATED HIGH-FAT DIET DECREASED MYOCARDIAL COLLAGEN TYPE I IN RATSD.C.T. Silva¹, L.C. Tomasi¹, D.H.S. Campos¹, C.A. Alves¹, A.F. Deus¹, P.P. Freire¹, A.F. Nascimento¹, C.R. Padovani², A.C. Cicogna¹¹Department of Medicine Clinical, Botucatu School of Medicine, São Paulo State University (UNESP), ²Department of Biostatistics, Institute of Biological Sciences, São Paulo State University (UNESP), Botucatu, Brazil

Objective: The purpose of the study was to test the hypothesis that long-term exposure of obesity induced by unsaturated high-fat diet increases myocardial collagen type I in rats.

Material and methods: Thirty-day-old male Wistar rats, weighing about 150g, were randomly assigned in two groups: control (C,n=20) and obese (Ob,n=20). While control group was fed with a standard rat chow, obese animals received high-fat diet, rich in unsaturated fatty acids for thirty weeks. Analyzed parameters: final body weights (FBW), adiposity index (AI), fasting glucose (FG), systolic blood pressure (SBP), left ventricle weight (LV), right ventricle weight (RV), and LV/FBW, RV/FBW ratios. The collagen type I protein expression was determined by Western Blot. Results were reported as mean \pm SD and analyzed using Student's t-test. The level of significance was 5%.

Results: Ob showed increased FBW, AI, SBP, RV in relation to C. Differentially, FG, LV, LVW/FBW and RVW/FBW were similar between the groups. The collagen type I protein expression was reduced in Ob compared to C.

Conclusion: The results did not corroborate with our hypothesis. The long-term

exposure of obesity induced by unsaturated high-fat diet decreased myocardial collagen type I in rats.

References: Carroll JF, Tyagi SC. Extracellular matrix remodelling in the heart of the homocysteinemic obese rabbit. *Am J Hyperten.* 2005;18:692-8.

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AMELIORATION OF SUCROSE INDUCED NON-ALCOHOLIC FATTY LIVER DISEASE THROUGH *TRIDAX PROCUMBENS* L. IN RATSN. Gnanasekaran¹, S. Daniel¹, S. Kalavathy²¹College of Health Sciences, School of Medicin, Dept. of Biochemistry, Addis Ababa University, Addis Ababa, Ethiopia, ²Dept. of Botany, Bishop Heber College, Tiruchirappalli, India

Introduction: Accumulation of more lipids in the liver can lead to cell dysfunction and cell death, a phenomenon known as lipotoxicity or Non-alcoholic fatty liver disease (NAFLD). Obesity, diabetes, hyperlipidemia and female sex are important risk factors for NAFLD.

Purpose: The NAFLD, the disease of civilization is threat to human health of current civilized society which needs immediate attention and management. *Tridax procumbens* is well known hepatoprotective herb. Hence this study aims at the Amelioration of sucrose induced Non-alcoholic Fatty liver disease through *Tridax procumbens*.L.in rats.

Material: In the male albino Wistar rats NAFLD was induced by 32% sucrose solution. The various forms of *Tridax*, 1.entire leaf 2.alcoholic extract of leaf 3.ashed form of leaf were used as drugs.

Method: The animals were divided into 8 groups. The sucrose solution and the three different forms of *Tridax* were given for 10 weeks.

Results: The elevated liver weight, total lipids, liver triglycerides TBARS and elevated serum AST, ALT, GGT and decreased liver protein, glycogen, antioxidant enzymes of liver were observed in sucrose fed animals. The above changes were ameliorated when fed with native form of *Tridax*. The other two forms of *Tridax* was not as effective as the native form.

Conclusion: *Tridax*, especially native form exhibit amelioration of sucrose induce NAFLD, which contains calcium, magnesium, potassium, selenium, alkaloids, flavonoids, sponon, carotenoids and tannnians. *Tridax* has no residual toxicity. It can be safely included in the diet for early prevention of the diet induced NAFLD.

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OBESITY-RELATED VASCULAR STRUCTURAL ALTERATIONS: EXPERIMENTAL STUDIES ON A MURIN MODEL

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Objectives: Among the pathological states associated with obesity, coronary artery disease is the most severe. To study the structural changes in the heart induced by generalized obesity and the mechanism of obesity-accelerated atherosclerosis remodeling, we used a naturally diabetes-prone murine model: *Psammomys obesus*.

Methods: A batch of 42 *P.obesus* from Biskra, was divided into: 10 "witnesses" fed halophyte plants, 20 *P.obesus* and 05 Wistar rats fed laboratory diet (HCD) and a lot composed with 04 fetuses, 04 newborns, and 4 pre-pubescent. The experiment lasted 12 months. The conventional experimental protocol was implemented to monitor the evolution of the metabolic state and the arterial remodeling induced by HCD.

Results: This study shows that, as in humans, the arterial lesions begin very soon. After 02 weeks, animals in HCD develop a systematic generalized obesity, insulin resistance, and atherosclerosis. After 3 months in HCD, the aorta wall is thinned and some ruptures are observed in the elastic frame. After 6 months the elastic lamellas of the media are disorganized, collagen is very abundant and cellular alterations are numerous and affect myocytes. Under the same conditions, Wistar rats never develop either obesity or diabetes.

Conclusion: In *P.obesus*, as in human, the atherosclerotic process is systematic and settled in the early days of the HCD and the atherosclerotic plaques progress with time, but more quickly and more severe, for obese animals. This study demonstrates that *P.obesus* is an animal model particularly well suited to represent the human obesity-related vascular structural alterations induced by HCD.

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COLLAGEN TYPE I AND III PROTEIN EXPRESSION IN THE MYOCARDIAL OF OBESE AND OBESITY RESISTANT RATS

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Objective: The purpose of the study was to test the hypothesis that obesity resistant rats show different interstitial matrix profile compared to obese rats, in relation to collagen type I and III.

Material and methods: Thirty-day-old male Wistar rats were randomly assigned in three groups: control(C)-standard diet; obese(Ob) and obesity resistant (OR)-high-fat diet, rich in unsaturated fatty acids, for thirty weeks. Analyzed parameters: final body weight(FBW), caloric intake(CI), adiposity index(AI), fasting glucose(FG), systolic blood pressure(SBP) and LV/FBW, RV/FBW ratios. Collagen type I and III protein expression were determined by Western Blot. Statistical analysis: ANOVA and Tukey Post Hoc Test ($p < 0,05$).

Results: Ob showed increased FBW and AI in relation to C and OR. CI was similar in Ob vs OR. The SBP, FG and LV/FBW, RV/FBW ratios were similar in the three groups. The collagen type I protein expression was reduced in Ob compared to C, however, there was no difference when comparing OR vs C and OR vs Ob. The collagen type III protein expression was similar among three groups.

Conclusion: The results did not confirm our hypothesis. OR showed the same interstitial matrix profile compared to Ob, in relation to collagen type I and III.

References: Carroll JF, Tyagi SC. Extracellular matrix remodelling in the heart of the homocysteinemic obese rabbit. *Am J Hyperten*. 2005;18:692-8.

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PROTECTIVE EFFECT OF LYCOPENE ON HIGH FAT DIET-INDUCED HEPATIC STEATOSIS AND INVOLVEMENT OF MICRORNA-21 MEDIATED REPRESSION OF FABP7

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Objectives: We investigated the effect of lycopene on high-fat diet-induced hepatic steatosis and the potential protective activity of miRNA regulation.

Methods: We measured miR-21 expression in steatotic livers fatty acid treated Hepa 1-6 cells. We examined the effect of miR-21 activator or inhibitor on fatty acid induced lipid accumulation in hepatocytes. We found fatty acid binding protein 7 (FABP7) as a selective target of miR-21 and confirmed it by a loss of function.

Results: We found that lycopene improved steatosis and reduced intracellular lipid accumulation induced by stearic acid (SA) in Hepa1-6 cells. MiR-21 was downregulated in the livers of mice fed a high-fat diet and in hepatocytes exposed to SA, but treatment with lycopene restored the expression of miR-21, which led to the downregulation of FABP7 at both the transcriptional and translational levels. . This specific negative regulation of miR-21 was achieved by targeting FABP7 3'UTR. Moreover, siRNA of FABP7 repressed SA uptake in hepatocytes.

Conclusions: Therefore, miR-21 functions as a negative regulator of high fat diet-induced hepatic steatosis and SA-evoked intracellular lipid accumulation. Downregulation of miR-21 contributes to the increase of FABP7 and this response leads to the intracellular lipid accumulation of hepatocytes. miR-21 may have a therapeutic potential to inhibit hepatic steatosis.

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MITOCHONDRIAL RESPIRATORY CHAIN COMPLEXES ARE ALTERED IN A RODENT MODEL OF METABOLIC SYNDROME WITH OR WITHOUT HYPERFIBRINOGENEMIA

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Objectives: To analyze the activity of the mitochondrial respiratory chain (MRC) complexes I, II, III and IV and citrate synthase of thoracic aorta cells in an animal model of metabolic syndrome (MS) and MS combined with hyperfibrinogenemia (HF) -inflammation marker and emerging cardiovascular risk factor-.

Methods: Wistar male rats, weighing 280±20g, were randomly distributed in 3 groups (12 animals per group): A)Control; B)MS; C)MS+HF. MS was induced through administration of 10% W/V fructose in drinking water during a 6-week period. HF was generated by daily subcutaneous injection of epinephrine (0,1 ml/day/rat) for 6 weeks. The state of MS was confirmed by measuring blood levels of glucose, insulin and triglycerides and calculating HOMA index. Serum levels of fibrinogen were measured. The activity of the MRC complexes was analyzed by spectrophotometry. ANOVA ($P < 0,05$).

Results: Activity of complexes I, II, IV and citrate synthase was significantly decreased in groups B and C compared to control. Complex III showed increased activity in group B as compared to control, whereas in group C the activity of the same complex increased markedly compared with the other two groups.

Conclusions: The data confirm the damage of MRC complexes in the model of

MS, both with or without hyperfibrinogenemia. Due to the participation of MRC in oxidative processes, our results suggest that oxidative stress present in MS may be the main cause of the injury. Hyperfibrinogenemia may be an additional damaging factor, suggesting that oxidative stress and inflammation are actively involved in the pathophysiology of atherosclerosis in MS.

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METABOLIC AND INCRETIN CHANGES INDUCED BY THE BILIOPANCREATIC DIVERSION IN RAT: COMPARISON WITH DUODENO-JEJUNAL BYPASS AND VERTICAL SLEEVE GASTRECTOMY

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Objectives: To investigate the mechanisms underlying the beneficial effects of bariatric surgery on body weight and diabetes remission.

Methods: Male Wistar rats underwent 3 types of bariatric surgery (biliopancreatic diversion, BPD; sleeve gastrectomy, Gx and duodenal switch, DS) or sham surgery. Food intake, body weight and composition and energy content of feces were determined pre- and post-operatively. To study the meal effect on incretin secretion, rats were refed for 1 hour after a 16-h fast at 3 weeks post-surgery. Food intake was measured and blood samples were taken during fasting and re-feeding. Intestine, fat, muscle and blood samples were collected at the end of the 8-weeks. Plasma levels of incretins (GLP-1₇₋₃₆, PYY, GLP) and insulin were determined.

Results: BPD, DS and Gx resulted in reduced food intake for the first 3-weeks post-operatively. BPD and DS induced significant reduction in body weight, fat-weight and -volume along with persistent mal-absorption compared to Gx. BPD and DS also induced intestinal hypertrophy with increased numbers of L cells, which caused the elevation of both fasting and postprandial plasma levels of GLP-1₇₋₃₆ and PYY. The Gx resulted in postprandial hypersecretion of GLP. Insulin levels at 1 hour post-meal were increased in Gx and BPD due to accelerated gastric emptying.

Conclusions: Our data suggests that the morphological changes in the stomach and intestine work in a complementary fashion to induce hypersecretion of incretins, which may contribute to the beneficial effects of bariatric surgery on weight loss and diabetes remission.

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HYPOTHALAMIC DEPTOR EXPRESSION IS ENHANCED BY FASTING IN OBESITY

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Introduction: Hypothalamic mTOR function as a nutrient/hormone sensor which is impaired in obesity. Recently discovered DEPTOR negatively regulates mTOR signaling pathways. Growth factor/nutrient deprivation caused an increase in DEPTOR expression *in vitro*, suggesting that this system may be sensitive to regulation by food consumption and could also be involved in the impairment of hypothalamic mTOR observed in obesity. Here, we hypothesized that mTOR might be controlled in a DEPTOR-dependent manner to regulate energy balance centrally.

Methods: Zucker lean and obese rats were killed *ad libitum* or after a 12-h or 48-h period of fasting. Male Wistar rats fed a chow of high-fat (HF) diet for 8 weeks were also killed *ad libitum* or after a 24-h period of fasting. The brains were collected and cut using a sliding microtome. *In situ* hybridization was performed to quantify DEPTOR mRNA expression in the arcuate nucleus (ARC) and the ventromedial part (VMH) of the hypothalamus.

Results: DEPTOR mRNA expression was induced in the ARC and the VMH of obese, but not lean Zucker rats, after a 12-h period of food deprivation. Both ARC and VMH mRNA expression of DEPTOR were enhanced by fasting in HF fed animals.

Conclusion: Hypothalamic DEPTOR expression is enhanced by fasting in two models of obesity. This elevation could represent a mechanism to slow down the mTOR signaling and thus, maintain energy reserves upon fasting. Additional experiments are needed to determine the exact role of DEPTOR in regulating the energy balance.

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SIRT1-DEPENDENT MITOCHONDRIAL BIOGENESIS INDUCTION BY BERBERINE PROTECTS AGAINST HIGH FAT DIET-INDUCED DYSFUNCTION IN MUSCLE MITOCHONDRIA

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Berberine (BBR) has recently been shown to improve insulin sensitivity. Although this effect was explained partly through an observed activation of AMP-activated protein kinase (AMPK), the upstream and downstream mediators of this phenotype were not explored. We show that BBR supplementation reverts mitochondrial dysfunction induced by high fat diet (HFD) and hyperglycemia in skeletal muscle, in part due to an increase in mitochondrial biogenesis. Furthermore, we observe that the prevention of mitochondrial dysfunction by BBR, the increase in mitochondrial biogenesis, as well as BBR-induced AMPK activation, are blocked in cells in which SIRT1 has been knocked-down. Taken together, these data reveal an important role for SIRT1 and mitochondrial biogenesis in the preventive effects of BBR on diet-induced insulin resistance.

Pathophysiology/Clinical Science/Human Studies

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PRAVASTATIN COMBINED WITH VALSARTAN SHOWS ADDITIVE BENEFICIAL VASCULAR EFFECTS IN PATIENTS WITH HYPERCHOLESTEROLEMIA**K. Koh***Cardiology, Gachon University Hospital, Incheon, Republic of Korea*

Objects: Biological mechanisms underlying statin and angiotensin II type 1 receptor blocker therapies differ. Therefore, we compared vascular responses to these therapies either alone or in combination in hypercholesterolemic patients. **Methods:** This was a randomized, single-blind, placebo-controlled cross-over trial with three treatment arms (each 2 months) and two washout periods (each 2 months). Sixty-two hypercholesterolemic patients were given pravastatin 40 mg and placebo, pravastatin 40 mg and valsartan 160 mg, or valsartan 160 mg and placebo daily during each 2 month treatment period. **Results:** When compared with valsartan alone, pravastatin alone or combined therapy significantly changed lipoproteins levels ($P < 0.001$ by repeated measures ANOVA). All three treatment arms significantly improved flow-mediated dilator response to hyperemia (FMD) relative to baseline measurements. However, FMD were changed to a greater extent with combined therapy when compared with valsartan or pravastatin alone ($P < 0.001$ by repeated measures ANOVA). Relative to baseline measurements, valsartan alone, pravastatin alone or combined therapy reduced hs-CRP levels ($P = 0.215$, $P = 0.002$, and $P < 0.001$ by Wilcoxon Signed Rank test, respectively). Interestingly, when compared with valsartan or pravastatin alone, combined therapy significantly reduced hs-CRP levels to a greater extent ($P = 0.001$ by repeated measures ANOVA on Ranks). **Conclusions:** Pravastatin combined with valsartan improves endothelial function and reduces an inflammatory biomarker to a greater extent than monotherapy with either drug in hypercholesterolemic patients.

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SERUM LEPTIN LEVELS IN POLYCYSTIC OVARY SYNDROME: CORRELATION WITH CLINICAL AND HORMONAL PARAMETERS**M.H. Daghestani¹, M.H. Daghestani², A. El-Mazny³**

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Objectives: To investigate serum leptin levels in women with and without polycystic ovary syndrome (PCOS), and the relationship of these levels to the clinical and hormonal parameters of PCOS.

Study design: Serum leptin levels were compared between 130 patients with PCOS, and 122 normo-ovulatory matched controls. Other hormonal and biochemical investigations included luteinizing hormone (LH), follicle-stimulating hormone (FSH), 17 β -estradiol (E2), 17OH-progesterone (P), testosterone (T), androstenedione (A), sex hormone binding globulin (SHBG), glucose and insulin levels.

Results: No significant difference in leptin levels was detected between the PCOS and control groups ($P = 0.8329$). However, leptin levels were significantly higher in obese PCOS patients in comparison with lean patients ($P = 0.0001$). In the PCOS group, there was a significant positive correlation of leptin levels with BMI, waist-hip ratio, LH, LH/FSH ratio, E2, T, A and insulin levels; and a significant negative correlation with P and SHBG levels. Multiple regression analysis demonstrated that insulin was the main determinant for leptin level ($R^2 = 0.375$; $P = 0.0001$).

Conclusion: Although serum leptin levels were found to be normal in women with PCOS; yet, there is a relationship, possibly linked to hyperinsulinemia, between leptin levels and hormonal pattern of PCOS.

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EVALUATION OF BDNF EXPRESSION IN LIVER, VISCERAL AND SUBCUTANEOUS FAT FROM OBESE SUBJECTS, BY IMMUNOHISTOCHEMISTRY**A.V. Araya^{1,2}, V. Tapia³, E. Lanzarini⁴, X. Orellana⁵, M. Maripangui⁴, C. Paulsen⁴, C. Romero⁶, M.E. Villanueva⁷**

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BDNF neurotrophin can act on nonneuronal cells. There are evidences of its role in metabolic actions.

Objective: To evaluate by immunohistochemistry technique, the expression of BDNF in liver, subcutaneous (SF) and visceral fat (VF) of non-diabetic obese and control subjects.

Patients and methods: 15 subjects with BMI ≥ 30 kg/m² and < 26 kg/m² who underwent abdominal surgery were selected. A fasting blood sample was taken for measurement of glucose, insulin and lipid profile. A liver, subcutaneous and omental fat biopsy was obtained for immunohistochemistry evaluation of BDNF protein expression levels. To quantify its expression in histological sections, we used the software Image-Pro Plus 6.2. A p value < 0.05 was considered statistically significant.

Results: Ten obese subjects (8F/2M), age: 37.7 ± 13.6 years, BMI: 33 ± 2.7 kg/m² and 5 female control subjects, age 44.4 ± 3.8 years, BMI: 22.9 ± 2.2 kg/m², were evaluated. BMI, waist circumference, fasting insulin, HOMA and LDL cholesterol were significantly higher in the obese group ($p = 0.005$). The expression of BDNF in VF was higher than in SF in both groups ($p < 0.005$). In obese subjects, BDNF expression in liver tissue was higher than in controls ($p = 0.0094$). There were no differences between groups in the expression of BDNF in SF or VF. Liver steatosis was found in obese subjects.

Conclusions: The increased expression of BDNF protein in visceral fat could be associated with local metabolic process. In obese subjects, the increased BDNF liver expression probably is related with insulin resistance and fatty liver disease.

Physical Activity/Exercise

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THE VALIDITY OF COMMUNITY BASED U-HEALTH PROGRAM FOR THE CARDIOVASCULAR RISK (FRAMINGHAM RISK SCORE)

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Introduction: The importance of chronic disease control has been more issued recently. We focused on the CV risk control of chronic disease patients by a personalized prescribed and monitored exercise program using u-health system.

Material and method: 114 subjects were recruited and they were divided by systemic classification. The u-health exercise program was composed of the automatic regulating system by heart rate monitoring. They were prescribed exercise in accordance with their exercise ability and risk, 150min per week for 3months. And we checked vital signs, clinical data, and cardiovascular risk at initial and final exercise

Results: Among 114 subjects(M/F= 17/97), 35 were the simple chronic disease, 12 complex chronic disease, and 35 health risk group by the systemic classification. By the disease entity, 46 had hypertension, 30 diabetes mellitus, 25 dyslipidemia, 3 cardiovascular disease, and 55 obesity. In each group, blood pressure, triglyceride, and body fat percentage and body mass index were controlled after exercise. The cardiovascular risk and the relative cardiovascular risk to healthy was decreased significantly (101 to 86 and 145 to 125) (p value< 0.05) after exercise. According to the disease group classification, cardiovascular risk(Framingham Risk Score) has been reduced significantly in the obesity group.

Conclusion: Using u-health based exercise program, we could see the significant improvement of parameters and the reduction of cardiovascular risk. At least 150 minutes per week of aerobic exercise was prescribed, but the attendance rate of the program were 57%. So we need more interventions in u-Health system to improve the compliance.

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STUDY OF BODY COMPOSITION AND BONE MINERAL DENSITY OF FEMALE HIGH SCHOOL TRACK AND FIELD ATHLETES

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Objective: Improving performance and developing the foundation for a healthy body are important for junior athletes, including high school students. The purpose of this study was to ascertain the physical status of these athletes and to obtain basic information for providing nutritional support.

Method: Biometric examinations, determination of body composition (DXA method), biochemical tests and a nutritional survey were conducted on 17 female high school athletes residing in O Prefecture of Japan in 2010 (*) and 2011 (**), respectively.

Results:

(1) Biometric examinations: height: 157.3±5.4 cm*, 158.7±4.5 cm**, weight: 44.2±4.0 kg*, 45.2±4.0 kg**, waist/hips ratio: 0.77±0.03*, 0.76±0.03**.

(2) Body composition: percent body fat: 15.6±4.4%*, 15.4±5.6%**, lean body mass: 35.4±3.8 kg*, 38.0±2.5 kg**, lumbar bone density: 0.89±0.11 g/cm*, 0.89±0.09 g/cm**, Z score: 88.9±11.1%*, 88.3±8.9%**, in which low bone density was demonstrated in particular.

(3) Nutritional survey: A detailed description of the correlation between dietary habits and bone density will be reported at the conference.

(4) Correlation between body composition and nutritional status: There were no significant correlations observed among nutrition/dietary intake, percent body fat, and waist/hips ratio.

(5) Biochemical test values: We did not find any factors that might affect athletic performance.

Conclusion: Although all of the subjects were members of teams demonstrating the highest levels of athletic performance in Japan, their percent body fat and bone density are low, suggesting the need for providing both health management and nutritional support to them.

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IS THE REDUCTION IN LOWER-BODY SUBCUTANEOUS ADIPOSE TISSUE ASSOCIATED WITH ELEVATIONS IN INSULIN RESISTANCE IN OLDER ADULTS?

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Objectives: Loss of lower body subcutaneous adipose tissue (LBSAT) is associated with increases in insulin resistance. We sought to determine whether exercise-induced reduction in peripheral adipose tissue exacerbated insulin resistance.

Methods: Abdominally obese, older men (waist circumference 113.1 ± 7.77 cm, age 67.6 ± 5.1y) and women (waist circumference 103.5 ± 9 cm, age 67.0 ± 5.5y) were randomized into one of three groups for 6 months: aerobic exercise (N=30), aerobic and resistance exercise (N=33), and control (N=24). All exercise sessions (3-5x/wk) were supervised and dietary intake carefully monitored. LBSAT was evaluated by magnetic resonance imaging. A hyperinsulinemic-euglycemic clamp method was used to determine insulin resistance. Analysis revealed no significant interaction for changes in LBSAT and insulin resistance for exercise group or sex (P>0.10). Thus all results are collapsed across exercise treatment and sex.

Results: Despite minimal weight loss (2.5 ± 2.1 kg), a significant reduction in LBSAT (8.4 ± 6.6%) and insulin resistance (30.2 ± 39.8%) was observed in response to exercise by comparison to controls (p< 0.05). A positive association was observed between the reduction in LBSAT and improvement in insulin resistance (r=0.28, P< 0.05). However, the association did not remain significant after statistical control for visceral adipose tissue (P>0.10).

Conclusion: Exercise-induced reduction in LBSAT in elderly participants is not associated with a corresponding increase in insulin resistance. To the contrary, decreases in LBSAT are associated with improvement in insulin resistance independent of sex and exercise modality, but not visceral adipose tissue.

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THE EFFECT OF A PHYSICAL ACTIVITY INTERVENTION ON BODY WEIGHT AMONG OBESE ADULTSA. Bélanger-Gravel¹, G. Godin¹, A. Bilodeau¹, P. Poirier², G.-R. Dagenais²¹Université Laval, ²Institut Universitaire de Cardiologie et de Pneumologie de Québec, Québec, QC, Canada

Objectives: The promotion of physical activity is an important component of obesity treatment. Nonetheless, increasing participation in physical activity among obese older adults represents a challenge. The aim of the present study was to test the long-term effect on body weight of a behavioural physical activity intervention for this population.

Methods: A total of 101 obese older adults were enrolled in a two-month behavioural intervention. At baseline, participants were randomised to an experimental or a control condition. All participants attended three counselling sessions and were followed for six months. In addition to the common intervention activities, those in the experimental group completed a self-regulatory task. Anthropometric measures (i.e., weight, height and waist circumference) were obtained at post-intervention and at six-month follow-up. A series of mixed model repeated-measures ANOVAs were used to evaluate the effect of the intervention on body weight.

Results: Overall, 78 participants completed the study. The mean age and BMI of the sample were 59.4±5.2 yr and 33.5±3.2 kg/m², respectively. The ANOVAs revealed no main effect of condition on BMI and waist circumference. However, a significant time effect emerged for both outcomes ($p < .03$). At follow-up, participants reduced their BMI (-0.45±1.2 kg/m²) and waist circumference (-2.0±6.9 cm).

Conclusions: Results showed that this two-month behavioural intervention contributed to decrease the BMI and waist circumference of obese older adults, regardless of condition. Although weight loss remains modest, findings suggest that such very short interventions could represent a cost-effective strategy. However, the self-regulatory task seems to have limited effects.

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A SYNTHESIS OF RECENT META-ANALYSES OF EXERCISE ON INTRA-ABDOMINAL FAT

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Objectives: The objective of the current systematic review was to summarize the results from all meta-analyses of the effects of exercise on intra-abdominal fat (IAF).

Methods: MEDLINE was searched up to December 31, 2011 for keywords and MeSH terms related to exercise and IAF. The primary objectives, inclusion criteria, primary findings and strength/limitations of each review were identified.

Results: The search identified 1647 records. Of these, 5 were classified as meta-analyses and 2 were systematic reviews that did not utilize statistical techniques to integrate the results of included studies. Primary conclusions from these analyses are that the greater reductions in IAF are associated with greater reductions in total body fat or greater amounts of IAF at baseline. For a given amount of fat loss, reductions in IAF are similar following exercise interventions compared to other weight loss methods (e.g., diet). A proportionally greater reduction in IAF occurs during modest weight loss or during the early phase of weight loss. In addition, exercise can lead to reductions in IAF in the absence of weight loss. Most analyses do not suggest that exercise frequency, intensity, type or volume predict proportionally greater reductions in IAF, but few have directly compared studies that randomized participants to different exercise interventions.

Conclusions: Measurements of IAF were relatively infrequent in exercise

studies prior to the 1990s, however recent interest in this area is very prominent. Recent meta-analyses have highlighted several predictors of exercise induced reductions in IAF.

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ANTHROPOMETRIC PARAMETERS RELATED TO BETTER EXERCISE TESTING PERFORMANCE IN PATIENTS WITH SYMPTOMATIC AORTIC STENOSIS

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Objectives: To identify which anthropometric feature is related to better exercise testing performance in elderly patients suffering severe symptomatic aortic stenosis (SSAS).

Methods: A breath-by-breath six minutes walking test and a ramp VO₂max have been performed in patients with SSAS and waiting for a transcatheter aortic valve implantation. Prior testing, a complete anthropometric data collection has been performed (waist circumference-WC, body mass index-BMI, fat% and lean body mass-LBM).

Results: Up to now, a total of 12 patients aged 79.5 ± 5.9 years participated to the evaluations. The group had a mean BMI at 25.7 ± 4.3 kg/m² and a mean WC at 95.9 ± 14.2 cm (♀ :93.6 ± 14.2 and ♂ :99.2 ± 14.2 cm). For the six minutes walking test, patients reached on average a distance of 335 ± 74 m. Lower fat percentage was the best anthropometric parameter predicting good performance during walking test, assessed by the distance travelled ($r = -0.557$, $p = 0.09$). However, in the VO₂max exercise testing, higher lean body mass (LBM) tended to be associated with higher maximal workload ($r = 0.535$, $p = 0.11$), but lower fat percentage is associated to a better exercise capacity ($r = -0.648$, $p = 0.04$) assessed by relative VO₂max. For the VO₂max, mean maximal workload for the group was 48.5 ± 13.2 watts and mean relative VO₂max was 11.9 ± 4.2 kg/m².

Conclusions: Anthropometric data, particularly fat% and LBM, are associated with better exercise capacity in patients with SSAS. However, a larger group is needed to make appropriate conclusions.

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BURNOUT SYNDROME AND PHYSICAL ACTIVITY IN HEALTH WORKERS AND EDUCATIONAL SECTORV. Delgado Sanchez¹, E. Halley Castillo², H. Quass Gutierrez², M.T. Hiriart Legorreta³, S. Ortega Contreras², J.A. Isassi Mejia², J. Salmeron⁴¹Instituto Nacional de Salud Publica, Cuernavaca, ²Instituto Mexicano del Seguro Social, Centro Medico 'Lic. Adolfo López Mateos', ³Universidad del Valle de México, Toluca, ⁴IMSS Epidemiology and Health Services Research Unit, Morelos, Mexico., Cuernavaca, Mexico

Objective: To evaluate the association between physical activity (PA) with presence of burnout syndrome (BS) and its three dimensions: emotional exhaustion, depersonalization and low personal accomplishment in health workers and educational sector.

Methods: A sample of IMSS workers, INSP and UAEM was obtained. After signing informed consent subjects answer a lifestyle questionnaire that included a PA questions and the Burnout scale designed by Maslach. Anthropometric measurements were performed by previously standardized personnel (concordance coefficient of 0.83 to 0.9), with conventional stadiometer and calibrated scales previously Tanita brand. We determined body mass index (BMI) based on the criteria of the Center for Disease Control (CDC). PA was considered sufficient to perform 30 or more minutes of daily PA. The data analysis was performed in the Stata statistical package.

Results: From the analysis of 1992 health workers and educational study participants' Cohort Health Workers. The mean age was 39 ± 9 years. Seven out

of ten participants performed less than 30 minutes of PA per day. A trend of higher prevalence of BS in those performing < 30 minutes of PA per day was showed, to perform ≥30 minutes of PA reduces the likelihood of developing BS in a 31% according to Grunfeld criteria and 65% according to the Ramirez's criteria.

Conclusions: To perform at least 30 minutes a day is a protective factor to avoid the presence of BS, but only three out of ten participants to perform AF. The most affected job categories by SB were trusted personnel, administrative and academic.

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THE RELATION BETWEEN PHYSICAL ACTIVITY AND CENTRAL OBESITY IN IRANIAN WOMEN

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Objectives: Low physical activity seems to be one of the major risk factors of central obesity. The aim of this study was determination of the relation between physical activity and central obesity in women living in Tehran, Iran.

Methods: In a cross-sectional study, 20-50 years old women living in Tehran were selected with Stratified random sampling method. Waist circumferences(WC) were measured with standard methods with (precision of 0.1cm). Central obesity was defined as WC ≥ 88 cm. Physical activity level (P.A.L) was obtained with a standard questionnaire via interviewing. This questionnaire was designed with the basis of P.A.L. In this questionnaire, at first amount of each P.A.L was calculated with basis of metabolic equivalent (MET). Then the time which was spent for each activity in a day was multiplied in MET of each activity. Sum of these amounts showed the total P.A.L (MET-h/day). MET≥ 29 was considered as active people. Data was analyzed by SPSS, version13 software.

Results: The mean age of participants was 33.5±9.7 y and their total physical activity mean was 25.7±7.2 MET-h/day.171 (38.8%) of subjects were centrally obese. After adjustment for age, women at the last tertial of physical activity had 53% lower odds for being centrally obese (OR=0.47;95%CI:0.26-0.85) than women in the first tertial of physical activity.

Conclusions: Our findings suggest that higher physical activity was related with lower risk of and central obesity.

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EVALUATION OF BODY COMPOSITION AND EXERCISE CAPACITY IN WOMEN AFTER BARIATRIC SURGERY

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Introduction: Obese patients have limitations, including a reduction in exercise capacity. Bariatric surgery is an effective alternative for weight loss, which appears to attenuate these effects of obesity.

Objective: To evaluate the body composition and the exercise capacity in women after bariatric surgery.

Methods: It was evaluated 25 women (43.05 ± 9.62 years) who underwent bariatric surgery between 6 months and two years to compose the surgery group (SG). Body composition was assessed by bioelectrical impedance and exercise capacity was assessed by the 6-minute walk (6MWT). It was also assessed 10 women (39.10 ± 9.80 years) non-obese and sedentary to compose the control group (CG).

Results: Even after surgery, 17 patients were still obese, the SG was divided into two groups: obese SG (OSG) and non-obese SG (NOSG).

Variable	OSG (n=17)	NOSG (n=8)	CG (n=10)
% body fat	40.79 ± 4.79*	30.93 ± 6.72	30.10 ± 4.30
% muscle mass	56.21 ± 4.55*	66.04 ± 5.94	65.89 ± 4.80
% total body water	42.34 ± 3.15*	49.16 ± 4.33	48.20 ± 3.00
% bone mass	3.00 ± 0.26*	3.51 ± 0.34	3.53 ± 0.23
6MWT distance (m)	434.00 ± 69.02*	513.37 ± 72.96	565.50 ± 112.10
% predicted	79.13 ± 11.86*	85.82 ± 10.40	88.50 ± 16.50

[Table 1 - Results of body composition and 6-minute]

Conclusion: Women who underwent bariatric surgery, but still remain obese have a higher percentage of body fat and less muscle mass, and a shorter distance in 6MWT. In addition, women who underwent bariatric surgery that return to normal BMI, presented results of body composition and 6MWD similar to non-obese sedentary women.

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EFFECT OF CONTROLLED SCHOOL-BASED MULTI-COMPONENT HEALTH AND NUTRITION INTERVENTIONS ON LIFESTYLES AND ANTHROPOMETRIC PROFILE OF URBAN ADOLESCENTS, HYDERABAD, INDIAN

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An overweight and obesity is a major public health problem even in India and its control and prevention is very important from early life.

Objective: To study the effect of multi-component health and nutrition intervention on lifestyles and anthropometric profile of adolescents.

Methods: A randomized controlled school intervention study was conducted in 10 schools matched for student strength, enabling environment, socioeconomic strata. Five schools each were randomized into intervention and control groups. Multi-component intervention strategies were developed based on formative research and implemented the interventions. Changes in nutrition knowledge, practices, lifestyles and food frequency of school children were assessed using pretested validated questionnaire. Anthropometry and blood pressure was measured. Percent body fat was computed using fat fold thickness measured at multiple sites.

Results: At 8 months follow-up, in the intervention group 10-15y (Boys: 271; girls: 265) a significant improvement was observed in nutrition-related knowledge and practices compared to control group (boys: 280; girls: 255), fewer consumed energy dense foods, more children participated in outdoor games and physical exercises and mean sum of fat fold thickness decreased significantly (-1.2mm, p< 0.01) compared to control group (+1.2mm). More importantly, there was shift from obesity to overweight to normal nutritional status.

Conclusions: The multi-component health and nutrition intervention successfully improved not only nutrition related knowledge but also lifestyle, eating practices and thus resulted in decline of percent body fat and obesity. This model can be scaled up in entire country to mitigate the problem.

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A SHORT 10-WEEK TRAINING PROGRAM REDUCED FAT MASS IN YOUNG ADULT WOMEN WITH DOWN SYNDROME

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Objectives: Regular exercise may play a key role in reducing fat mass in people with intellectual disabilities. However most of published studies were focused on male or mixed (males and females) groups so that women had received little attention in the literature. For the reasons already mentioned, the present study was designed to determine the influence of a short training program on fat mass percentage in young women with Down syndrome.

Methods: Twenty young adult women with Down syndrome (25.2±4.4 years) volunteered for this study. Eleven were randomly included in experimental group to perform a 10-week aerobic training program, 3 days/week, consisting of warm up (10-min), main part (35-40-min) at a work intensity of 55-65% of peak heart rate (increasing 2% each 2 weeks) and cool-down (10-min) in a treadmill. Control group included 9 age, sex and BMI-matched women with Down syndrome that did not perform any program. Fat mass percentage was assessed by bioelectrical impedance analysis (BIA). Further our protocol was approved by an institutional Ethics Committee.

Results: When compared to baseline fat mass percentage was significantly reduced (28.4±3.6% vs. 26.7±3.1%; p=0.006). Conversely no changes were reported in controls. It should be also pointed out no withdrawals were reported during the study what suggested our training program was safe and easy to follow-up.

Conclusion: A 10-week aerobic training reduced fat mass percentage in young women with Down syndrome. Further long-term, well-conducted studies on this topic are required.

Prevention

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BODY MASS INDEX: THE INFLUENCE OF DEPRESSION IN ADOLESCENTS.

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Objective: Determined the effects of depression (D) on increase in body mass index (BMI) in adolescents.

Methods: The participants were 237 adolescents, males (n= 102) and females (n= 135), age-mean = 14, 11 years (SD=1, 6), who were measured weight and height. BMI was calculated by dividing the weight by height to the square. Adolescents completed the Zung depression scale to assess depression symptoms, and they were classified in 3 categories: Minimum Depression (MiD), Moderate Depression (MoD) and Extreme Depression (ExD).

Results: The of MiD in all adolescents was 70,5% (n=167), MoD was 21,9% (n= 52) and ExD was 7,6% (n= 18). The mean and standard deviation BMI was: $21,74 \pm 4,55$ in all adolescents, for MiD was $21, 22 \pm 4, 15$, for MoD were $21,66 \pm 4,50$ and for ExD were $23, 94 \pm 5,86$. The weight status 2,1% (n=5) with underweight; 54, 4% (n=129) with healthy weight; 28,3% (n=67) with overweight and 15,2% (n=36) obese. The One-Way ANOVA showed a significant effect when the sample was divided two age groups 12 to 15 years and 16 to 18 years, find that d factor ($f = 3,530$ $p = .031$) on BMI in the group of adolescents 12 to 15 years.

Conclusions: The present results provide evidence the effect of category for D on increase in BMI considered a alternative to measure body fat in adolescents between 12 to 15 years, which would mean that D may influence obesity being this group vulnerable to D by hard changes.

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CORRELATION BETWEEN BOWEL MOVEMENT FREQUENCY AND NON-SPECIFIC COMPLAINTS, FOOD INTAKE AND MANIC DEPRESSIVE TENDENCIES AMONG HIGH SCHOOL STUDENTS

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Subjects and methods: The subjects of the survey consisted of 2,535 high school students attending five high schools in Okayama Prefecture. The survey consisted of a questionnaire asking about complaints regarding subjective symptoms (2002 Working Group for Occupational Fatigue) according to bowel movement frequency for one week, food intake frequency (eating score) by food group, and use of the Birlson Depression Self-Rating Scale (manic score, depression score), and the results were tabulated and analyzed using a one-way analysis of variance.

Results and discussion:

(1) Those subjects who had daily bowel movements maintained a low level of complaints during the course of daily life for both boys and girls, while the number of complaints by students categorized as having irregular bowel movements was high.

(2) Significantly higher eating scores were demonstrated by those subjects categorized as having a bowel movement every morning for both boys and girls.

(3) A similar trend was also observed for girls. Manic/depressive scores were higher among girls than boys overall.

Summary: As a result of studying the effects of bowel movement frequency for one week from the three aspects of subjective symptoms, food intake and depressive tendencies for use as a reference for implementation of promotion of

health maintenance and lifestyle guidance among high school students, daily bowel movements were found to be an essential condition for health management, thereby suggesting the importance of establishing a fixed interval between bowel movements.

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INFLUENCE OF ENERGY DRINKS ON 24-HOUR HEART RATE AND BLOOD PRESSURE IN YOUNG HEALTHY SUBJECTS: PRELIMINARY RESULTS

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Objectives: The aim of this study was to evaluate the effects of caffeinated energy drinks with and without taurine on 24-hr ambulatory blood pressure (BP) and heart rate (HR).

Methods: Four healthy men drank three experimental drinks according to a randomized crossover design: 1) caffeinated drink with taurine [548 kcal, 136 g carbohydrates (CHO), 400 mg caffeine, 4.8 g taurine]; 2) caffeinated drink [527 kcal, 124 g CHO, 400 mg caffeine] and, 3) control drink [548 kcal, 136 g CHO]. BP and HR were monitored for 24 hours with ambulatory blood pressure monitoring and three periods were of interest: 1) 24-hour, 2) daytime [8:00 AM to 10:00 PM] and, 3) nighttime [10:00 PM to 7:00 AM]. Anthropometric variables were measured during a preliminary screening.

Results: Subjects were aged 25 ± 4 years with a body weight of 73 ± 9 kg and a body mass index of 24 ± 3 kg/m². The caffeinated drink with taurine increased nighttime SBP in comparison to the placebo drink (114 ± 7 vs. 109 ± 8 mmHg; $p < 0.05$). DBP tended to be higher with the caffeinated drinks with and without taurine vs. the control drink (24-hour: 74 ± 7 vs. 75 ± 6 vs. 70 ± 6 mmHg; $p = 0.06$; daytime: 77 ± 8 vs. 77 ± 7 vs. 73 ± 6 mmHg; $p = 0.06$; nighttime: 67 ± 2 vs. 65 ± 9 vs. 60 ± 5 mmHg; $p = 0.11$). There was no difference in HR between the drinks.

Conclusion: Blood pressure, especially during the nighttime period, seems to be sensitive to energy drinks in healthy volunteers.

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ASSOCIATION OF VISCERAL ABDOMINAL AND INTRATHORACIC ADIPOSITY WITH THE CARDIOMETABOLIC PROFILE OF YOUNG AND APPARENTLY HEALTHY ADULTS

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Objectives: We investigated the associations between specific adipose tissues - subcutaneous abdominal adipose tissue (SAT), visceral abdominal adipose tissue (VAT) and epicardial adipose tissue (EAT) - and markers of cardiometabolic risk of young and apparently healthy adults.

Methods: Two hundred and eighty non-obese adults aged 18-35 years (49% men) with apparent good health underwent anthropometric measurements, blood pressure measurement and fasting blood test for cardiometabolic profile assessment as well as magnetic resonance imaging for specific adipose tissues quantification.

Results: Correlations of VAT and EAT with markers of cardiometabolic risk were stronger than those of SAT. In multivariable regression analyses including age, gender and BMI, VAT was independently associated to diastolic blood pressure, low-density lipoprotein cholesterol (LDL-C), total cholesterol (TC), TC/high-density lipoprotein cholesterol ratio (TC/HDL-C), triglycerides (TG),

apolipoprotein B (ApoB) and ApoB/ApolipoproteinA1 ratio (ApoB/ApoA1); EAT was independently associated to TC/HDL-C, TG and ApoB/ApoA1; and SAT was independently associated only to CT and TG. Even though BMI, waist circumference (WC) and WC/hip circumference ratio were all associated to VAT in univariable analyses, when performing multivariable regression including all three office-based anthropometric markers, we observed that only WC remained an independently associated to VAT.

Conclusion: Visceral adiposity is more strongly associated with the cardiometabolic profile of young and apparently healthy adults than subcutaneous adiposity. Evaluation of VAT by WC, in addition to BMI, would increase the ability of clinicians to appreciate visceral adiposity and therefore, the way to assess cardiometabolic risk of young adults.

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DEPRESSION MANAGEMENT MAY FAVOR HEALTHIER LIFESTYLE IN INDIVIDUALS AT HIGH CARDIOMETABOLIC RISK

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Introduction: Depression coexists with obesity which may be in part associated with unhealthy life habits, contributing to increase cardiometabolic risk.

Objectives: To evaluate whether the reduction of depression symptomatology favors better dietary habits and physical activity during a lifestyle intervention.

Methods: 183 prediabetic individuals (54.7±12.3 yrs, BMI: 30.8±5.8 kg/m²) underwent an 18-month intervention on diet, physical activity and stress management, conducted by a multiprofessional team. Dietary (24hr recalls), psychological and clinical data were obtained. Severity of depressive symptoms was assessed using the Beck Depression Inventory (12-19: mild, 20-35: moderate, 36-63: severe) and QoL by the SF-36 domains. Pearson correlation was used to examine associations of depression improvement and changes in habits and QoL.

Results: At baseline, 46% (n=81) had depression (score ≥12); they were predominantly women, with higher BMI and waist circumference and lower scores of QoL compared with those without depression. Depression scores were correlated to age (r=-0.196, p=0.011), fat mass (r=0.381, p< 0.001), fiber consumption (r=-0.213, p=0.005) and physical activity (r=-0.216, p=0.007). Mean scores and severity of depression reduced after 18 months. The subset of individuals that improved the category of depression increased physical activity and fiber intake (p< 0.05) but not those who maintained symptomatology. Changes in depression score were correlated with changes in QoL (general health: r=-0.317, p< 0.001; vitality: r=-0.221, and mental health: r=-0.257, p< 0.05) but not to adiposity.

Conclusion: Higher adiposity in depressive individuals may be associated with unhealthy lifestyle. Interdisciplinary approach induces psychological benefits which favor healthier behaviors.

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EDMONTON OBESITY STAGING SYSTEM (EOSS) CLASSIFICATION IN A GROUP OF ITALIAN OBESE WORKERS

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BMI classification might have some limitations when applied to clinical practice, and when work-related impairments must be evaluated; in fact it does not provide information on presence and/or severity of clinical impairments associated with obesity.

EOSS classification categorizes obesity in five stages: **St0** (obesity/overweight without complications); **St1** (obesity/overweight with metabolic complications), **St2** (st1 + psychological symptoms + functional limitations with mild restrictions of daily living and working activities); **St3** (st2 + organ damage + significant limitations of daily living and working activities), **St4** (end stage organ disease).

Aim of the present study is to compare BMI and EOSS in a group of obese workers, and to evaluate their different utility for precautionary and work-eligibility purposes.

Results: EOSS **St0**: 9/134 subjects (7%); **St1**: 16/134 subjects (12%); **St2**: 102/134 subjects (76%); **St3**: 7/134 subjects (5%). Complications and comorbidities: 109/134 subjects (81%) with mental complications, . 89/134 subjects (66%) with mechanical complications; 127/134 subjects (95%) with metabolic complications .

44/134 of workers (33%) complained a direct relationship between personal health and working performance.

BMI: overweight: 33/134 soggetti (24%); obesity I: 50/134 subjects (37%); obesityII : 31/134 (23%); obesity III: 20/134 (16%).

Considering both organic and functional complications, other than anthropometric parameters only, might influence the evaluation of work-eligibility for a specific activity.

Results on our study population, even if small in sample size, suggest that a more systematic use of the EOSS classification - thus considering gender, type of organic/functional damage, and type of working activity - might be useful in occupational medicine.

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RELATIONSHIP BETWEEN THE URBAN ENVIRONMENT AND HEALTHY BEHAVIOURS AMONG TEENAGERS LIVING IN QUÉBEC CITY

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Objectives: To explore the existence of clusters in healthy behaviours and to examine the association between the urban environment and a healthy lifestyle among teenagers.

Methods: Fourth grade high school teenagers (n=211) from 10 schools in Québec City were recruited. Through an Internet survey, participants were invited to identify the location of their home and to document their lifestyle as well as their healthy eating, physical activity and active transportation habits. They were also asked to list all places (selling food or not) that they visited around their school, either by walking or biking. To define profiles of teenagers based on their lifestyle, cluster analyses were used.

Results: Five reliable lifestyle clusters could be identified and labelled as «Typical Teens (n=93)», «Daily Walkers (n=44)», «Neighborhood Walkers (n=41)», «Food Conscious (n=21)» and «Sports Minded (n=12)». Environmental factors were significantly associated with these clusters as well as the neighbourhood walkability score ($p < 0,01$), district of residence ($p < 0,01$), house-school distance ($p < 0,01$) and specialized schools ($p = 0,01$). Furthermore, visiting or not places around school or places selling food or not was associated with these clusters ($p < 0,01$).

Conclusion: The majority of the studied teenagers presented lifestyle behaviours that do not prioritize active transportation, healthy eating and regular physical activity. In a suburb designed city such as Québec, the districts of residence as well as the urban form and functions and the built environment of school districts are related to the teenagers' healthy lifestyle.