

Proceedings of the 2nd International Conference on Obesity and Chronic Diseases (ICOCD-2017)

Keynote Presentations

Obesity; Breast Cancer and Liver Steatosis Protection by Weight Loss

Reza Hakkak^{1-3*} and Soheila Korourian⁴

¹Department of Dietetics and Nutrition, University of Arkansas for Medical Sciences, AR, USA

²Department of Pediatrics, University of Arkansas for Medical Sciences, AR, USA

³Arkansas Children's Research Institute, University of Arkansas for Medical Sciences, AR, USA

⁴Department of Pathology, University of Arkansas for Medical Sciences, AR, USA

Abstract

Obesity has been an epidemic in the US and world for more than two decades. Obesity is associated with serious health conditions, including type 2 diabetes, cardiovascular disease, certain types of cancers, hyperlipidemia, and liver steatosis. Nonalcoholic fatty liver disease (NAFLD), a major cause of abnormal liver function, is often associated with obesity. Dehydroepiandrosterone (DHEA) is a dietary supplement that is available in many health food stores and has been shown as an anti-cancer agent and anti-obesity supplement. Previously, we reported that obesity promotes 7, 12-dimethylbenz(a)anthracene (DMBA)-induced mammary tumors. The objectives of this study were to investigate the effects of obesity and DHEA feeding on mammary tumor development and liver steatosis. Female Zucker rats were randomly assigned and had ad libitum access to water and a diet of either control or diet with DHEA at a concentration of 6 g/kg of diet. All rats were orally gavaged at age 50 days with 65 mg DMBA/kg body weight. Rats were weighed and palpated twice weekly for detection of mammary tumors and sacrificed 155 days post-DMBA treatment. Livers and mammary tumors were collected for histological examination. Serum was collected to measure DHEA, DHEA-S, IGF-1, and IGFBP-3. Our results show that; 1) Obese rats fed the DHEA diet gained significantly less weight than obese control diet rats ($P < 0.001$) than control-fed rats; 4) DHEA feeding caused significant decreases ($p < 0.001$) in the serum levels of IGF-1 and IGFBP-3 and significantly increased ($p < 0.001$) serum levels of DHEA and DHEA-S. Our results suggest that lowering body weight can protect against DMBA-mammary tumors and liver steatosis.

Weight Bias and Obesity Sensitivity for Healthcare Professionals

Colleen M. Cook

Bariatric Support Centers International, UT, USA

Abstract

This session features and open an honest discussion about the need for and value of identifying and addressing weight bias in a hospital setting. It also includes insights about the disease of obesity and treatment options as well as ways to increase understanding of and improve sensitivity towards those struggling with the effects of the disease.

Enhancing Micronutrient Density to Effectively Resolve Obesity, Food Addiction and Cravings

J. Fuhrman*, B. Sarter, D. Glaser and S. Acocella

Nutritional Research Foundation, Flemington, NJ, USA

Abstract

People overeat because their hunger directs them to consume more calories than they require. The purpose of this study was to analyze the changes in experience and perception of hunger before and after participants shifted from their previous usual diet to a high nutrient density diet.

Methods: This was a descriptive study conducted with 768 participants primarily living in the United States who had changed their dietary habits from a low micronutrient to a high micronutrient diet. Participants completed a survey rating various dimensions of hunger (physical symptoms, emotional symptoms, and location) when on their previous usual diet versus the high micronutrient density diet. Statistical analysis was conducted using nonparametric tests.

Results: Highly significant differences were found between the two diets in relation to all physical and emotional symptoms as well as the location of hunger. Hunger was not an unpleasant experience while on the high nutrient density diet, was well tolerated and occurred with less frequency even when meals were skipped. Nearly 80% of respondents reported that their experience of hunger had changed since starting the high nutrient density diet, with 51% reporting a dramatic or complete change in their experience of hunger.

Conclusions: A high micronutrient density diet mitigates the unpleasant aspects of the experience of hunger even though it is lower in calories. Hunger is one of the major impediments to successful weight loss. Our findings suggest that it is not simply the caloric content, but more importantly, the micronutrient density of a diet that influences the experience of hunger. It appears that a high nutrient density diet, after an initial phase of adjustment during which a person experiences “toxic hunger” due to withdrawal from pro-inflammatory foods, can result in a sustainable eating pattern that leads to weight loss and improved health. A high nutrient density diet provides benefits for long-term health as well as weight loss. Because our findings have important implications in the global effort to control rates of obesity and related chronic diseases, further studies are needed to confirm these preliminary results.

Using “Genetic Precision Medicine” to Treat and Prevent Obesity: Induction of “Dopamine Homeostasis”

Kenneth Blum^{1,2*} and Rajendra D. Badgaiyan¹

¹*Department of Psychiatry and Behavioral Sciences, Wright State University Boonshoft School of Medicine, Dayton OH, USA*

²*Department of Nutrigenomics, Geneus Health LLC, San Antonio, TX, USA*

Abstract

Earlier work from our laboratory, showing anti-addiction activity of a nutraceutical consisting of amino-acid precursors and enkephalinase inhibition properties and our discovery of the first polymorphic gene (Dopamine D2 Receptor Gene [DRD2]) to associate with severe alcoholism serves as a blueprint for the development of “Personalized Medicine” in addiction with special application to obesity. Prior to the later genetic finding we developed the concept of Brain Reward Cascade which continues to act as an important component for stratification of addiction risk through neurogenetics. In 1996 our laboratory also coined the term “Reward Deficiency Syndrome (RDS)” to define a common genetic rubric for both substance and non-substance related addictive behaviors (Hyper or HypoPhagia) now a recognized disorder. Following many reiterations, we utilized polymorphic targets of a number of reward genes (serotonergic, Opioidergic, GABAergic and Dopaminergic) to customize KB220 [Neuroadaptogen- amino-acid therapy (NAAT)] by specific algorithms. Identifying 1,000 obese subjects in the Netherlands a subsequent small subset was administered various KB220 formulae customized according to respective DNA polymorphisms individualized that translated to significant decreases in both Body Mass Index (BMI) and weight in pounds (3 studies published). Following these experiments, we have been successfully developing a panel of genes known as “Genetic Addiction Risk Score (GARS)[™]” Selection of 10 genes with appropriate risk variants, a statistically significant association between the ASI Media Version -alcohol and drug severity scores and GARS was found. It is well-known that the DRD2 A1 allele reduces responsivity to palatable food (Milk Shake) in obese adults. Carriers of the DRD2 A1 variant after one-year follow-up gain weight. In an attempt to understand the Mechanism of Action (MOA) of KB220Z (a Pro-dopamine Regulator) we carried out fMRI studies in humans and rats. We found in abstinent heroin addicts, increased resting state

functional connectivity in a putative network including: dorsal anterior cingulate, medial frontal gyrus, nucleus accumbens, posterior cingulate, occipital cortex, and cerebellum. In addition, we show that KB220Z significantly activates above placebo, seed regions of interest including the left nucleus accumbens, cingulate gyrus, anterior thalamic nuclei, hippocampus, pre-limbic and infra-limbic loci. KB220Z significantly enhances functional connectivity and dopaminergic functions. It also activates additional brain areas across the reward circuitry. For obesity we propose a Reward Deficiency System Solution that promotes early identification and stratification of risk alleles by utilizing GARS allowing for customized nutrigenomic targeting of these risk alleles by altering KB220 ingredients as an algorithmic function of carrying these polymorphic DNA –SNPS. Potentially yielding the first ever nutrigenomic solution for obesity.

Different Types of Obesity in Clinical Practice: “Fat and Fit” or “Healthy Obese”

Edita Stokić

Clinical Centre of Vojvodina, Medical Faculty of Novi Sad, Serbia

Abstract

Obesity has become one of the major health problems in a modern society because it is associated with comorbidities such as type 2 diabetes, cardiovascular diseases, dyslipidemia, hypertension, and certain types of cancer, which may lead to increased mortality. One of the areas of particular interest is the question of obesity as clinical entity not associated with cardiometabolic risk and insulin resistance. Having in mind all three aspects of obesity overview – a nutrition degree, body fat mass and metabolic activity of intra-abdominal fat, Plourde G and Karelis AD have defined several subtypes of obesity based on the observation that all metabolic and cardiovascular abnormalities are not always manifested in all obese people, as well as that the same disorders could also be found in persons with normal weight. In this regard, there is a difference between metabolically healthy and metabolically risky obese, as well as metabolically obese and metabolically healthy normal weight persons. Percentage of Metabolically healthy obese people (MHO) has been estimated to be between 10% and 34% depending on the criteria used. MHO persons have a high BMI (BMI ≥ 30 kg/m²) and a higher body fat mass, but the quantity of visceral fat in them is within normal range, as well as insulin sensitivity, triglycerides level and HDL-cholesterol. Today, the reasons for the differences between individual subtypes of obesity, is still unclear and needs to be clarified. Results from our investigation show differences in mass and distribution of body fat between metabolically healthy and metabolically obese women, with remarkably differences in intraabdominal adipose tissue morphology, represented by smaller number and larger size of adipocytes in metabolically obese women. Immunoeexpression of leptin and TNF- α was higher in metabolically obese women, with higher immunoeexpression of leptin in visceral adipose tissue that followed blood concentrations of leptin. In conclusion, studying the changes in the adipocyte level of visceral fat in particular, in regard to the metabolic and cardiovascular risk factors, could contribute to the understanding of phenotypic differences between obese individuals.

References

1. Plourde G, Karelis AD. 2014. Current issues in the identification and treatment of metabolically healthy but obese individuals. *Nutr Metab Cardiovasc Dis* 24(5): 455–459. <https://doi.org/10.1016/j.numecd.2013.12.002>
2. Galić BS, Pavlica T, Udicki, M, Stokić, E, Mikalački M, et al. 2016. Somatotype characteristics of normal-weight and obese women among different metabolic subtypes. *Arch Endocrinol Metab* 60(1): 60–65. <https://doi.org/10.1590/2359-399700000159>

A Neutralizing Monoclonal Antibody to Gastric Inhibitory Polypeptide (GIP) Prevents and Treats Obesity in Mice

M. Michael Wolfe^{1,2}, Patricia Glazebrook^{1,2}, Alice A. Newman^{1,2} and Michael O. Boylan²

¹*MetroHealth Medical Center, OH, USA*

²*Case Western Reserve University, Cleveland, OH, USA*

Abstract

This study was designed to determine whether immunoneutralization of GIP using a newly developed monoclonal antibody (mAb) might prevent and treat obesity. A specific mAb directed against the C-terminus of mouse GIP was generated, and its effect on weight gain in C57BL/6 mice were evaluated. In separate studies, obesity was induced in mice by feeding a high-fat diet (HFD; 60% calories from fat) from weaning to 18 weeks (wks). The mice were then fed a 45% HFD and administered GIP mAbs for 6 wk. BW was recorded weekly, and HgA1c levels were measured after wk 6. Nine wk-old C57BBL/6 mice injected with GIP mAbs (60 mg/kg BW/wk) for 17 wk gained 46.5% less weight than control mice fed the identical diet (P = 0.00000007). No difference in quantity of food consumed was detected between the groups. Furthermore, MRI

demonstrated that subcutaneous, omental, and hepatic fat were 1.97-, 3.46- and 2.15-fold, respectively, lower in mAb-treated animals. Moreover, serum insulin, leptin, total cholesterol, low-density lipoprotein, and triglycerides were significantly reduced, while the high-density lipoprotein: TC ratio was 1.25-fold higher in treated animals. In the reversal studies, BW was reduced by $6.0 \pm 2.7\%$ in obese mice treated with GIP mAbs (45 mg/kg BW/wk), while BW increased in control mice by $3.6 \pm 1.4\%$ ($P < 0.002$). Mean HgA1c levels for mAb-treated mice trended lower ($4.4 \pm 0.2\%$), compared to control mice ($4.8 \pm 2.7\%$, $P = \text{NS}$). These studies support the hypothesis that a reduction in GIP signaling using a GIP neutralizing Ab might provide a useful method for the treatment and prevention of obesity and related disorders.

Fructose as an Etiological Factor in the Obesity and MetS Epidemics

Alejandro Gugliucci^{1*}, Robert H Lustig², Ayca Erkin-Cakmak², Susan M Noworolski⁴, Viva W Tai³, Michael J Wen³, Kathleen Mulligan^{1,3} and Jean-Marc Schwarz⁵

¹Department of Research, College of Osteopathic Medicine, Touro University-California, CA, USA

²Department of Pediatrics, University of California, San Francisco, CA, USA

³Department of Medicine, University of California, San Francisco, CA, USA

⁴Department of Radiology and Biomedical Imaging, University of California, San Francisco, CA, USA

⁵Department of Basic Sciences, College of Osteopathic Medicine, Touro University California, CA, USA

Abstract

Dietary fructose may play a role in the pathogenesis of metabolic syndrome (MetS) and obesity. The reduction in fat and saturated fat consumption in the past 40 y led to an increase in CHO consumption and especially of fructose. The result is an epidemics of MetS, obesity and diabetes. In this presentation we summarize the current evidence from epidemiological and intervention studies that support the contention that fructose, per se, and not just its calories may be a key factor in the etiology of the epidemics. After reviewing fructose metabolism and its impact on de novo lipogenesis, liver fat and insulin resistance; we will focus on recent intervention studies, including our own, to show powerful evidence indicating that fructose restriction in obese adolescents can reverse most of the metabolic signs of insulin resistance. Obese children with MetS ($n = 37$) consumed a diet that matched self-reported macronutrient composition for nine days, with the exception that dietary fructose was reduced from $11.7 \pm 4.0\%$ to $3.8 \pm 0.5\%$ of daily calories and substituted with glucose (in starch). Participants underwent fasting biochemical analyses on days 0 and 10. This diet reduced insulin and peptide C levels and AUC, fasting glucose and AUC during OGTT. We also show that obese children with MetS put in an isocaloric fructose restriction show reduced fasting triglyceride (TG) and LDL-cholesterol (LDL-C) in just 9 days. Significant reductions in apoB apoC-III and apoE (all $p < 0.001$) were noted. LDL size increased ($p = 0.008$). Small dense LDL was present in 25% of our cohort and reduced by 68% ($p = 0.04$). The TG/HDL-C ratio by 50% ($p = 0.02$). These changes in fasting lipid profiles correlated with changes in insulin sensitivity. The improvements in these outcome measures occurred irrespective of baseline liver fat content or weight change. These results suggest that fructose consumption is an important determinant of insulin resistance and adverse lipoprotein markers of CVD risk in children with obesity and MetS, at least in high sugar consumers. These studies provide evidence that support recent public health efforts to reduce sugar consumption as a means to improve metabolic health.

This project was supported by the NIH (R01DK089216, P30DK056341), UCSF Clinical and Translational Science Institute (NCATS-UL1-TR00004), and Touro University.

Workshop

Green to Lean

Jennifer Cassetta

Abstract

The media is saturated with often times contrary nutritional headlines that can confuse even the most well-informed fitness enthusiasts. We have been conditioned to look for the quick fix and magic pill to weight loss and health even though logic tells us that the path to fitness is a sustainable healthy lifestyle.

Jennifer Cassetta, a clinical nutritionist, health coach and fitness expert, has worked with clients around the world helping them transform their health from the inside out. In her Green to Lean keynote, she will compare and contrast various trends in dietary theory to show what works and what doesn't when it comes to weight loss and long-term wellness and even the sustainability of our planet.

Featured Presentations

Session on Childhood Obesity Treatment and Prevention

Prevalence and Trends of Obesity and Overweight Among Mississippi Public School Students between 2005 and 2015: Translating Findings into Policy

Jerome R. Kolbo

The University of Southern Mississippi, MS, USA

Abstract

Presented will be the estimated the prevalence of overweight and obesity among weighted, representative samples of Mississippi public school students in grades K-12 and changes between 2005 and 2015. In 2015, the prevalence of overweight, obesity, and both combined remained higher than national averages, yet the rates had neither increased nor decreased significantly since 2005 ($p = 0.6904$). In 2015, as with all previous years, there was no difference between boys and girls ($p = 0.570$). As in all previous years, the prevalence of obesity in 2015 was significantly higher among black students ($p < 0.001$) than among white students. Similar to 2011 and 2013, there was a significant difference by grade level in 2015 ($p = 0.0029$), with the lowest prevalence again among the elementary students. The significant linear decrease in obesity prevalence among elementary school students observed during 2013 continued to 2015 ($p = 0.0209$). Steps to combine these findings with other state and national research in order to call for earlier assessment and comprehensive treatment of factors associated with obesity and racial disparities among younger children (i.e., gestational diabetes, BMI and weight gain during pregnancy, smoking, gestational age of child at delivery, high birth weight, weight gain in infancy, breastfeeding, age at introduction to solid foods, hours of sleep, and active play vs. screen time) will be shared. Successful efforts to translate these findings into state and national policy will also be discussed.

The Prevalence of Obesity in School Children and Its Association with Dental Caries

Deema Farsi¹, Heba Elkhodary¹, Leena Merdad² and Najat Farsi¹

¹*Department of Pediatric Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia*

²*Department of Dental Public Health, King Abdulaziz University, Jeddah, Saudi Arabia*

Abstract

Background: The prevalence of overweight/obesity in children in Arab countries is amongst the highest in the world. The prevalence of dental caries is also high in Saudi children. The aims are to study the prevalence of obesity, and determine the association between obesity and caries.

Materials and Methods: A cross-sectional study was conducted in 2014-2016 using a multi-stage stratified sample of 2,536 school children (1,287 boys and 1,249 girls). Anthropometric measurements, consisting of height, weight, body mass index (BMI) and waist circumference (WC), were obtained. Children were classified as underweight/healthy, overweight or obese and as non-obese or obese according to their BMI and WC, respectively. Caries experience was assessed using the decay score in the primary and permanent teeth (d/D).

Results: Based on BMI, 33.7% of the children were overweight/obese. Based on WC, 16% of them were obese. Girls had a significantly higher prevalence of obesity than boys based on WC measurements ($P < 0.001$) in pre-schoolers and elementary school children. In high school adolescents, the prevalence of obesity based on BMI ($P < 0.001$) and WC measurements ($P 0.042$) was significantly higher in boys than in girls. Children enrolled in private had a significantly higher prevalence of obesity than public schools ($P < 0.05$). In preschools and elementary schools, obese children had lower prevalence of dental caries in primary and permanent teeth (P -value < 0.05).

Conclusion: Obesity prevalence was high, particularly among private preschool children. The correlation between caries and BMI and WC was significant and varied among the different stages of dentition.

Stability and Changes in Feeding Cues and Quality of Mealtime Interaction: a Longitudinal Cross-cultural Study of British and Israeli Mothers and Infants

Netalie Shloim¹, Rudolf MCJ², Feltbower RG³, Vereijken CMJL⁴, Blundell-Birtill P⁵ and Hetherington MM⁵

¹*Institute of Medicine and Health, School of Healthcare, University of Leeds, Leeds LS2 9JT, UK*

²*Faculty of Medicine in the Galil, Bar Ilan University, Safed, Israel*

³*Centre for Epidemiology and Biostatistics, Leeds Institute for Genetics Health and Therapeutics, School of Medicine, University of Leeds, Leeds LS2 9JT, UK*

⁴*Danone Nutricia Research, Uppsalalaan 12, 3584 CT Utrecht, The Netherlands*

⁵*Institute of Psychological Sciences, University of Leeds, Leeds LS2 9JT, UK*

Abstract

Decisions about what and how to feed infants influences obesity risk. For example, early weaning and formula feeding are associated with rapid infant weight gain which is a risk factor for obesity development. Therefore, it is important to understand and to characterize the earliest interactions between mother and baby during feeding. This study aimed to explore stability and changes in mealtime interactions and feeding cues in a sample of Israeli and UK mothers and how these varied by maternal BMI and country. Mother-infant dyads (N = 41) from Israel and UK were filmed from birth and until two years old (every six months). Behaviours were coded using the Nursing Child Assessment Satellite Training (NCAST) and the Simple Feeding Element Scale (SFES). Positive mealtime interactions were seen in the first follow-up, however, with time; babies ate in a less ideal setting and were distracted during the feed. Breastfed babies showed higher levels of hunger and satiety cues in early life compared to bottle fed babies. UK mothers enjoyed the feeding interaction more than Israeli mothers, potentially explained by faster return to work in Israeli mothers compared to stay-at-home mothers in the UK. Healthy weight women used fewer feeding commands and fed their babies a healthier meal compared to overweight and obese mothers. Mealtime observations offer an insight into the quality of the early feeding experience and future research should continue to explore this within larger and more diverse populations.

Intervention in Maternal Perception of their Pre-school Child Weight with Overweight and Obesity in Mexican and Mexican-American Mothers

Yolanda Flores-Pena¹, Velia M. Cardenas-Villarreal¹, Meizi He², Erica Sosa², Hermelina Avila-Alpirez³ and Perla M. Trejo Ortiz⁴

¹*The University Autonomous of Nuevo Leon, Mexico*

²*The University of Texas at San Antonio, TX, USA*

³*The University Autonomous of Tamaulipas, Mexico*

⁴*The University Autonomous of Zacatecas, Mexico*

Abstract

Background: Studies from different countries had documented that mothers do not perceive accuracy when her child is overweight or obese. They underestimate their child's weight. In addition, exert more discipline and control, which could increase their child's weight. We support, a first step in treatment of child excess weight is to help the mother to recognize when their child is overweight or obese.

Objectives: a) Change the proportion of mothers who accurately perceived their child's weight, b) Changes in maternal feeding styles, c) Increase the scores of maternal self-efficacy to management the child's life styles behaviors related to the weight, d) Reduction or maintenance of the child's body mass index (BMI) and body fat percentage at the end of the intervention.

Methods: Multicenter two-arm randomized trial with four centers, three in Mexico: a) Nuevo Leon, b) Tamaulipas, and c) Zacatecas, and one in USA, San Antonio, Texas. Each center had an intervention and a control group. A total of 360 mother-child pairs (90 pairs per center) were randomly and evenly allocated to either the intervention Healthy Change or the control group. The health education was delivered by trained peer-parent promotoras, in Spanish or English in accordance mother's preference. The intervention "Healthy Change" was founded on the Social Cognitive Theory.

Discussion: Mexico and USA share the border, both have a Hispanic population, that has more rate of childhood obesity; therefore, it is consider important to design, implement, evaluate, and compare, the interventions in different populations, to decide that more effective intervention.

Childhood Obesity Prevention Through a Policy-based Randomized Controlled Physical Activity Intervention Among Schools in China: the Health Legacy Project of the 2nd World Summer Youth Olympic Games

Fei Xu¹, Zhiyong Wang¹, Qing Ye¹, Qing Yin², Wenhao Li³, Eva Leslie⁴ and Youfa Wang⁵

¹Nanjing Municipal Center for Disease Control and Prevention, Nanjing, China

²Nanjing Qinhuai District Center for Disease Control & Prevention, Nanjing, P. R. China

³Nanjing Yuhuatai District Center for Disease Control & Prevention, Nanjing, P. R. China

⁴School of Health Sciences, Faculty of Medicine, Nursing and Health Sciences, Flinders University, Adelaide, South Australia, Australia

⁵Department of Nutrition and Health Sciences, College of Health, Ball State University, IN, USA

Abstract

Background: Childhood obesity has been becoming a worldwide public health problem. There is an urgent need to develop effective childhood obesity prevention programs to fight the childhood obesity epidemic.

Objective: This study was developed to assess the effectiveness of a policy-based physical activity (PA) intervention program aiming at childhood obesity prevention in Nanjing of China, the host city of the 2nd World Summer Youth Olympic Games.

Design: This was a cluster randomized intervention study. Participants were the 4th and 7th grade students from 48 schools and randomly allocated (1:1) to intervention or control groups at school level. Routine health education was provided to all schools, while the intervention schools additionally received a tailored multi-component PA intervention program. The primary outcome measures were changes in body mass index, obesity occurrence and PA.

Results: Overall, 9858 (97.7%) of the 10091 enrolled students completed the follow-up survey. Compared with baseline, PA level increased by 33.13 min/week (SE 10.86) in the intervention group but decreased by 1.76 min/week (SE 11.53) in the control group ($p = 0.028$). After adjustment for potential confounders, compared with the control group, the intervention group were more likely to have increased time of PA (adj. OR = 1.15, 95% CI = 1.06–1.25), but had a smaller increase in mean BMI (0.22 [SE 0.02] vs. 0.46 [0.02], $p = 0.01$) and BMI z-score (0.07 [0.01] vs. 0.16 [0.01], $p = 0.01$) and were less likely to be obese (adj. OR = 0.7, 95% CI = 0.6, 0.9) at study end. The intervention group had fewer new events of obesity/overweight and a larger proportion of formerly overweight/obese students having normal weight by study end.

Conclusions: This large policy-based PA promotion intervention was feasible and effective in promoting PA and preventing obesity among the general student population in a large city in China. Such programs

Endoplasmic Reticulum Stress and Nrf2 Signaling in Cardiovascular Disease, Diabetes and Obesity

Anna Fratta Pasini¹, Chiara Stranieri¹, Denise Peserico¹ and Chiara Mozzini¹

¹Department of Medicine, Section of Internal Medicine, University of Verona, Italy

Abstract

Endoplasmic reticulum (ER) stress is an adaptive mechanism that arises when an excessive newly synthesized and/or misfolded polypeptides in the ER lumen exceed its protein folding capacity in response to multiple cellular stress triggers such as oxidative stress, hypoxia and hyperglycaemia [1-3]. The accumulation of unfolded/misfolded proteins activates transcriptional and translational pathways, known as the unfolded protein response (UPR), an adaptive response that helps cell survival by activating a series of intracellular signaling pathways. When the UPR fails to control the level of unfolded/misfolded proteins, ER-initiated apoptotic signaling is induced [1]. Several studies have demonstrated that ER stress occurred in atherosclerotic plaques, particularly in the advanced stages [4, 5]. In addition, ER stress has an important role in cardiac hypertrophy mainly in the transition to heart failure [6]. Interestingly, chronic UPR activation has also been observed in obesity [7] and in diabetes [7, 8]. Oxidative stress that plays a key role in cardiovascular and metabolic disease is counterbalanced by complex antioxidant defense systems regulated by a series of multiple pathways, including the UPR, to ensure that the response to oxidants is adequate. Nuclear factor-E2-related factor (Nrf2) is an emerging regulator of cellular resistance to oxidants [9]; Nrf2 is strictly interrelated with the UPR sensor called pancreatic endoplasmic reticulum kinase [10]. Interventions against ER stress and Nrf2 activators seem to reduce myocardial infarct size and cardiac hypertrophy in animals [6] and to protect against obesity and insulin resistance [11]. These evidences may open new promising therapeutic approaches in chronic cardiovascular and metabolic diseases.

References

1. Ron D, Walter P. 2007. Signal integration in the endoplasmic reticulum unfolded protein response. *Nat Rev Mol Cell Biol* 8(7): 519-529. <https://doi.org/10.1038/nrm2199>
2. Back SH, Kaufman RJ. 2012. Endoplasmic reticulum stress and type 2 diabetes. *Annu Rev Biochem* 81: 767-793. <https://doi.org/10.1146/annurev-biochem-072909-095555>
3. Wang S, Kaufman RJ. 2012. The impact of the unfolded protein response on human disease. *J Cell Biol* 197(7): 857-867. <https://doi.org/10.1083/jcb.201110131>
4. Tabas I. 2010. The role of endoplasmic reticulum stress in the progression of atherosclerosis. *Circ Res* 107(7): 839-850. <https://doi.org/10.1161/CIRCRESAHA.110.224766>
5. Garbin U, Stranieri C, Pasini A, Baggio E, Lipari G, et al. 2014. Do oxidized polyunsaturated fatty acids affect endoplasmic reticulum stress-induced apoptosis in human carotid plaques? *Antioxid Redox Signal* 21(6): 850-858. <https://doi.org/10.1089/ars.2014.5870>
6. Cominacini L, Mozzini C, Garbin U, Pasini A, Stranieri C, et al. 2015. Endoplasmic reticulum stress and Nrf2 signaling in cardiovascular diseases. *Free Radic Biol Med* 88(Pt B): 233-242. <https://doi.org/10.1016/j.freeradbiomed.2015.05.027>
7. Pagliassotti MJ, Kim PY, Estrada AL, Stewart CM, Gentile CL. 2016. Endoplasmic reticulum stress in obesity and obesity-related disorders: an expanded view. *Metabolism* 65(9): 1238-1246. <https://doi.org/10.1016/j.metabol.2016.05.002>
8. Mozzini C, Fratta Pasini A, Garbin U, Stranieri C, Pasini A, et al. 2014. Increased endoplasmic reticulum stress and Nrf2 repression in peripheral blood mononuclear cells of patients with stable coronary artery disease. *Free Radic Biol Med* 68: 178-185. <https://doi.org/10.1016/j.freeradbiomed.2013.12.017>
9. Singh S, Vrishni S, Singh BK, Rahman I, Kakkar P. 2010. Nrf2-ARE stress response mechanism: a control point in oxidative stress-mediated dysfunctions and chronic inflammatory diseases. *Free Radic Res* 44(11): 1267-1288. <https://doi.org/10.3109/10715762.2010.507670>
10. Digaleh H, Kiaei M, Khodaghali F. 2013. Nrf2 and Nrf1 signaling and ER stress crosstalk: implication for proteasomal degradation and autophagy. *Cell Mol Life Sci* 70(24): 4681-4694. <https://doi.org/10.1007/s00018-013-1409-y>
11. Seo HA, Lee IK. 2013. The role of Nrf2: adipocyte differentiation, obesity, and insulin resistance. *Oxid Med Cell Longev* 2013: 184598. <https://doi.org/10.1155/2013/184598>

Symposium on “Molecular Mechanisms of Obesity”

E3 = Environment, Epigenetics, and Endocrinology

Mahua Choudhury*, Luis Schultz, Min Hi Park, Jian Zhang, Catherine Powell and Sunitha Meruvu

Department of Pharmaceutical Sciences, Texas A&M Health Science Center, TX, USA

Abstract

Exposure to environmental chemicals has adverse effects on the health and survival of humans. Emerging evidence supports the idea that exposure to endocrine disrupting chemicals (EDCs) can perturb an individual's metabolic set point and as a result, increase his/her propensity towards metabolic diseases. In addition, while any exposure window is detrimental, it is anticipated that chemical exposures during critical periods of development (e.g. in utero, neonatal, or early childhood), may lead to adverse health consequences that are manifested later in life and possibly in successive generations. Recent evidence also suggests that environmental factors (e.g. chemicals as well as nutrition) can cause epigenetic marks in DNA, histones, or microRNA in metabolically active tissues that result in increased susceptibility to Type 2 diabetes (T2D) and obesity (diabesity) or other metabolic diseases. Our lab studies the complex epigenetic regulation of obesity and its associated complications in pre-clinical and clinical models. The research focuses on identifying the altered epigenetic mechanisms and detecting the early, mid and late epigenetic biomarkers in the metabolically active tissues of liver, adipose, and skeletal muscle. We are also interested in how the diet of the mother affects the epigenome of three generations of metabolic health. As transgenerational inheritance of metabolic disease is of great importance in the present-day obesity epidemic, it is important to understand how a maternal diet high in fat and carbohydrates leads to pregnancy complications and poor maternal and pup health. We are currently investigating epigenetic regulations in the development of metabolic syndrome and potential reversal with several nutraceuticals.

Western Diet and Early Life Nutritional Modifications: Programming Obesity Epidemics?

Christopher Faulk

Department of Animal Sciences, University of Minnesota, MN, USA

Abstract

The obesity epidemic has many contributing causes, and growing evidence indicates that developmental programming is

a major factor. While the results of developmental programming have been repeatedly shown, the timing and mechanisms by which early life environment influences later life phenotype remains an active area of research. The largest exogenous exposure in any animal comes from diet. Similarly, a large and ongoing shift in diet has occurred over the last century in western cultures. This shift creates a situation of anticipatory mismatch between developing offspring and the later life adult diet, an example of the thrifty phenotype in action. I will present data from multiple studies showing that developmental exposure to low fat diets aggravates adult response to high fat diets, due to developmental programming of the offspring. The mechanism by which this occurs are likely epigenetic, acting at the interface of gene regulation and the environment. Results show changes in DNA methylation, but may also affect chromatin modifications, and small RNA, and appear to play a large role in mediating adult physiological response to environmental and developmental cues.

“Does Air Pollution Contribute to Obesity?”

John R. Balmes^{*}, Jennifer Mann, Helene Margolis and Nina Holland

Division of Environmental Health Sciences, School of Public Health, University of California, Berkeley, CA, USA

Abstract

The prevalence of obesity among U.S. children is about 17% and affects about 12.7 million children and adolescents. The prevalence of obesity is higher among Hispanics (21.9%) and non-Hispanic blacks (19.5%). The childhood obesity epidemic is thought to be due primarily to increased caloric intake from high consumption of sugar-containing drinks and high-caloric-density fast food combined with decreased energy expenditure from a sedentary lifestyle. However, animal evidence suggests that chemicals in the environment may be “obesogens.” Exposures to these chemicals may be contributing to the obesity epidemic. There is limited but growing epidemiological evidence that ambient air pollutants may also have an obesogenic effect. Although the mechanism(s) underlying this association remains to be elucidated, air pollution can induce oxidative stress and systemic inflammation. Animal evidence supports the involvement of inflammatory pathways. For example, exposure to fine particulate matter induced adipose tissue inflammation and insulin resistance in a mouse model of diet-induced obesity (Sun et al. 2009). Polycyclic aromatic hydrocarbons (PAHs), produced whenever carbon-based fuels are combusted, may be obesogenic. In Fresno, CA, an American city with relatively high levels of air pollution, we are enrolling children of several different age strata (in utero, age 7, adolescents) into a study (Children’s Health and Air Pollution Study, CHAPS) of the relationship of air pollution exposure, especially ambient PAHs, to obesity and glucose dysregulation. In addition to anthropometry, we are measuring markers of oxidative stress and systemic inflammation and adipokines (adiponectin and leptin). The results of preliminary analyses from CHAPS will be presented.

Effects of Obesogens on Host-microbiome Function in the Gastrointestinal System: What Can We Learn from Zebrafish

Joseph Bisesi^{1,2}, Amanda Buerger^{1,2}, Jordan Schmidt^{2,3} and Christopher Martyniuk^{2,3}

¹*Department of Environmental and Global Health, University of Florida, Gainesville, FL, USA*

²*Center for Environmental and Human Toxicology, University of Florida, Gainesville, FL, USA*

³*Department of Physiological Sciences, University of Florida, Gainesville, FL, USA*

Abstract

Recent evidence supports a role for environmental exposures to chemicals, termed obesogens, in the etiology of obesity. During dietborne exposures, the gastrointestinal (GI) system acts as a first line of defense, and consequently may be impacted by obesogens. Within the GI system, the microbiome plays an essential role in host immunity and nutrient digestion, and GI microbial dysbiosis has been implicated as a potential contributor to obesity. To study obesogen effects on the microbiome, we have used the zebrafish model, which exhibits functional similarities to the human GI system, offers extensive molecular tools, and supports large sample sizes which are often needed in metagenomics studies to combat inter-individual variability. To test the effectiveness of this model for studying obesogens, we conducted a two-month feeding study with adult zebrafish exposed to the phthalate plasticizer diethyl-hexyl phthalate (DEHP), a suspected obesogen. Following exposures, intestines were analyzed for microbial dysbiosis using 16S targeted next generation sequencing. Additionally, RNA seq was performed on the GI tissue to determine if there were effects on host GI system functionality. Results indicated that differential microbial dysbiosis was associated with both overfeeding as well as DEHP exposure, with disruption of bacterial phyla that often accompany obesity, inflammatory bowel disease, and colorectal cancer in humans. Finally, RNA seq data indicated enrichment of subnetworks associated with digestion, lipid metabolism, and immune function in the GI. Results from this study indicate that the zebrafish is a promising model for the study of chemical induced microbial dysbiosis and host GI function.

Molecular Mechanisms of Obesity and Metabolic Disorders in Children with Prenatal Exposure to Endocrine Disruptors

Nina Holland¹, Karen Huen¹, Asa Bradman¹, Daniel K. Nomura², Douglas Lee³, Breanna Ford², Gwen Tindula¹, Michael Zhou¹, Maria Escudero-Fung¹, Kim Harley¹ and Brenda Eskenazi¹

¹School of Public Health, CERCH, University of California, Berkeley, CA, USA

²Departments of Chemistry, Molecular and Cell Biology, and Nutritional Sciences and Toxicology, University of California, Berkeley, CA, USA

³Omic Insight, LLC, PO Box 12362, Durham, NC, USA

Abstract

The prospective nature of birth cohort studies and wealth of epidemiological data and biological samples provide unique opportunities to address effects of early life exposures on health outcomes such as obesity and chronic diseases later in life in light of DoHAD paradigm. Several lines of evidence highlight phthalates as potential key obesogens. We aimed to study the relationship of prenatal exposure to phthalates with epigenetic modifications and obesity parameters in children.

Urinary phthalate metabolites were measured during pregnancy in 400 women from the CHAMACOS study, an ongoing longitudinal birth cohort of low-income Mexican-Americans from California. DNA methylation and miRNA expression were characterized using 450K and EPIC Infinium BeadChips, pyrosequencing and Next Generation Sequencing at several time-points. BMI, waist circumference and metabolic health parameters of children were assessed from birth through age 14 years.

Phthalate concentrations in CHAMACOS women were correlated with several markers identified by targeted metabolomics. More than 55% of CHAMACOS children aged 9-14 years were overweight or obese. Phthalate metabolites were associated with child BMI Z-score, waist circumference, and biomarkers of metabolic health. MiRNA expression and DNA methylation differed by sex and were also associated with phthalate exposure and prenatal factors adjusting for blood cell composition.

Our findings provide evidence that in utero exposure to phthalates may contribute to obesity development in children. Furthermore, the relationship of prenatal phthalate exposure with altered DNA methylation and miRNA profiles suggest epigenetics as a potential molecular pathway through which prenatal exposure can affect obesity in children at older ages.

Featured Talks

Supportive Aftercare for the Bariatric Patient

Colleen M. Cook

Bariatric Support Centers International, USA

Abstract

New research shows that successful weight loss surgery patients are three times more likely to participate in bariatric support groups. Quality post op educational and support programs are an essential part of any comprehensive bariatric program.

Objectives

1. Learn ways to improve post-operative compliance and outcomes by developing quality aftercare programs.
2. Identify the different needs of pre, post, and long-term bariatric patients and the importance of creating events, educational programs & quality support groups to meet those needs.
3. Learn ways to cultivate a network of support among your bariatric patients and keep them engaged with one another and your bariatric team.

The Truth Behind Weight Loss and Maintenance

Muamer Dajdic

The Healthy Living, Canada

Abstract

The objective of this research and analysis was to identify the key success factors behind the weight loss and maintenance. With numerous failed attempts at losing weight, earlier in my life even with the help of healthcare professionals, I was determined to identify the key success factors behind the weight loss and maintenance so that I could have fun, enjoy life, and achieve my full potential in life. I was almost 500 lbs when I was only 20 and I thought I was going to die young. I could barely move from the couch where I played video games and ate junk food. By the time I turned 22, I had lost OVER 300 lbs and continue to keep it off for over 5 years now!

My mission in life is to prevent youth from becoming obese and going down the same path I've been on. It is such a waste of a young life. In addition to this, I help Global Healthcare Professionals improve their weight loss and maintenance processes so that together WE CAN help SAVE 100,000,000 lives from obesity across the world.

I believe maintaining a healthy body (mental & physical) is the foundation for our health & life. We can do this by having fun and enjoying life, living well by eating well and being moderately active while achieving our dreams. I am here to present my findings in order to help you better understand people who are struggling with obesity. This presentation will provide you a better understanding of what obese individuals go through on a daily basis. As a result, you will be able to improve your patient's lives and help them achieve a healthier lifestyle while achieving their full potential in life.

Normalizing Blood Pressure, Reversing Heart Disease and Permanent Weight Reduction via a Nutrient Dense, Plant-rich Diet

J. Fuhrman*, B. Sarter, D. Glaser and S. Acocella

Nutritional Research Foundation, Flemington, NJ, USA

Abstract

Background: The results presented from a practice survey include cases of interest, demonstrating improvements in cardiometabolic risk factors utilizing a Nutrient-Dense, Plant-Rich (NDPR) diet. It includes changes in weight, blood pressure, and lipids parameters derived from the survey and retrospective chart review.

Methods: Practice records and interviews were used for case history descriptions. Participants' data were collected via an online survey.

Results: Adherence to a NDPR dietary protocol resulted in reduced low-density lipoprotein cholesterol and serum triglycerides. Compliance of greater than 80% with the target diet resulted in an average sustained weight loss of over 50 pounds in 75 obese subjects. There was a corresponding average reduction of 27.8 mm Hg in systolic blood pressure for the 127 survey responders with untreated hypertension at baseline, and a 42.2 mg/dL average decrease in low-density lipoprotein cholesterol for the 328 survey responders, not on cholesterol reducing medications.

Conclusion: The outcomes from both the survey responders and cases demonstrate the potential for the NDPR dietary intervention to improve weight, blood pressure, lipids, and even reverse severe cardiovascular disease. Though this is a report of cases and self-reported benefits, it adds evidence to support the need for further studies investigating the potential of this dietary intervention.

An Eating Disorder is an Eating Disorder??? Multidisciplinary Care for the Eating Disorder Patient with Comorbid Obesity

Julie Friedman^{1,2} and Heather Fritz^{2*}

¹*Northwestern University Medical School, IL, USA*

²*Eating Recovery Center, USA*

Abstract

This seminar will teach the outpatient provider how to identify various forms of eating pathology that are more prevalent in higher weight populations, introduce the outpatient provider to basic neurobiological foundations of eating disorders and obesity, and describe treatment options from interventions that can be used in an outpatient setting through how and when to make referrals for higher levels of care. Nutrition, medical, and behavioral interventions for Binge Eating Disorder, Night Eating Syndrome, and post-bariatric surgery eating pathology will be introduced.

Peroxisomal-Mitochondrial Interactions in Skeletal Muscle, Obesity, and Metabolic Disease

Ronald N. Cortright

Department of Kinesiology, East Carolina University, Greenville, NC, USA

Department of Physiology, East Carolina University, Greenville, NC, USA

The Diabetes Obesity Institute, East Carolina University, Greenville, NC, USA

Abstract

The symposium proposed is extremely novel and likely never provided to the Conference Attendees as a symposium or featured topic. We are only now identifying peroxisomal function in skeletal muscle and the potential for exploitation for therapeutic strategies for the treatment of obesity and related metabolic diseases is great.

Known almost exclusively from studies in the liver, peroxisomes are essential organelles for life as demonstrated by neonatal death or shortened life span in people with their absence or dysfunctions in the organelle. Accordingly, peroxisomes are multipurpose organelles contributing to numerous metabolic pathways deemed indispensable for maintaining cellular homeostasis. Common functions include partial oxidation of long- and very long-chain fatty acids and hydrogen peroxide metabolism. Once thought of as the “garbage pail” of the cell, peroxisomes have been shown to share vital metabolic functions by interacting with other organelles such as mitochondria, the endoplasmic reticulum, and even with lipid droplets. This makes the study of peroxisomal function highly significant because of the potential for direct clinical application to human health. For example, in sedentary obese and diabetic individuals, human skeletal muscle is overwhelmed with lipids resulting in an oversupply of substrate for mitochondria provoking lipotoxicity (e.g., excess ceramide accumulation), and increased oxidative stress (increased reactive oxygen radicals, ROS) both which can lead to impairments in insulin signaling and insulin resistance. Peroxisomes likely play an obligatory role in defending against excess accumulation of cellular lipids by metabolizing fatty acids to acyl-carnitines which are exported and oxidized more efficiently by the mitochondria and by buffering ROS as they are rich in anti-oxidant enzymes. We propose that peroxisomal biogenesis accompanies mitochondrial biogenesis to enhance the efficiency of mitochondrial oxidation of fatty acids and maintenance of normal ROS and glucose dynamics. The symposium proposes to provide a general overview of peroxisomal biology in multiple organ systems and then to offer several novel hypotheses describing a role for peroxisomes in muscle lipid metabolism, glucose homeostasis, and REDOX balance. The overreaching hypotheses to be evaluated will focus on when (skeletal) muscle mitochondrial oxidation of fatty acids is “outpaced” by supply (obesity or high fat diet; lipid oversupply theory) or with increased bioenergetic requirements (increased lipid utilization), peroxisomal oxidation will be enhanced to increase the efficiency of mitochondrial fatty acid oxidation, metabolism of free radicals (e.g., H₂O₂) and concomitant maintenance of insulin sensitivity.

The broad goals of the symposium are:

1. To establish the presence of peroxisome-mitochondrial interactions which will likely lead to a new paradigm in lipid metabolism and free radical biology, and cellular adaptation to high lipid environments in human skeletal muscle.
2. To suggest to the audience the development of novel therapeutic interventions that stress peroxisomal function to treat Obesity, Type II Diabetes, and other metabolic diseases.

Session on Chronic Diseases Linked with Obesity

Corner Stores as Community-based Enterprises for Health Promotion

Rachael D. Dombrowski

Wayne State University, MI, USA

Abstract

Background: Understanding store owner motivations and rationale for participation in food access projects is rarely reported in health promotion literature. This study explicates the development of healthy corner stores as community-based enterprises (CBEs) within eight suburban, low-income communities. CBEs are defined as community-oriented small businesses with a common goal to improve population health. The healthy corner stores assessed in this study were participants in Healthy HotSpot (HH), a suburban Cook County corner store project.

Methods: In order to determine progression of HH stores as CBEs, a qualitative case study design was used. Existing

outcome data from all stores, via a market basket assessment, was reviewed to determine typologies of increased healthy food access. Interview data from store owners, participating local community-based organizations (CBOs) and consumer focus groups were analyzed using an iterative process to determine how store owners aligned with the CBE identity, and how this influenced continuation of health promoting activities.

Results: Several key factors influenced the strength of store owners' CBE identities within this study. They included the following: 1) similar ethno-cultural identities and residence as consumers; 2) positive, trustworthy relationships with consumers; 3) store owners valuing and prioritizing community health, often over profits; 4) collaboration with a highly-engaged CBO in the HH project and 5) community social capital, which was an unmeasured but emerging concept in this study.

Discussion: Study results can assist in theory development and intervention design in working with corner stores, and other small businesses, as CBEs that promote community health over the long-term.

Effects of n-3 Polyunsaturated Fatty Acids Supplementation on Lipid Metabolism in Lewis Male Rats with Altered Thyroid Status

Stanislav Pavelka^{1,2*}, Hana Rauchová² and Narcisa Tribulová³

¹*Institute of Biochemistry, Faculty of Science, Masaryk University, Brno*

²*Institute of Physiology, Czech Academy of Sciences, Prague, Czech Republic*

³*Institute for Heart Research, Slovak Academy of Sciences, Bratislava, Slovak Republic*

Abstract

Several epidemiological studies have demonstrated that consumption of marine n-3 polyunsaturated fatty acids (PUFA) is associated with a reduced risk of atherosclerosis and hyperlipidaemia. It is also well known that thyroid hormones (TH) play important roles in lipid metabolism, and alteration of thyroid status in animals and humans is associated with changes in serum lipids and lipoproteins concentrations. The results of our previous studies on aged spontaneously hypertensive rats showed benefit from n-3 PUFA supplementation, such as significant decline of blood pressure, suppression of inducible ventricular fibrillation, and improvement of myocardial metabolic state.

The aim of the present study was to test whether n-3 PUFA supplementation in Lewis male rats with different thyroid status would affect animals' lipid metabolism. Experimentally adjusted hypothyroid and hyperthyroid, and euthyroid status in rats was well defined. In spite of the fact that analyzed parameters such as TH plasma levels, enzyme activity of liver mitochondrial glycerol-3-phosphate dehydrogenase, concentrations of glucose and plasma lipids, and also relative heart weight and other biometric data, were clearly different among particular groups of experimental animals, no significant effect of 6-week-supplementation period of n-3 PUFA (200 mg/kg body weight/day) on the above-mentioned parameters was found in this study.

Liver Metabolic Status in Obese Zucker Rat's Model

Stepan Melnyk^{1,2*}, Soheila Korourian³, Joseph W. Levy^{1,2}, Teresa Evans^{1,2}, Oleksandra Pavliv^{1,2}, and Reza Hakkak^{1,2,4}

¹*Department of Pediatrics, University of Arkansas for Medical Sciences, AR, USA*

²*Arkansas Children's Research Institute, University of Arkansas for Medical Sciences, AR, USA*

³*Department of Pathology, University of Arkansas for Medical Sciences, AR, USA*

⁴*Department of Dietetics and Nutrition, University of Arkansas for Medical Sciences, AR, USA*

Abstract

Epidemic proportions of obesity in the United States and world is on rise. It is undisputable that there are higher comorbidity and mortality rates from chronic diseases such as diabetes, cardiovascular diseases, certain types of cancer and liver steatosis in the obese population. Previously, we reported that obesity was accompanied with oxidative/nitrosative stress, global DNA hypermethylation and oxidative damage, with morphological changes in liver using obese Zucker rat's model. However, metabolic details that lead to these changes in the liver of obese rats are not fully understood. Six-week old female lean (n = 26) and obese (n = 20) Zucker rats were fed AIN-93 G diet and sacrificed 155 days later. Liver samples were snap frozen in liquid nitrogen and stored at -80 °C. HPLC-ECD and LC-MS methods were used to assess methionine cycle and oxidative/nitrosative stress metabolites. Our results showed obese rats had significantly higher levels of Methionine (P < 0.0004) and Homocysteine (P < 0.01) but lower level of Cysteine (P < 0.01) in liver. In contrast, the Cystine (P < 0.01) and the Cystine/Cysteine (P < 0.001) ratio was significantly higher in the liver of obese rats. Additionally, obesity caused a significant drop in

liver HADPH/HADP ratio ($P < 0.01$) and a significantly lower remethylation (Homocysteine/Methionine) ratio ($P < 0.02$) in liver. A multiple linear regression analysis shows a difference in linear slopes and data distribution between obese and lean animals. In summary, obesity creates higher levels of oxidative/nitrosative stress in the liver of obese Zucker rats, reduced level of Cysteine (rate limiting amino acid in Glutathione synthesis) and affects methylation reaction activities.

Retinoid Dyshomeostasis and O-linked GlcNAcylation Cause RBP4 Overproduction in Obesity

Shyi-Jang Shin^{1,2*}, Chao-Hung Chen¹, Wen-Chen Kuo¹ and Kun-Der Lin²

¹Graduate Institute of Medicine, Kaohsiung Medical University, Taiwan

²Division of Endocrinology and Metabolism, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

Abstract

Vitamin A (retinol) deficiency is thought as a causative factor of obesity. Interestingly, blood retinol binding protein 4 (RBP 4) concentration is elevated in obesity and obesity-related diseases. However, the regulation of increased RBP4 level is not understood. RBP4 receptor 2 (RBPR2) is discovered to bind with RBP4 and facilitate transport of retinol into liver cells. O-linked GlcNAcylation has also been shown to contribute hepatic fibrosis of obesity, but very few proteins are observed to be O-GlcNAc modified. Therefore, we investigated whether retinoid dyshomeostasis and O-linked GlcNAcylation lead to overproduction of RBP4 in the liver of ob/ob mice. By using immunoprecipitation method and proximity ligation assay, O-GlcNAc-modified RBPR2 was highly expressed and consistently distributed with adipogenesis and trichrome staining in liver of ob/ob mice. Furthermore, RBP4 levels were lowered on RBPR2 immunoprecipitate despite RBPR2 mRNA and protein is elevated. GFAT and OGT proteins increased but OGA decreased. CRBP1, LRAT, retinol, retinoic acid (RA), RAR α , RAR β and RXR α markedly decreased while phospho-NF κ B, fibronectin and interleukin 6(IL6) increased in liver of ob/ob mice and in high glucose-cultured hepatic cells. However, blood RBP4, hepatic RBP4 protein and mRNA remarkably increased in ob/ob mice. OGT silence and crbp1 transfection reversed O-GlcNAc-modification of RBPR2 and up-regulation of phospho-NF κ B, fibronectin and IL6 whereas both rescued the suppression of CRBP1, LRAT, retinol, RA, RAR α , RAR β and RXR α in HG-treated liver cells. Our results indicate that retinoid dyshomeostasis and O-GlcNAc-modification increase RBP4 expression and are associated with adipogenesis in the liver of obesity.

Adipokine Leptin Considerably Affects Metabolism of Thyroid Hormones in White Adipose Tissue

Stanislav Pavelka

Institute of Physiology, Czech Academy of Sciences, Prague

Institute of Biochemistry, Faculty of Science, Masaryk University, Brno, Czech Republic

Abstract

Systemic effects of white adipose tissue (WAT) reflect its ability to function as an endocrine organ, secreting a large number of various adipokines. One of the most important of these adipokines is the protein leptin. Leptin affects the activity of hypothalamic centers, while decreasing food intake, activating energy expenditure and modulating neuroendocrine functions. WAT represents also an important target for thyroid hormones (THs), which are known as the most important central regulator of energy balance and thermogenesis.

In the presented work, we have tested our recent hypothesis that THs and leptin may share some common downstream action sites and could act additively, although independently, to enhance energy expenditure. Our preliminary results suggest that leptin controls the expression of one of the key enzymes in THs metabolism, the iodothyronine deiodinase of type 1 (D1), and D1 enzyme activity in various depots of WAT. Demonstrated changes in D1 activity in white fat under the conditions of changing adiposity suggest that D1 might be involved in the control of adipose tissue metabolism and/or of fat accumulation.

Obesity and Multiple Chronic Disorders: Global Prevalence, Correlates and Temporal Trend

Rajesh K. Gautam^{1-3*} and Amir H. Golnabi¹

¹Center for Quantitative Obesity Research, Montclair State University, 1 Normal Avenue, Montclair, NJ, USA

²Department of Anthropology, Montclair State University, 1 Normal Avenue, Montclair, NJ, USA

³Department of Anthropology, Dr. H.S. Gour Central University, Sagar, MP, India

Abstract

Background: Obesity is emerging as a global challenge for public health, and its association with multiple chronic disorders has further aggravated the situation.

Objectives: This paper attempts to highlight the global magnitude of the obesity and multiple chronic disorders with the focus on the correlates.

Methods: The findings are based on the exploratory review of 301 entries/data points for 84 countries. A regression analysis was used to identify the correlates of obesity.

Results: The highest prevalence of obesity was found in Tonga ($65.5 \pm 13.3\%$) and Cook Island ($61.6 \pm 5.9\%$) followed by Middle Eastern countries and countries of American continent, namely Paraguay, Argentina, and USA. The lowest prevalence was reported in Vietnam ($0.5 \pm 0.2\%$) and African countries of Mali, Ghana, and Tanzania. The regression analysis indicated that obesity is higher in those countries where HDI and life expectancy are higher.

Conclusion: Obesity is now a global pandemic as even underdeveloped region are also in the grip of the problem, but positive regression of female obesity and life expectancy ($r^2 = 0.040$, $\beta = 0.275$ $p > 0.009$) indicate its evolutionary significance as adaptive strategy of surviving, as long as it is not morbid. Nevertheless, its association with multiple chronic disorders such as diabetes, hypertension, arthritis, and asthma is a new challenge for public health professionals.

Effect of Nutritional Counselling on Nutritional Status of Breast Cancer Patients: an Intervention Study

Doaa A. Saleh^{*}, Maissa Shawky, Sahar Yassin, Mona Abo-Elenein and Eman Nasr

Faculty of Medicine, Cairo University, Egypt

Abstract

The aim of this study was to assess the effect of nutrition counselling on the nutritional status of breast cancer patients (grade 2) receiving chemotherapy.

Recruited patients were assigned to either nutrition counselling (NC) group ($n = 50$) or control group ($n = 50$). NC group received four NC sessions over 6 weeks. Nutritional assessment was done at baseline, and then after 2&3 months. Assessment parameters were nutritional status (weight, body mass index (BMI), bone mass and percent of body fat, water and muscles) and nutritional intake (EPIC-Norfolk Food Frequency Questionnaire).

At baseline, nutritional status and intake did not differ between NC and control groups ($p > 0.05$). About 28% and 62% of patients were overweight and obese respectively. During follow up, control group showed progressive increase in weight, BMI and body fat percent, and decrease in body water percent ($p < 0.05$), while the NC group showed progressive decrease in weight, BMI, body fat percent and increase in body water percent ($p < 0.05$).

The control group didn't show any change in the intake of various food groups or their eating habits ($p > 0.05$). While the NC group showed a progressive increase in eating fish, eggs, milk, vegetables and fruits; and a decrease in eating fats and sugars ($p < 0.05$). Consequently, there was increased intake of protein, most vitamins and minerals and decreased intake of energy, carbohydrates and fat ($p < 0.05$). NC group also reported lower frequency of skipping meals, eating visible fats or fried foods ($p < 0.05$).

Conclusion: Nutritional counseling is necessary to improve nutritional status of breast cancer patients receiving chemotherapy.

Transcription Factor IRX3 Inhibited in Central Nervous System (CNS) Propitiate Fat Mass and Obesity-associated Protein (FTO) Increases and Getting Worse Obesity

Thiago Matos Ferreira de Araújo^{1,2*}, Daniela Soares Razolli¹, José Carlos de Lima-Junior¹, Felipe Correa da Silva¹, Young-Bum Kim² and Licio Augusto Velloso¹

¹Laboratory of Cell Signaling, Obesity and Comorbidities Research Center, University of Campinas-UNICAMP, Campinas, Brazil

²Division of Endocrinology, Diabetes, and Metabolism, Department of Medicine, Beth Israel Deaconess Medical Center, and Harvard Medical School, MA, USA

Abstract

IRX3 modulates FTO expression and contribute to obesity. However, little is known about the effect of the consumption of dietary fats (HFD) in hypothalamic IRX3 gene expression and this contribution in important metabolic tissues (brown adipose tissue (BAT) and white adipose tissue (WAT)). Thereby, the aim of this work was establish the correlation between IRX3 inhibition in hypothalamus and these metabolic repercussions. In C57Bl6J mice the consumption of HFD resulted in hypothalamic IRX3 reduction accompanied by the increase of FTO expression. In chow, fasting resulted in reduction in IRX3 transcript expression, and followed by increased NPY and AgRP. This effect was blunted after HFD consumption. Lentivirus (LV) was ICV inoculated to inhibit IRX3 in hypothalamus and metabolic outcomes were determined. In mice fed on HFD, the inhibition of hypothalamic IRX3 by LV was accompanied by >1.6-fold in body mass despite caloric intake, spontaneous physical activity and whole body oxygen consumption. Using a thermosensitive camera, we did not detected alterations in BAT heat production. UCP1 and β 3 adrenergic presented decreased expression, and LV injection increased WAT accumulation in BAT. In WAT IRX3 inhibition in hypothalamus produce modulation in UCP1 and TBX1 gene expression. In conclusion, IRX3 expressed in hypothalamus is regulated by fasting and the consumption of a HFD. The inhibition of IRX3 expression in the hypothalamus worsens diet-induced body mass gain and presented effect on BAT function and important markers of "browning". Otherwise, IRX3 could be an important target to future obesity-treatments.

Session on Chronic Diseases Linked with Obesity

The Heart Protection Effect of Alcalase Potato Protein Hydrolysate in Aging Rats on High Fat Diets

Peiying Pai¹, Wei Syun Hu¹, Wei Jen Ting² and Chih Yang Huang²⁻⁴

¹China Medical University Hospital, Taiwan

²Graduate Institute of Basic Medical Science, China Medical University, Taiwan

³Graduate Institute of Chinese Medical Science, China Medical University, Taiwan

⁴Department of Health and Nutrition Biotechnology, Asia University, Taiwan

Abstract

The pathogenic factors of CVDs include smoking habits, alcohol consumption, and lack of exercise, especially in the elder obese population (Blondon et al. 2013; Fernhall 2013; Gargiulo et al. 2013). Oxidative stress is due to metabolic function degradation causing reactive oxygen species (ROS) accumulation (Ahmed and Tang 2012). This long-term oxidative stress is usually accompanied by inflammation in the elderly. Human metabolism decreases with increasing age, indicating that the risks of obesity and metabolic syndrome increase with age. In fact, more than 34.9% of adults were obese (obesity defined as BMI > 30), and the prevalence rates of obesity were 39.5% in middle-aged adults and 35.4% in older adults (Cynthia 2013). Obesity can increase the burden on the heart, with deteriorating coronary circulation and atherogenesis (Kranendonk 2014). Moderate exercise can reduce weight and decrease the loading on the heart; however, the requirement of exercise therapy for the elderly remains controversial; in particular, obesity and sarcopenia in the elderly simply render them unable to exercise. Thus, the intake nutraceuticals foods with cholesterol-lowering functions could help the elderly to achieve health relatively easily (Ruiz 2014). Soy peptides have been reported to decrease the risk of cardiovascular disease. Not only soy peptides but also potato protein hydrolysate (PPH) were discovered to have antioxidative activity [Kudoh 2003]. In our research, alcalase potato protein hydrolysate (APPH) was used, and elderly rats were treated with a high-fat diet to evaluate the cardiac protective function of APPH.

APPH treatments could reduce the serum lipids, such as TC, TG, and LDL. However, APPH treatment did not decrease HDL levels in high-fat diet aging rats. In addition, our previous research revealed that the IGF1R-PI3K-Akt survival pathway

was more expressed in young rats fed high-fat diets than in elder rats [Lin 2013]. Furthermore, APPH could reactivate the compensatory IGF1R-PI3K-Akt survival pathway. Our results showed that the heart-protective effects of APPH were highly dependent on IGF1R-PI3K-Akt pathway activation and Fas apoptotic pathway reduction in an animal model of aging with a high-fat diet. In conclusion, APPH treatments indeed provided physiologic protection to the hearts of aging rats with hyperlipidemia induced by a high-fat diet.

The Effect of Obesity after Smoking Cessation on Cardiovascular Risk Markers

Koji Hasegawa^{*}, Maki Komiyama and Yuko Takahashi

National Hospital Organization Kyoto Medical Center, Japan

Abstract

Smoking cessation is one of the most effective ways to reduce cardiovascular risk. However, body weight gain and abdominal obesity generally occur after quitting smoking. Obesity results in an increase in various inflammatory markers. However, how the relationship between post-smoking cessation weight gain and cardiovascular risk will change over time is unknown. The α 1-antitrypsin-low-density lipoprotein complex (AT-LDL) is an oxidatively modified LDL complex that promotes atherosclerosis. Serum AT-LDL levels are closely associated with inflammation, and associated with obesity and smoking. The serum level of AT-LDL was higher in current smokers than in both former smokers and non-smokers. At three months after smoking cessation in current smokers, a significant decrease in serum AT-LDL values among patients with a smaller BMI increase was noted. However, no significant changes in serum AT-LDL values were found in patients with a greater BMI increase. Thus, body weight gain may attenuate the decrease (improvement) in AT-LDL at 3 months after smoking cessation. The study followed up patients for a longer period (1 year). As a result, during the period of 3 months to 1 year after smoking cessation, a further increase was observed in both BMI and waist circumference; nevertheless, serum AT-LDL levels significantly decreased. Thus, the benefits of smoking increase over time and outweigh the risks associated with body weight gain at least at the time of 1 year after smoking cessation.

Regular Exercise Reduces Endothelial Cortical Stiffness in Western diet-fed Female Mice

Jaume Padilla^{1-3#}, Francisco I. Ramirez-Perez^{2,4#}, Javad Habibi^{6#}, Brian Bostick⁵, Annayya R. Aroor⁶, Melvin R. Hayden⁶, Guanghong Jia⁶, Mona Garro⁶, Vincent G. DeMarco⁶, Camila Manrique⁶, Frank W. Booth^{1,9}, Luis A. Martinez-Lemus^{2,4,7} and James R. Sowers^{2,6,7,8#}

¹Department of Nutrition and Exercise Physiology, University of Missouri, MO, USA

²Dalton Cardiovascular Research Center, University of Missouri, MO, USA

³Department of Child Health, University of Missouri, MO, USA

⁴Department of Biological Engineering, University of Missouri, MO, USA

⁵Division of Cardiovascular Medicine, Department of Medicine, University of Missouri, MO, USA

⁶Diabetes and Cardiovascular Research Center, University of Missouri, MO, USA

⁷Department of Medical Pharmacology and Physiology, University of Missouri, MO, USA

⁸Research Service, Harry S. Truman Memorial Veterans' Hospital, Columbia, MO, USA

⁹Biomedical Sciences, University of Missouri, MO, USA

[#]denotes equal contribution to this work

Abstract

We recently showed that Western diet (WD)-induced obesity and insulin resistance promotes endothelial cortical stiffness in young female mice. Herein, we tested the hypothesis that regular aerobic exercise would attenuate the development of endothelial and whole artery stiffness in female WD-fed mice. Four-week old C57BL/6 mice were randomized into sedentary (i.e., caged confined, n = 6) or regular exercise (i.e., access to running wheels, n = 7) conditions for 16 weeks. Exercise training improved glucose tolerance in the absence of changes in body weight and body composition. Compared to sedentary mice, exercise-trained mice exhibited reduced endothelial cortical stiffness in aortic explants (sedentary: 11.9 ± 1.7 kPa vs. exercise: 5.5 ± 1.0 kPa; p < 0.05), as assessed by atomic force microscopy. This effect of exercise was not accompanied by changes in aortic pulse wave velocity (p > 0.05), an *in vivo* measure of aortic stiffness. In comparison, exercise reduced femoral artery stiffness in isolated pressurized arteries and led to an increase in femoral internal artery diameter and wall cross-sectional area (p < 0.05), indicative of outward hypertrophic remodeling. These effects of exercise were associated with an increase in femoral artery

elastin content and increased number of fenestrae in the internal elastic lamina ($p < 0.05$). Collectively, these data demonstrate for the first time that the aortic endothelium is highly plastic and thus amenable to reductions in stiffness with regular aerobic exercise in the absence of changes in *in vivo* whole aortic stiffness. Comparatively, the same level of exercise caused de-stiffening effects in peripheral muscular arteries such as the femoral artery that perfuse the working limbs.

PilAm Go4Health: A Feasible and Effective mHealth Weight Loss Lifestyle Intervention for Filipinos with Type 2 diabetes

Melinda Sarmiento Bender^{*}, Bruce A. Cooper, Linda Park and Shoshana Arai

University of California San Francisco, CA, USA

Abstract

Introduction: Compared to most Asian American subgroups, Filipino have the highest prevalence for obesity and type 2 diabetes (T2D). Limited preventive health research targeting Filipinos exist to reduce these health disparities. Mobile health weight loss lifestyle interventions can reduce cardiometabolic risks, but are untested in Filipinos with T2D. Thus, we conducted a pilot RCT of a culturally adapted mHealth weight loss lifestyle intervention (PilAm Go4Health) for Filipinos Americans with overweight and T2D to reduce their cardiometabolic risks.

Objective: Assess feasibility and potential efficacy of the PilAm Go4Health intervention to reduce cardiometabolic risks in Filipinos with T2D.

Methods: N = 45 Filipino Americans with obesity and T2D were recruited from Northern California and randomized to an intervention (3-month PilAm Go4Health (Phase 1) and 3-month follow-up (Phase 2) or waitlist control group. Multilevel regression analyses with bootstrap methods were used to assess between and within group differences in percent weight change (primary outcome) from Phase 1 and Phase 2.

Results: Mean age was 58+10 years and 62% were women, with 100% retention. Intervention group had significantly greater % weight reductions [Cross-level interaction = -2.6 (-3.9, -1.4)] compared to the waitlist control, with a moderate effect sizes ($d = 0.53$). Over 90% of intervention participants continued to maintain their weight loss after completing Phase 2.

Conclusion: PilAm Go4Health was feasible and effective for Filipinos with overweight and T2D. This warrants further testing of the PilAm Go4Health in a larger RCT. Positive findings may support the translation of this intervention program for other diverse populations with T2D.

Sacbe, an Educational Clinical Program for Children at Risk of Type 2 Diabetes and their Families is Effective to Decrease Z-score of Body Mass Index and Revert Prediabetes

Rodríguez-Ventura A^{*}, Parra-Solano A, Almaguer L, Flores M, Paredes B, Monroy L, Palacios F, Sánchez B, Flores C, and Sámano R

Instituto Nacional de Perinatología, Mexico City, Mexico

Abstract

Introduction: Interventions in children with overweight or obesity report success only 23-25%. On recommend to focus in behaviors to get a healthy lifestyle (HLS) inside the sociocultural context of participants. It has been demonstrated that a HLS is effective to decrease type 2 diabetes (D2), but in children it has not been reproduced and it is necessary to counteract its increase in childhood

Methods: Longitudinal study in children between 8-18 years old at risk of D2. We designed an educational clinical program, Sacbe, focused to get HLS considering sociocultural context of participants. We organized 2 workshops for groups of 3-6 families and after each month during 3-4 months to favor habits. Clinical history, habits, diet and anthropometric data were recorded in each visit by family (mother-child). Metabolic parameters were made in basal visit and after 3-4 months. Descriptive statistic and association tests were made through SPSS vs. 22.

Results: Fifty-five children and 64 parents participated, media age was 13.95 + 3.3, Z-score of body mass index (BMI) was 2.17+0.55 and decreased to 1.909 $p < 0.028$; 35% had overweight and 65% obesity, which decreased until 42.5%; 83% of were mothers, media age was 45.8 + 9.4, 90.6% had overweight or obesity, 77% lost weight and fat ($p < 0.001$). Almost all participants

improved their habits (breakfast every day, eating more vegetables and less fast food). The 29% had abnormal glucose fasting (AFG) and it decreased to 9%.

Conclusions: A comprehensive educational clinical program by family (mother-child), is effective to decrease Z-score BMI and to revert AFG in children.

Function Preserving Metabolic Surgery for Non-Obese Patients with Type 2 Diabetes

Kyung Yul Hur

Department of Surgery, Soonchunhyang University Seoul Hospital, Seoul, Republic of Korea

Abstract

Management of non-obese type 2 diabetic subjects are extremely challenging. One of the effective option is surgical rerouting of food passage to recover normal entero-insular axis.

We have been doing laparoscopic single anastomosis gastric bypass (LSAGBP) since 2009. By the way, we adopted novel surgery for post-operative better quality of life without deterioration of antidiabetic effect from end of 2015.

Through the subtle modification of prototype of procedure, inevitable side effects of surgery were minimized without compromising antidiabetic effect of original surgery. Contents of my presentation is underlying mechanism of glycemic improvement in non-obese type 2 diabetes with time after surgery, and technical tips for preserving pyloric sphincter function without deterioration of antidiabetic effects.

Underlying mechanism

The numbers of patients who have been followed up for more than 4 years were 60. Among them, 37 patients were analyzed. Outcomes of preoperative, post-operative 1st year and 4th year follow-up were included. The HbA1C, HOMA-IR, Matsuda index and acute insulin response were analyzed to evaluate blood glucose control, insulin resistance and insulin sensitivity.

Preoperatively, mean age was 48, BMI was 24.5 and HbA1C level was 9.1%. 30 patients (81%) have shown decreased HbA1C lower than 6.9% during the follow up. Results are shown in figure 1.

HbA1C decreased continuously after the surgery. HOMA-IR decreased at first year after the surgery and then increased within the acceptable range. Interestingly, insulin sensitivity, which is represented by Matsuda index, sharply increased at first year and then recovered. In addition, acute insulin response, which represents the secretory function of the pancreas beta cell, has been increased significantly at fourth year after the surgery. That means, early mechanism during the first year after the surgery was improvement of insulin resistance rather than functional improvement of islets. However, as time goes on, recovered early postprandial insulin secretion contributed to maintain glucose homeostasis.

Technical tips to improve postoperative quality of life without compromising antidiabetic effects

Most symptoms or complaints after surgery are linked to the absence of pyloric sphincter function. To recover this function, the entire stomach along with the sphincter has to be preserved. While preserving the pyloric sphincter, duodenal epithelium was completely removed or cauterized from the distal end of the stomach. Small bowel was anastomosed with distal end of pyloric sphincter. Distance between Trietz ligament and anastomosed bowel was 200 cm (Figure 2). Even though surgical structure looks very alike with the single-anastomosis pylorus-preserving duodenojejunal (DJB) or duodenoileal (DLB) bypass, surgical outcomes would be different. Right side figure is structural configuration.

We carry out our procedure based on three principles:

- (1) Preservation of the pyloric ring
- (2) Total duodenal exclusion
- (3) More than 200 cm of biliopancreatic limb

To understand surgical structure, comprehensive knowledge of following mechanism is very important:

1. Unique intestinal regeneration pattern especially after gastric bypass surgery is mandatory.
2. Identification of enteroendocrine cell distribution is also important.
3. Surgeon should remember that the function of alimentary and biliopancreatic limb is quite Different between bariatric surgery with metabolic surgery.
4. Epithelial transformation begins with proximal short cut end of anastomosed segment heading to distal portion. This is

reason why 6~9 months takes for recurrence after DJB.

5. Epithelial cells in the edge of transected bowel is critical for recurrence.
6. To avoid deterioration of normal digestive function, preservation of pyloric sphincter is mandatory.
7. Care should be taken to incomplete exclusion of duodenum.

There had been no operative complication and clinical course were not unusual in every case. The early outcomes of novel procedure are promising in entire 40 cases. The clinical course is just same as previous surgery and the patient dose not complaint with previous problem. Big difference against prototype of surgery, is constant clinical course of individual patients.

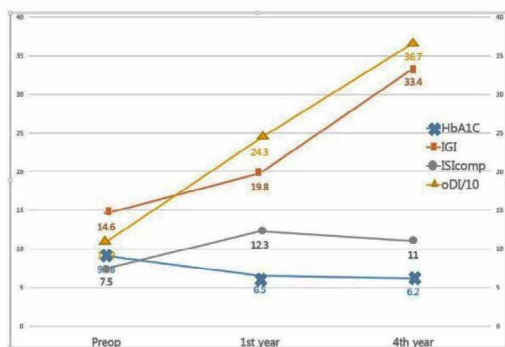


Figure 1. Changing parameters for DM with times.

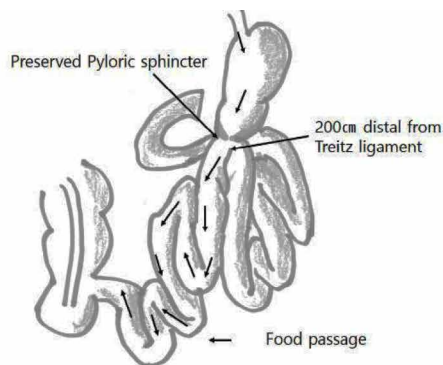


Figure 2. Structure of surgery.

Obesity as a Transgenerational Disease

Ronaldo C. Araujo^{*}, Frederick Wasinsk and Rogerio Batista Oliveira

Department of Biophysics, Federal University of Sao Paulo, Brazil

Abstract

Physical exercise induces positive alterations in gene expression involved in the metabolism of obesity. Maternal exercises provoke adaptations soon after birth in the offspring. Here, we investigated whether adult mouse offspring of swim-trained mothers and fathers is protected against the development of the deleterious effects of high fat diet (HFD). Our study comprises some parts. First, female C57BL/6 mice were divided into one sedentary and one swim-trained group (before and during pregnancy). Another group of adult males were submitted the same exercise protocol and mated with sedentary females. We investigated the offspring of trained mothers or fathers as well offspring of sedentary mothers or fathers challenged to HFD for 16 weeks. Our results demonstrate that maternal and paternal exercise has several beneficial effects on the mouse offspring and protects them from the deleterious effects of HFD in the adult. When subjected to HFD for 4 month in the adulthood, our study presents novel data on the male offspring's metabolism of trained mothers. The offspring gained less weight, which was accompanied by less body fat, and they used more calories during daytime compared with offspring of sedentary mothers. Furthermore, we observed increased adiponectin expression in skeletal muscle, which was accompanied by decreased leptin levels and increased insulin sensitivity. A liver sterosis protection was observed in offspring of father trained. Our results point to the conclusion that maternal and paternal exercises are beneficial to protect the offspring from developing obesity, which could be important for succeeding generations as well.

The Healthy Weights Initiative

Mark Lemstra

Alliance Health Medical Clinics, Saskatchewan, Canada

Abstract

Background: After 274 community consultations, the free, comprehensive Healthy Weights Initiative (HWI) started in Saskatchewan, Canada with supervised exercise therapy, dietary and cognitive behavior therapy.

Objectives: This study determined adherence, factors affecting adherence, and the impact on various health outcomes.

Methods: From January 2014 to March 2015, 229 participants started the comprehensive 6-month HWI program. It was determined that having a “buddy” and signing a social support contract with three additional family members or friends were important to program adherence. As such, both policies went from being recommended to becoming mandatory. From April 2015 to August 2016, 771 additional participants started the program, allowing evaluation of the two new policies. As well, HWI participant adherence was compared to that of 1000 new YMCA members.

Results: Among the first 229 HWI participants, 79.9% completed the 6-month program. After the two new policy changes among the 771 participants, 96.1% completed the HWI program (risk ratio 1.20; 95% CI: 1.01–1.49). In comparison, among new YMCA regular members without supervision, 14.0% were still adhering to their fitness program after 6 months (risk ratio 6.85; 95% CI: 3.88–12.10). Although weight loss reductions were obtained (mean: 4.3 kg), the more significant benefits observed were health outcomes. For example, the prevalence of depressed mood reduced from 44% to 16.4% (P = 0.000).

Conclusion: With two new policy changes, including a mandatory “buddy” and a signed social support contract, the HWI has become more successful at promoting program adherence. Numerous positive health outcomes have been obtained during this free, community based initiative.

Altered Insulin Signaling and Changes in Metabolism in Mg²⁺-Deficient Hepatocytes

Andrea Romani¹ and Chesinta Voma

Department of Physiology and Biophysics, Case Western Reserve University, Cleveland, OH, USA

Abstract

Decreased Mg²⁺ content within tissues and serum have been observed in metabolic syndrome and diabetes, one of its main complications. Yet, it is still undefined whether Mg²⁺ decrease plays a role in the onset of these pathologies.

Studies carried out in our laboratory in human and animal hepatocytes indicate that decreased cellular Mg²⁺ levels impact insulin signaling, resulting in decreased IRS1/Pi3K/Akt activation and increased FOXO1 activation with consequent increase in gluconeogenesis. This is further supported by increased expression in key gluconeogenic genes including PEPCK, F1,6BPase, and G6Pase. On the other hand, Mg²⁺-deficient hepatocytes present increased mRNA expression of IRS2, LCAD, FAS, and HMG-CoA synthetase. As a result of these changes, hepatocytes utilize external glucose less effectively, accumulate intrahepatic triglycerides, and generate glucose ex-novo.

Returning cellular Mg²⁺ content to physiological levels reverses these all the events mentioned above albeit to a differing extent.

Taken together, our results suggest that Mg²⁺ deficiency is an integral factor of the metabolic changes observed under metabolic syndrome conditions, and can actually be a preceding and leading component to the onset of the disease.

Impact of Eating Habits on Neurocognitive Processes and Decision Making during Food Choice Tests in Normal-weight Young Adults: A fMRI Pilot Study

Y. Gautier^{1*}, O. Petitgas¹, N. Coquery¹, P. Meurice¹, E. Banier², R. Moirand³ and D. Val-Laillet¹

¹INRA, UR1341 ADNC, France

²Neurinfo, CHU Rennes Ponchaillou, France

³CHU Rennes, UMR 991 Liver, Metabolism & Cancer, INSERM, France

Abstract

Introduction: Overweight and obesity are a global epidemic that affects 35% of adults in 2014 (WHO). It also affects 15% of the French population (OBEPI survey 2012). However, treatment is at risk for failure if it does not take into account the psychobehavioural factors involved in food intake. However, we do not yet know the extent to which chronic consumption of palatable foods, independently of weight gain and ED, can condition the emergence of neuronal plasticity.

Issue: The aim of the study is to determine the impact of dietary habits on brain responses to food visual stimuli in normal-weight adults with contrasting eating habits, using fMRI imaging and cognitive test based on a food choice.

Materials and methods: We constructed a database of food images. This protocol compared low-risk consumers (LRc, N = 8) to high-risk consumers (HRc, N = 8) in terms of eating habits (FFQ). Both groups were based on a validated food

consumption frequency questionnaire (FCFQ). The volunteers then evaluated the energy density and the hedonic value of the food (Liking), using visual analogic scales (VAS). Finally, the volunteers participated in a cognitive test in fMRI (Wanting task).

Results: From the FCFQ, we showed that meat and pork products were the most discriminating foods to highlight risky food behaviors. Based on the consumption of these foods, we established two distinct groups: low-risk consumers (LRc, N = 9), versus high consumer (HRc, N = 7). In fMRI (Wanting), the HRc group selected more the rich food items than the LRc group. In a preliminary fMRI analysis showed that cerebral responses were more important in SL compare to LD on the overall population in zones involved in internal conflict, vision, and reward anticipation.

Conclusion: The results are still being analyzed and thus do not allow us to draw any conclusions from this study. However, this pilot study will have confirmed the method for the larger scale study.

Relationship between Common Dietary Polyphenols and Obesity-Induced Inflammation

Lada Tucakovic, Natalie Colson and Indu Singh

School of Medical Science, Griffith University, Gold Coast, Australia

Abstract

Background: The incidence of obesity and its related metabolic disorders has escalated dramatically in the past decades worldwide. Defined as abnormal or excessive fat accumulation caused by an imbalance between energy intake and expenditure, obesity is presently the major health challenge in developed countries and the causative factor of numerous diseases such as heart problems, hypertension, hyperlipidemia and type 2 diabetes.

Summary: Presence of high level of cytokines and acute phase proteins associated with inflammation in obese individuals relates obesity to chronic low-grade inflammation. Obesity-induced inflammation has an impact on insulin resistance and cardiac health. Polyphenols including catechins, tocopherols, resveratrol, curcumin and anthocyanins have been shown to reduce adipose tissue inflammation. It has been broadly accepted that adipocyte dysfunction plays a major role in development of obesity and obesity related complications. This state is characterised by hypersecretion of pro-atherogenic, pro-inflammatory and pro-diabetic adipokines as well as decreased secretion of adiponectin.

Key Message: The dietary polyphenols described in this review have potential as nutritional strategies for the prevention of obesity and associated inflammation as well as increase in insulin sensitivity in diabetic people.

Session on Obesity Prevention and Control

Multifaceted Community-based Intervention Reduces Rate of BMI Growth in Obese Mexican-origin Boys

Banafsheh Sadeghi¹, Lucia Kaiser, Sara Schaefer, Iraklis Tserregounis, Lisa Martinez, Rosa Gomez-Camacho and Adela de la Torre

University of California, Davis, CA, USA

Abstract

Latino children and youth have some of the highest rates of overweight and obesity. Early intervention is important to prevent future obesity and illness in this population. A three year, multifaceted intervention was designed to reduce the rate of growth of BMI among Mexican-origin children. Two communities in California's agricultural Central Valley were targeted for intervention and comparison. To assess impact, anthropometric measures of participating children (N = 422) were collected and analyzed at baseline and after one year of intervention. After one year of intervention, triceps skinfold thickness in girls showed a significant decrease in unadjusted analysis between children in the two communities. In multivariate analysis, a reduction in BMI growth was seen among obese boys in the intervention community (s-coefficient = -1.94, P = 0.05). Obese boys in the intervention community also had smaller increase in waist circumference (s-coefficient = -5.2, P = 0.04) than the comparison community. These early findings indicate the intervention's effectiveness for preventing BMI growth among obese boys. Longitudinal follow-up is needed to determine the sustainability of results and whether similar results extend to obese girls and overweight boys or girls.

Burden of Obesity and its Determinants among an Indian Tribe: Results from a WHO STEP's Survey in the Sub-Himalayan Region

Prakash Chand Negi^{1*}, Raman Chauhan² and Kunal Mahajan¹

¹ Department of Cardiology, Indira Gandhi Medical College, Shimla, India

² Department of Social and Preventive Medicine, Indira Gandhi Medical College, Shimla, India

Abstract

Background: It is perceived that lifestyle related diseases like obesity are not a feature of tribal populations. However, the socio-economic transition may influence their traditional lifestyle. There is paucity of data regarding the prevalence of obesity and its determinants among Indian tribes especially from the hilly terrains of the Himalayan belt.

Methods: A total of 3555 randomly selected natives of Kinnaur (men 45.6%), aged 20-70 years were screened by trained health workers. WHO STEP's approach was used to record the demographic, dietary and anthropometric details. International cut off points of the body mass index (BMI) for Asian populations were used to assess overweight (BMI > 23-24.99 kg/m²), obesity-1 (> 25-29.99 kg/m²) and obesity-2 (> 30 kg/m²).

Results: The prevalence of overweight, obesity- 1 and obesity- 2 was found to be 17%, 23.8% and 6.6% respectively. Obesity/overweight (BMI > 23 kg/m²) together constituted 47.4% of total population. Normal BMI (18.50-22.99 kg/m²) and underweight (BMI < 18.50 kg/m²) was recorded in 1489 (41.9%) and 389(10.7%) respectively. On multivariate logistic regression analysis, the factors associated with obesity/overweight included female sex [Odds Ratio (OR)1.44, CI 1.01-1.47, p = 0.03], advancing age (OR 1.01, CI 1.00-1.02, p = 0.005), inadequate vegetable consumption (OR 1.33, CI 1.12- 1.57, p = 0.0008), poor educational status (OR 1.22, CI 1.02-1.44, p = 0.02) and presence of diabetes (OR 1.35, CI 1.03-1.76, p = 0.03) and hypertension (OR 1.65, CI 1.38-1.97, p = 0.0001). No significant association was noted with sedentary lifestyle, alcohol consumption, smoking and inadequate fruit intake.

Conclusion: The obesity and overweight is prevalent in the tribal population of Kinnaur. Future studies are needed to explore the other risk determinants for developing and designing informed public health interventions.

Weight Loss after Gastric Bypass and Sleeve Gastrectomy: Outcome and Influences

John Sczepaniak^{1*} and Milton Owens²

¹Sczepaniak Health and Medical Enterprises, USA

²Coastal Center for Obesity, USA

Abstract

Prediction of weight loss following gastric bypass and sleeve gastrectomy is important for patients and surgeons. For both it provides a realistic expectation for weight loss at a given time after surgery. It may also serve as an index when considering a revision. In theory weight loss may be influenced by a variety of preexisting conditions: To elucidate the factors most important predicting weight loss success we collected information on thousands of gastric bypass and sleeve gastrectomy patients. We looked at preop weight loss, height, initial weight, gender, ethnicity, geographic location, time after surgery, age, and operative approach.

Surprisingly only initial body weight and time after surgery significantly influenced weight loss. Type of operation and race had statistically significant but clinically minor effects. Patients with BMI's greater than 70 and less than 35 tended to have lesser percentage weight losses. After one year additional factors contribute to weight regain and may include diet, psychologic and social factors, and length of the common channel. The preferred follow-up measure in describing weight loss is percent initial weight lost or percent initial body weight at a given time after surgery. These are similar expressions that sum to one hundred percent. Their use minimizes statistical variability. Total weight loss is an absolute number that varies considerably depending on initial body weight and is not comparable between patients. The use of ideal weight in calculations such as percent excess weight loss introduces variability in that different ideal weights apply depending on height and reference source.

Four Pairs of Gene-Gene Interactions Associated with Increased Risk for Type 2 Diabetes, Obesity and Hypertension in Chinese Women

Mary MY. Waye*, MH. Wang, J. Li, VSY. Yeung, BCY. Zee, RHY. Yu and S. Ho

The Chinese University of Hong Kong, China

Abstract

Metabolic disorders including type 2 diabetes, obesity and hypertension are common health problems globally and Asia, in particular, has a growing trend that is worrying. Genome-wide association studies have successfully identified many genetic markers associated to these conditions, but not many studies reported their interaction effects. We have selected twenty candidate SNPs from sixteen genes, and used a lasso-multiple regression approach to consider the SNP-SNP interactions among them in a group of Hong Kong Chinese women. Overall, the candidate genes had no strong main effect but we found strong interaction effects, and the interactions among the candidates showed a significant association to diseases. SNPs from genes CDKN2BAS and KCNJ11 are significantly associated to risk for developing diabetes, and SNPs from FTO and APOA5 might interact to play an important role for the onset of hypertension. Unlike the reports concerning Western populations, the main effects of the candidate genes in this Hong Kong Chinese cohort were much weaker; however, strong interaction effects were found among the SNPs for type 2 diabetes (CDKN2BAS-KCNJ11), for obesity (SLC2A9-IGF2BP2, FTO-APOA5) and for and hypertension (MC4R-IGF2BP2). Recently some microRNAs, (e.g. hsa-miR-505) have been reported to be novel circulating signatures of hypertension, which may play a role in angiogenesis. The human genome has more than 1,000 miRNAs and they target more than 60% of the human genes. Thus, it would be interesting to investigate whether such microRNA plays any regulatory role in these gene-gene interactions.

Pharmacophore Modeling, Virtual Screening and Molecular Docking Approaches in the Identification of a Series of Benzimidazole and Quinoxaline Analogs as Antihyperlipidemic, Antiadipogenic Agents through HMG-CoA Inhibition

Shradha Sinha¹, Rakhi Choudhary², Vishal M. Balaramnavar² and Shailja Pandey¹

¹*Department of Chemistry BBD NIIT Ex. Director BBDEGSI Faizabad Road, Lucknow, India*

²*Global Institute of Pharmaceutical Education and Research, Kashipur, Uttarakhand, India*

Abstract

Quinazolone and bezimidazole derivatives have drawn more and more attention in the synthesis and bioactivities research due to their diverse biological activities. These compounds also possess anti-obesity activity. Therefore our previous synthesized quinazolone (J.Indian Chem. Soc.1979, 56:1237 & Indian Drugs 1980, 17: 96) and benzimidazole (Indian J. Pharm. 1982, 26: 176 & Current Sci. 1982, 51: 820) derivatives reported as CNS depressant, anticonvulsant and MAO inhibitors were evaluated for the pharmacophore development as anti-obesity. The Pharmacophore model was developed using the known compounds for antihyperlipidemic activity. The activity of the training set compounds in nM range (IC₅₀1900-5nM) is selected for the Pharmacophore development. We evaluated the common feature required for binding using the HipHop module of catalyst software. The seven training set molecules were submitted for the pharmacophore generation based on common chemical features. The basis of selection is the fit value criteria ranging from 3-5. Both of the series were showing good to moderate activity predicted as antihyperlipidemic through HMG-CoA inhibition. The selected series were again validated for the further validation for antiadipogenic activity. The already published model (Journal of Lipid Research. 2014, 55(6): 1019-1032) is used to study the probable antiadipogenic activity of the selected series of ligands. The predicted most active ligand from the training set was considered to bind in the similar fashion as that of standard at the receptor active site.

Environmental and Policy Supports for Obesity Prevention: the Tulane Prevention Research Center

Carolyn C. Johnson*, Keelia O'Malley and For the Faculty and Staff of the Tulane Prevention Research Center

Tulane University School of Public Health and Tropical Medicine, LA, USA

Abstract

Background: Obesity has a stranglehold on America. In spite of priority funding and numerous programs around the country to curb obesogenic behaviors, no downward trend has been observed nationally. In fact, adult obesity rates have stabilized over 2009 to 2012, but at levels that have doubled over the last 35 years, with the average American 24 pounds heavier today than in 1960. The Tulane Prevention Research Center (PRC) has been working to achieve its mission, the prevention/reduction of overweight and obesity in the Greater New Orleans area, for more than 12 years.

Purpose: To present the many activities of the PRC that have improved the environment and promoted positive policy change within our community, with input from community partners. Examples of these activities are: evaluating new bike lanes for increases in active transportation, facilitating joint use agreements, promoting physical activity by building walking paths, addressing access to healthy food by policy change.

Methods and Results: These PRC activities will be described, along with some impressive results.

Discussion: The importance of environmental and policy implications for the prevention of obesity will be reviewed, along with recommendations for how we might proceed as a nation to healthy weight for the population.

Head Start to Healthy Weight: Evaluating the Relationship between Infant Feeding Practices and Obesity-related Child Outcomes

Katherine I. DiSantis¹, Thomas G. Power², Jennifer O. Fisher³, Teresia M. O'Conner⁴ and Sheryl O. Hughes⁴

¹Arcadia University, PA, USA

²Washington State University, WA, USA

³Temple University, PA, USA

⁴USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine, TX, USA

Abstract

While increases in obesity rates among Hispanic children have slowed in recent years, these rates remain above white non-Hispanic children, particularly for children of lower income. Early infant feeding practices might influence these rates. An authoritative feeding style has been associated with less accelerated growth and lower obesity in childhood. Likewise, longer breastfeeding and less bottle use has been shown to reduce overfeeding, accelerated growth, and later obesity. This secondary analysis assessed the relationship between infant feeding practices (assessed retrospectively) and child eating behaviors, parent feeding styles, and child weight status in 4-5 year olds. Participants were Hispanic (n = 187; 100%) and of low income families (n = 187; 100%). Mean breastfeeding duration was 6.2 months (s.d. = 6.9) and 66% of mothers reporting using a bottle all or most of the time at 6 months. Children who were breastfed for 6 months or more were 74% more likely to have parents with an authoritative style compared to those breastfed less than 6 months. More bottle use predicted high scores on the food fussiness scale of the Child Eating Behavior Questionnaire and early introduction of solids and shorter breastfeeding duration predicted high scores on the enjoyment of food subscale, which is related to increased obesity risk. Breastfeeding, Bottle use, and early supplementation were not significantly related to BMI z-scores at 4-5 years of age; however, the direction of effect showed promise. These findings, in conjunction with past work, support the notion that infant feeding practices can predict later parent feeding and child eating behaviors that promote obesity.

SALTO – Community Oriented Childhood Obesity Prevention in the Kindergarten

Susanne Ring-Dimitriou^{1,3}, Thomas Freudenthaler^{1,3}, Verena Aistleitner³, and Daniel Weghuber^{2,3}

¹Department of Sport Science and Kinesiology, Paris Lodron University Salzburg, Austria

²Department of Pediatrics and Obesity Research Unit Salzburg, Paracelsus Medical University Salzburg, Austria

³SALTO, Salzburg Together against Obesity-Study Group, Austria

Abstract

In Austria, the prevalence of early childhood overweight and obesity has reached average European levels of 20% in boys and 18% in girls. As obesity strongly tracks into adolescence and adulthood, we choose the kindergarten as a core setting of a community oriented prevention. Based on the socio-ecological concept we identified the interpersonal level as the key layer targeting health behavior in the kindergarten. In November 2014 SALZBURG Together against Obesity (SALTO) was launched with the aim to increase the percentage of children with a healthy body mass at school entry (6 yrs. of age). A 3 year lasting

controlled longitudinal-sequential study consisting of 14 intervention (IK) and 8 control kindergarten (CK) services was chosen to investigate the effects of actions on body mass index in four to six year old children. Secondary outcomes such as fundamental movement skills and psycho-social determinants are investigated in children, KT and P of both groups with standardized tests on a yearly basis. In a participative way IK have to complete six health topics, each of six months duration: portion size & vegetables, water consumption & nutrients for children, sweets/snacks & special situations, sitting/standing up & outdoor activities, fundamental movement skills & family leisure time activities, screen-time & sports activities. Each topic will be translated into various actions in regard to the needs of the kindergarten with support of SALTO. The concept of a community oriented core setting (COCS) intervention for early childhood obesity prevention will be presented and mooted to discussion.

Design and Synthesis of Protein Tyrosine Phosphatase 1B Inhibitors as Potential Antidiabetic and Antiobesity Agents

Anil K. Saxena

Global Institute of Pharmaceutical Education and Research, Kashipur, UK, India

Abstract

Protein tyrosine phosphatase 1B (PTP1B) is a typical member of protein tyrosine phosphatase superfamily, and its inhibition results both in increased insulin sensitivity and resistance to obesity, with no abnormalities in growth or fertility or other pathogenetic effects. Thus, in search of small molecule potential PTP1B inhibitors, the CoMFA and CoMSIA models were developed and validated by the design and synthesis of a series of 2-(4-methoxyphenyl) ethyl] acetamide derivatives leading to a promising PTP1B inhibitor ($IC_{50} = 69 \mu M$). It was followed by the synthesis of a new series of substituted phenoxy-3-piperazin-1-yl-propan-2-ols among which one compound showed 40.3% normalization of plasma glucose levels at 100 mg/kg in sugar-loaded model (SLM) and 32% activity in streptozocin model (STZ). In continuation of this work another series of aryl thiazolyl phenylsulfonamides was investigated where the most active compound showed good PTP1B inhibition ($IC_{50} = 1.08 \mu M$) but showed low *in vivo* activity in STZ model. Further optimization of this series by pharmacophore modeling, docking and scaffold hopping techniques led to the identification, synthesis of compounds where the best compound showed 81.5% inhibition at 10 μM ($IC_{50} = 7.54 \mu M$) and improved *in vivo* activity in STZ model. It restored the insulin level and the serum lipid profile by significantly improving the insulin signaling and insulin resistance. It also showed anti-adipogenic effect on 3T3L-1 cells and inhibited MDI induced lipid accumulation in a dose-dependent manner and had oral bioavailability of approximately 10.29% after 30 mg/kg oral dose in rat.

Identification of Novel CCK2 Receptor Antagonists as Potential Antiulcer Agents

Mridula Saxena

Department of Chemistry, Amity University, Lucknow, India

Abstract

The cholecystokinin (CCK) receptor plays a major role in the pathophysiology of gastrointestinal (GI) disorders such as acid reflux, gastroesophageal reflux disease, and peptic ulcers including obesity. The CCK-Rs belong to G-protein coupled receptor (GPCR) superfamily. The present study revisited the three-dimensional (3D) homology model of CCK-2R using human adenosine receptor and the resolved NMR based structure of the third extracellular loop of the CCK2 receptor as templates. Further in order to identify novel antiulcer agents, rational designing has been performed using the substructure of well-known CCK-2R antagonist benzotript as a lead molecule followed by combined docking and simulation studies. This led to the understanding of the essential structure requirement as well as variation of binding mode among conformational isomers of small molecule CCK-2R antagonists. In the next step, preparation of each configurational isomers of these molecules was carried out and submitted for their *in vitro* activity. Further the compounds were evaluated against cold restraint (CRU), alcohol (AL) and pyloric ligation (PL) induced gastric ulcer rat models. Potential antiulcer activity was observed for the best compound of the series against CRU (81.2%), AL (73.9%), PL (62.5%) in comparison to benzotript having CRU (62.4%), AL (83.9%), PL (40%). The biological screening of these compounds has not only validated the developed homology model of CCK-2R but also led to the identification of highly potent CCK-2R antagonist as an orally active and safe candidate molecule having better antiulcer properties than the well-known drug benzotript.

Antiobesity Potential of Embelin in High Fat Diet-induced Obesity in Wistar Rats

Uma Bhandari^{*}, Rashid Ali Khan and Md. Akbar

Department of Pharmacology, Faculty of Pharmacy, Jamia Hamdard (Hamdard University), New Delhi-110062, India

Abstract

Obesity, a new world syndrome, is a chronic disease requiring effective strategies for its management. A model of high fat diet (HF)-induced obesity in rats is well controlled and shares many features with human obesity. Embelin, active constituent from *Embelis ribes* extract (Myrsinaceae) is reported to have antidiabetic and antihyperlipidemic activity in experimental animals. The present study was designed to evaluate the pharmacological mechanism of antiobesity potential of Embelin with HFD-induced obesity in Wistar rats. Wistar rats were fed with HFD ad lib for 28 days. Embelin (50 mg/kg, p.o.) was administered from day 8 to day 28 days in above HFD rats resulted in significant ($P < 0.01$) reduction in BMI, body weight gain, decrease in mean arterial pressure, decrease in visceral fat pad weight (perineal, mesenteric and epididymal), serum total lipids (cholesterol, TG and LDL-C) and atherogenic risk and coronary risk indices, serum apolipoprotein B and blood glucose levels. Further, there were reduction ($P < 0.01$) in insulin, HOMA-IR values and leptin levels; increase in HDL-C, hepatic and cardiac Na^+/K^+ ATPase and antioxidant levels; and decreased myocardial lipid peroxidation. The treatment improved the impaired architecture and morphology of hepatocytes, myocardial & glomerular cells on histological analysis. The present study reports new findings on the preventive effects of Embelin in obesity.

Clinical Significance of Sesame oil and Rice Bran oil in Health and Diseases -New Insights for the Healthcare Professional

Sankar Devarajan

Nutrition and Dietetics Program, Department of Human Sciences, University of Arkansas at Pine Bluff, AR, USA

Abstract

Sesame oil and rice bran oil are known for their unsaturated fatty acids and antioxidants contents, and have been reported to reduce the cardiovascular risk. Considering the health benefits of sesame oil and rice bran oil, a study was conducted to determine the extent to which the daily use of these oils blend controls hypertension, hyperglycaemia and improves the lipids in hypertensives and in patients with type 2 diabetes mellitus. A prospective, randomized 8-wk dietary intervention approach was carried it in two separate clinical studies include 1) effect of a blend of 20% un-refined cold pressed lignans rich sesame oil and 80% physically refined γ -oryzanol rich rice bran oil as cooking oil in mild to moderate hypertensive patients; and 2) effect of a blend of sesame and rice bran oils in hyperglycaemia and lipids in patients with type 2 diabetes mellitus. Use of the blend of sesame oil and rice bran oil as regular cooking oil in place of other edible oils for 8-wk significantly reduced blood pressure and improves the lipid profile whereas, hypertensives in combination of the oils blend and antihypertensive medication showed a greatest reduction. Likewise, type 2 diabetes mellitus patients treated with sesame oil blend or combination with antidiabetic medication showed significant reduction in fasting and postprandial blood glucose. A significant improvement in lipid profile was also observed in these patients. These two studies have demonstrated, for the first time that using a blend of sesame oil and rice bran oil as cooking oil showed a significant antihypertensive, antihyperglycaemic and lipid-lowering action, and had noteworthy additive effect with anti-hypertensive or antidiabetic medication.

Depot-specific Adipose Tissue Dysfunction Induced by Obesity and the Role of Fish Oil

Maria Isabel Cardoso Alonso Vale¹, Rui Curi², Maysa Mariana Cruz¹ and Roberta Dourado Cavalcante da Cunha de Sá¹

¹*Institute of Environmental Sciences, Chemical and Pharmaceutical, Federal University of Sao Paulo, Brazil*

²*Institute of Biomedical Sciences, University of Sao Paulo, Brazil*

Abstract

We performed a study to show the effect of fish oil (FO) on metabolism and adipokine production by adipocytes from subcutaneous (inguinal -ING) and visceral (retroperitoneal -RP) white adipose depots in high fat (HF) diet-induced obese mice. Mice were divided into CO (control diet), CO+FO, HF and HF+FO groups. The HF group presented higher body

weight, glucose intolerance, insulin resistance, higher plasma total and LDL cholesterol levels and greater weights of ING and RP adipose depots accompanied by hypertrophy of the adipocytes. FO exerted anti-obesogenic effects associated with beneficial effects on dyslipidemia and insulin resistance in mice fed a high fat diet (HF+FO group). HF raised RP adipocyte lipolysis and production of pro-inflammatory cytokines and reduced de novo synthesis of fatty acids whereas in ING adipocytes it decreased glucose uptake and adiponectin secretion but did not change lipolysis. Therefore, the adipose depots play different roles in the HF diet-induced insulin resistance according to their location in the body. Concerning cytokine secretion, adipocyte per se in addition to white adipose tissue infiltrated leukocytes have to be considered in the etiology of the comorbidities associated to obesity. The results obtained suggest that FO prevents the changes in adipocyte metabolism and adipokine secretion (in a depot-specific manner) induced by the HF diet. We demonstrated for the first time that continuous consumption of fish oil initiated in healthy conditions prevents deleterious alterations in fat depots caused by high dietary fat intake, regardless the specific feature of each. Fish oil supplementation may be used in addition to other strategies as a prophylactic health public measure to prevent the development of insulin resistance and type-2 diabetes mellitus.

Session on Obesity Treatment and Prevention

Nutritional Assessment in Bariatric Surgery: Seventeen Year's Experience of a Private Practice

Patricia Savino¹, Claudia Carvajal¹, Andrea Ramirez², Martha Grajales¹, Ricardo Nassar³ and Natan Zundel⁴

¹Metabolic and Bariatric Surgery Group, Hospital Universitario Fundación Santa Fe de Bogota, Colombia

²Center of Epidemiological Research, Universidade Federal de Pelotas, Brazil

³Bariatric and Minimally Invasive Surgery Service, Hospital Universitario Fundación Santa Fe de Bogota, Colombia

⁴Department of Surgery, FIU Herbert Wertheim College of Medicine Miami, FL, USA

Abstract

Background: Obesity and its consequences have now reached worldwide pandemic proportions. Among treatments bariatric surgery is the most effective for weight reduction. Here we describe the change in anthropometric measurements (AMs) taken in the private practice of a registered dietitian for nutritional assessment of 615 adult bariatric surgery patients over a 17-year period.

Methods: Observational retrospective study of AMs recorded between 1996 and 2013 for laparoscopic sleeve gastrectomy (LSG, n = 290), laparoscopic adjustable gastric banding (LAGB, n = 207), gastric balloon (GB, n = 82) and laparoscopic Roux-EN-Y gastric bypass (LRYGB, n = 36). Follow-up measurements were obtained bimonthly for 6 months after the procedures. Paired t-tests were applied to data from patients with complete AMs at first (pre-surgery) and fourth (6 months after surgery) follow-up visits.

Results: Differences in AMs between the first and fourth visits were statistically significant for all four procedures. A mean weight loss of 22 kg was observed along with a 22% total body weight loss and significant reduction of the waist-to-height-ratio (WHtR)(p < 0.001) and body mass index (BMI)(p < 0.001).

Conclusions: The use of multiple AMs enables a comprehensive assessment of the overall nutritional status of patients who undergo bariatric surgery and during post-surgical follow-up. Our study provides an insight into the competence of the available bariatric surgery procedures in Colombia and a useful resource for international future reference.

Nutrient Intake of Patients with Morbid Obesity

Mini Joseph¹, Nitin Kapoor¹, Shobana Ramasamy², Stephen Amarjeet Jiwanmall³, Kattula Dheeraj³, Vijay Abraham⁴, Inian S⁴, Thomas Paul¹, Simon Rajaratnam¹ and Nihal Thomas¹

¹Department of Endocrinology, Diabetes and Metabolism Christian Medical College & Hospital, Vellore, Tamil Nadu, India

²Weill Cornell Medicine, New York, NY, USA

³Department of Psychiatry, Christian Medical College & Hospital, Vellore, Tamil Nadu, India

⁴Department of Upper GI Surgery, Christian Medical College & Hospital, Vellore, Tamil Nadu, India

Abstract

Introduction: Morbid obesity is rapidly sweeping across the Indian continent and is a serious health condition.

Methodology: The study was conducted on 101 morbidly obese individuals who attended the Bariatric clinic of a tertiary center over a period of 6 months. Their anthropometric measurements were measured using standard procedures. The dietary assessment was done using a 24 hour dietary recall and a food frequency questionnaire. The study was approved by the Institutional review board.

Results: 75% were females, 60% were educated till the school level and 63 per cent had Type 2 DM. The mean age of the population was 37.5 + 12.6 years. Their mean BMI was 40.0 + 6.3 kg/m². Amongst the males, the mean waist circumference (126.93 + 20.71 cm) was greater than their hip measurements (121.0 + 34.92 cm). In contrast, the female population had a larger hip measurement (121.55 + 31.54 cm) than the waist circumference (116.5 + 31.76 cm). The mean daily intake of calories was 2254 kcal/day with a gross deficit in the intake of micronutrients. The macronutrient distribution indicated a high fat diet (30% of total calories) and low proteins (13% of total calories) intake. Fried snacks, fast foods, sweets, carbonated drinks were frequently consumed by the patient population. The consumption of fruits and vegetables was below the daily recommended servings.

Conclusion: The obese patients require intense and frequent individualized counselling by a dedicated team of an endocrinologist, psychiatrist, dietician, bariatric surgeon and a social worker.

Assessment Methods and Criteria of Obesity for Koreans based on the Articles in the Korean J. Community Nutrition

Youngnam Kim

Korea National University of Education, Korea

Abstract

The methods of obesity assessment and criteria of obesity classification for Koreans in the KJCN (1996 to 2011) articles were analyzed. Among the total of 1012 research papers enlisted in the KJCN, 248 papers (24.5%) were examined in which study subjects were divided into more than 2 groups by obesity class. On the obesity data collection (anthropometric measurement), 52.5% were directly measured and 28.7% were self-described. About the methods of the obesity assessment, indirect methods of weight-height index (BMI, BMI percentile, and Rohrer index) and PIBW (WLR, Broca index, and Korea Diabetic Association standards) were 62.4% and 23.2%, respectively, and direct method of percent of body fat assessment was only 9.3%. The most frequently applied methods were WLR in the age group of under primary and primary school children, and BMI in the middle, high school students and adults. For primary school children, WLR was the most frequently applied method up to 2007, but it changed to BMI percentile afterward. Broca Index was no longer utilized from 2008. There were no articles applying BMI percentile and Rohrer index for obesity assessment in adults. Criteria for obese were not consistent among research papers: for example, % body fat, 19 to 40%; BMI, 20 to 30; BMI percentile, 85th or 95th. In the case of PIBW, 120% was the most frequently utilized criterion for Obese. Based on these finding, I suggest that proper method and criterion of obesity assessment for each age group should be determined and proclaimed.

Daily Intake of Fructooligosaccharide Reduces hs-CRP and Other Inflammatory Markers in Grade 1 Sedentary Obese Individuals Residing in Urban Baroda - A Double Blind Placebo Control Trial

Swati Parnami¹, Mini Sheth¹, Sania Quraishi¹, Jyoti Prakash¹, Anil Kumar², Manish Jain², Manoj Gote² and Ashok Dubey²

¹Department of Food and Nutrition, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India

²Innovation Center TATA Chemicals Ltd., Pune, Maharashtra, India

Abstract

Background: Obesity is not an immediate lethal disease in itself but is a significant risk factor associated with a range of serious non-communicable diseases probably due to its association with inflammation of tissues of certain vital organs.

Objective: To study the putative role of Fructooligosaccharide in modulation of Gut microflora and thereby affect the levels of inflammatory markers in obese individuals.

Methodology: Using a double blind placebo control study design, eighty-two sedentary obese subjects in the age group of 20-50 years who voluntarily agreed to participate in the study were purposively selected and were equally divided into two

groups who received 10 ml liquid FOS and 10 ml liquid sucrose solution respectively for a period of 30 days. Their serum inflammatory markers in terms of TNF α , Leptin, and IL-6 was determined using Metabolic Hormone Magnetic Bead Panel and hs-CRP was determined using nephelometry method. Assessment of hematological indices was based on the principle of cell counting and volumetric analysis and the fecal bifidobacteria counts were determined using selective medium under anaerobic conditions.

Results: Supplementation of liquid FOS significantly reduced the hs-CRP levels by 17.24% with a non-significant reduction in the TNF α , IL6 and Leptin levels was observed by 4.94% and 2.90% respectively.

Conclusion: Daily intake of 10 g of liquid FOS helps in reducing the low grade inflammation especially in terms of hs CRP and improved bifidobacteria colonisation in sedentary obese individuals and can be used as an effective strategy to delay obesity related co-morbidities.

Brief Strategic Therapy vs Cognitive Behavioral Therapy for the Inpatient and Telephone-Based Outpatient Treatment of Binge Eating Disorder: the STRATOB Randomized Controlled Clinical Trial and 18-Month Follow-up Results

Giada Pietrabissa^{1,2*}, Gian Mauro Manzoni^{1,3} and Gianluca Castelnovo^{1,2}

¹Clinical Research Lab, IRCCS Istituto Auxologico Italiano, Milan, Italy

²Department of Psychology, Catholic University of Milan, Italy

³Faculty of Psychology, eCampus University, Novedrate, Como, Italy

Abstract

Background: Obesity and overweight are often associated with Binge Eating Disorder (BED). Cognitive-Behavioral Therapy (CBT) has shown solid results in reducing binge eating, but it does not traditionally encourage weight loss. Recently, Brief Strategic Therapy (BST) has revealed favorable results in dealing with weight problems.

The STRATOB (Systemic and STRATegic psychotherapy for OBesity) study, a two-arm randomized controlled clinical trial, is aimed at comparing the BST protocol for BED with the gold standard CBT, through an inpatient and telephone-based outpatient program.

Methods: 80 patients referring to a single clinical center for weight loss were randomly allocated into two conditions: 1) in-hospital treatment plus outpatient telephone-based CBT-oriented treatment; 2) in-hospital treatment plus outpatient telephone-based BST-oriented treatment. Primary outcome measure was the change in the Global Index of the Outcome Questionnaire (OQ_{45.2}). Secondary outcome measures were BED remission (weekly binge episodes < 2) and weight loss. Data were collected at baseline, discharge from the hospital (1 month later) and after 6, 12 and 18 months through tele-sessions.

Results: Significant differences emerged between groups, with the BST conditions scoring greater in the primary outcome and resulting in improved weight loss and number of binge episode at 6, 12 and 18 months follow-up points.

Conclusion: The observed superiority of BST (vs CBT) may depend on its focus on typically BED-related attempted solutions, in how the problem works and not only in why it exists, thus representing an innovative and effective treatment procedure.

Fine Morphological Evaluation of Hypothalamus in Patients with Hyperphagia

Yoshikazu Ogawa^{1*}, Kuniyasu Niizuma² and Teiji Tominaga²

¹Department of Neurosurgery, Kohnan Hospital, Sendai, Miyagi, Japan

²Department of Neurosurgery, Tohoku University Graduate School of Medicine, Sendai, Miyagi, Japan

Abstract

Background: Various metabolic diseases induced by eating disorders are one of the most serious and difficult problems for modern public healthcare. But little is known about hyperphagia, partly because of the lack of a clear definition. Several basic studies have analyzed eating habits using endocrinological or neurophysiological approaches, which have suggested controlled balance between the hunger and satiety centers in the central nervous system. However, more detailed neuro-radiological evaluations have not been achieved for hypothalamus and evaluations were limited only for the floor of the third ventricles.

Methods: Fine structures of hypothalamic morphology were investigated using high-resolution magnetic resonance

imaging in 7 patients with hypothalamo-pituitary tumors, who suffered from preoperative hyperphagia-induced severe obesity and metabolic disorders. Body mass index (BMI) varied from 22.4 to 40.5 kg/m² (mean 32.8 kg/m²). Clinical data were compared with the data of 9 patients without hyperphagia and 7 healthy volunteers.

Results: Morphological evaluation was possible in all patients and control subjects, and patients with hyperphagia had significantly shortened maximum distances between the ependymal layers of the lateral wall of the third ventricle and fornixes (hyperphagia group right side 0.30 mm, left side 0.23 mm vs. patients without hyperphagia group right side 1.60, left side 1.53 vs. healthy group right side 1.73 mm, left side 1.85 mm) ($p < 0.01$) ($p < 0.01$). Two patients achieved postoperative improvement in both clinical and neuro-radiological findings.

Conclusion: Eating and metabolic disorders are related to strongly dysfunction of the medial nuclei of the hypothalamus in patients with hypothalamo-pituitary tumors.

Polyphenols and Weight Loss: Effective Treatment or an Adverse Effect

Oren Tirosh^{*}, Nina Hirsch N, Anya Konstantinov, Sarit Anavi S, Anna Aronis, Zion Hagay and Zecharia Madar

The Hebrew University of Jerusalem, Rehovot Israel

Abstract

People consume dietary supplements with the idea of maintaining or improving their health. Green tea polyphenol extracts (GTE) are sold commercially as cholesterol-reducing agents and for weight reduction however, they have also been reported to be hepatotoxic. Our preliminary results from both *in vitro* and *in vivo* studies indicate that green tea polyphenols can potentiate liver injury after and during treatment with high cholesterol diet to induce experimental NASH.

Methods and results: Eight week old male C57BL mice ($n = 32$) were fed for 6 weeks with one of the following diets: Control diet (Con); Con + 1% w/w polyphenols from green tea extract (Con + GTE); High cholesterol diet, Con+ 1% cholesterol + 0.5% cholate w/w (HCD); HCD + 1 % polyphenols w/w (HCD + GTE). Hepatic steatosis, oxidative and inflammatory markers and bile acid synthesis pathways were measured.

Feeding mice, a HCD, GTE or combination resulted in weight loss and decreased mass of adipose tissue. However, it also resulted in hepatic steatosis and liver damage. GTE enhanced hepatic steatosis but only in animals exposed to the high cholesterol diet. In HCD treated animals GTE elevated blood levels of liver enzymes SGOT, SGPT, and bile acids. Inflammatory and oxidative markers in the liver were also significantly increased including liver mRNA expression of TNF-alpha, IL-6, SAA1, SAA2, iNOS and levels of 4-hydroxynonenal protein adducts.

Conclusions: This study showed that liver injury in the presence of lipids could be the reason for weight loss by high dose of polyphenols.

Bile Acid Signaling Pathway in a Metabolic Disease

Mitsuhiro Watanabe

Department of Internal Medicine, School of Medicine, Keio University, Japan

Abstract

Bile acids (BAs), a group of structurally diverse molecules that are primarily synthesized in the liver from cholesterol, are the chief components of bile. Recent studies have revealed that BAs are not only facilitators of cholesterol homeostasis and dietary lipid absorption but also important signaling molecules exerting multiple physiological functions. Three major signaling pathways, including the mitogen activated protein kinase (MAPK) pathways, the nuclear hormone receptor farnesoid X receptor (FXR) mediated pathways and the G protein-coupled receptor TGR5/M-BAR mediated pathways, have been identified to be the targets of BAs. Through activation of these diverse signaling pathways, BAs can regulate their own enterohepatic circulation, but also triglyceride, energy, and glucose homeostasis. Thus, BA-controlled signaling pathways are promising novel drug targets to treat common metabolic diseases, such as NAFLD, obesity, type II diabetes, hyperlipidemia, and atherosclerosis.

Protein-Pacing Caloric-Restriction Enhances Body Composition Similarly in Obese Men and Women during Weight Loss and Sustains Efficacy during Long Term Weight

Paul Arciero¹, Rohan Edmonds¹, Feng He^{1,2*}, Emery Ward¹, Eric Gumpricht³, Alex Mohr³, Michael Ormsbee^{4,5} and Arnes Astrup⁶

¹Skidmore College, NY, USA

²California State University-Chico, CA, USA

³Isagenix International LLC, AZ, USA

⁴Florida State University, FL, USA

⁵University of KwaZulu-Natal, South Africa

⁶University of Copenhagen, Denmark, Germany

Abstract

Short-Term protein-pacing (P; ~6 meals/day, >30% protein/day) and caloric restriction (CR, ~25% energy deficit) improves total (TBF), abdominal (ABF) and visceral (VAT) fat loss, energy expenditure, and biomarkers compared to heart healthy (HH) recommendations (3 meals/day, 15% protein/day) in obese adults. Less is known whether obese men and women respond similarly to P-CR during weight loss (WL) and whether a modified P-CR (mP-CR) is more efficacious than a HH diet during long-term (52 week) weight maintenance (WM). The purposes of this study were to evaluate the efficacy of: (1) P-CR on TBF, ABF, resting metabolic rate (RMR), and biomarkers between obese men and women during WL (weeks 0–12); and (2) mP-CR compared to a HH diet during WM (weeks 13–64). During WL, men (n = 21) and women (n = 19) were assessed for TBF, ABF, VAT, RMR, and biomarkers at weeks 0 (pre) and 12 (post). Men and women had similar reductions (p < 0.01) in weight (10%), TBF (19%), ABF (25%), VAT (33%), glucose (7%–12%), insulin (40%), leptin (> 50%) and increase in % lean body mass (9%). RMR (kcal/kg bodyweight) was unchanged and respiratory quotient decreased 9%. Twenty-four subjects (mP-CR, n = 10; HH, n = 14) completed WM. mP-CR regained significantly less body weight (6%), TBF (12%), and ABF (17%) compared to HH (p < 0.05). Our results demonstrate P-CR enhances weight loss, body composition and biomarkers, and maintains these changes for 52-weeks compared to a traditional HH diet.

Achieving Weight Loss by Modulation of Gut Incretins and Gut Hormones upon Feeding Fructooligosaccharide (FOS) to Obese Bank Employees

Mini Sheth¹, Swati Parnami, Aparna Assudani and Nidhi Jain

Department of Food and Nutrition, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India

Abstract

Background: India is currently facing the dual burden of overnutrition as well as under-nutrition. Strategies to control obesity are few and newer measures need to be undertaken and implemented after understanding its mechanism of action.

Objective: To examine the effects of Fructooligosaccharide (FOS) supplementation on gut-flora (Bifidobacteria, Lactobacillus, Clostridium and Bacteroides), gut-incretins (GLP-1 and GIP), an anorexigenic hormone PYY and anthropometric measurements and interactions amongst them.

Design: The study was a randomized, double-blind, placebo controlled trial. A total of 120 obese grade –I, young adults (25–35 yrs.) were randomly assigned to groups that received either 20 g FOS/d or 20 g dextrose/d for 90 days. Anthropometric measurements, fasting plasma and faecal samples were collected at baseline and post intervention. Plasma samples for gut incretins were analyzed using Luminex x-MAP technology in sub sample of 60 subjects.

Results: Significant reduction in experimental group when compared to placebo was observed in body weight, BMI, WC, WHR, body fat, colonization of Clostridium and Bacteroides by 1.32%, 2.18%, 1.07%, 2.92%, 1.95% and 11.40% respectively along-with significant increase in the colonization of Bifidobacteria (10.78%) and Lactobacillus (30.51%). The experimental group showed significant increase in plasma level of gut-incretin GLP-1 (1.53%) and non-significant increase in GIP (6.25%) and PYY (1.04%). Body Weight of obese individuals negatively correlated (p < 0.001) with GLP-1 (r = 0.729), PYY (r = 0.709). Stepwise linear regression analysis depicted GLP-1 as a strong predictor of obesity (58.6%).

Conclusion: FOS is a promising supplement in increasing satieogenic gut incretins by modulating gut microflora and achieving weight loss.

Laparoscopic Roux Y Gastric Bypass as a Revisional Procedure – Results: Comparative Match Pair Study

Elemér Mohos¹, Manfred Prager², Gábor Sándor¹ and Petra Mohos¹

¹Department of General Surgery, Territory Hospital Veszprém, Hungary

²Department of General Surgery, Krankenhaus Hietzing, Vienna, Austria

Abstract

Background: The incidence of severe obesity and its co-morbidities (diabetes mellitus type 2 DMT2, hypertension, chronic joint disease, etc.) is growing dramatically all over the world, as is the extent of weight loss surgery. A large number of patients after various bariatric procedures need revisional intervention for various reasons. The efficacy and the safety of revisional laparoscopic Roux Y gastric bypass (LRYGB) were investigated among our patients, the indication for operation were inadequate weight loss or weight regain after previous bariatric interventions.

Method: A double centre, comparative (match pair) study was performed comparing the data after revisional and primary gastric bypasses (65 patients in each arms, operated on between 2005 and 2015, focusing on weight loss, life quality and improvement of co-morbidities). The patients were matched for age, gender, preoperative BMI and follow up period. Previous procedures consisted of 40 gastric bandings, 17 sleeve resections, 4 LRYGB and 4 vertical banded gastroplasties.

Results: Extra weight loss was significantly reduced after revisional gastric bypasses compared to primary intervention (EWL: 66% vs. 91%, $p < 0.05$). The resolution rate of co-morbidities (DMT2, hypertension, GER, osteo-arthritis, sleep apnoea) were also higher after primary gastric bypasses.

Conclusion: LRYGB as a revisional procedure proved to be safe and effective for patients with inadequate weight loss or weight regain after previous bariatric surgery. Our results indicate lower efficacy of revisional compared to primary LRYGB reaching statistical significance in regard to weight loss.

References

1. Zingg U, McQuinn A, DiValentino D, Kinsey-Trotman S, Game P, et al. 2010. Revisional vs. primary Roux-en-Y gastric bypass--a case-matched analysis: less weight loss in revisions. *Obes Surg* 20(12):1627-1632. <https://doi.org/10.1007/s11695-010-0214-z>
2. Buchwald H, Avidor Y, Braunwald E, Pories W, Jensen MD, et al. 2004. Bariatric Surgery: a systematic review and meta-analysis. *JAMA* 292(14): 1724-1737. <https://doi.org/10.1001/jama.292.14.1724>
3. Mor A, Keenan E, Portenier D, Torquati A. 2013. Case-match analysis comparing outcome of revisional versus primary laparoscopic Roux-en-Y gastric bypass. *Surg Endosc* 27(2): 548-552. <https://doi.org/10.1007/s00464-012-2477-z>
4. Spivak H, Abdelmelek MF, Beltran OR, Ng AW, Kitahama S. 2012. Long-term outcomes of laparoscopic adjustable gastric banding and laparoscopic Roux-en-Y gastric bypass in the United States. *Surg Endosc* 26(7): 909-1919. <https://doi.org/10.1007/s00464-011-2125-z>

Is Routine Preoperative Oesophagogastroduodenoscopy Screening Necessary Prior to Laparoscopic Sleeve Gastrectomy? Review of 1555 Cases and Comparison with Current Literature

Tamer Saafan¹, Asaad Salama², Walid El Ansari³, Mohsen Karam² and Moataz Bashah²

¹Department of General Surgery, Hamad General Hospital, Hamad Medical Corporation, Doha, State of Qatar

²Departments of Bariatric Surgery, Hamad General Hospital, Hamad Medical Corporation, Doha, State of Qatar

³Department of Surgery, Hamad General Hospital, Hamad Medical Corporation, Doha, State of Qatar

Abstract

Background: Routine pre-operative oesophagogastroduodenoscopy (OGD) in patients undergoing bariatric surgery is controversial. There are equivocal opinions as to whether it should be undertaken routinely in order to avoid missing lesions that may affect patients' management; or undertaken selectively based on patients' symptoms. As laparoscopic sleeve gastrectomy (LSG) is a common procedure, and few studies have focused on the role of OGD before LSG, we assessed the role and impact of OGD in patients scheduled for LSG.

Methods: Retrospective review of records of all patients scheduled for LSG and operated upon at Hamad General Hospital, Qatar (February 2011 - July 2014, $n = 1555$). All patients were screened by OGD. Results of OGD and patient characteristics were analyzed, and OGD findings were categorized into four groups employing Sharaf et al. (2004) classification.

Results: OGD findings indicated that: about 89.5 % of patients had either normal or mild findings and these were asymptomatic; no patients had gastric cancer or varices (Group 3); and 10.5% were categorized as Group 2 which, according to Sharaf et al. (2004), these patients might have their surgical approach changed. All patients diagnosed pre-operatively with hiatal hernia had LSG with crural repair and their symptoms resolved postoperatively.

Conclusion: In the era of cost effectiveness and best utilization of hospital resources, routine p-OGD screening in patients scheduled for LSG is not needed except in symptomatic patients. p-OGD findings has low impact on management of asymptomatic patients. Crural repair plus LSG is effective for hiatal hernia.

Presentation of a Rare and Serious Sequela of Bariatric Surgery Tourism and Review of the Literature on a Growing and Alarming Phenomenon that is Raising Major Ethical Issues

Antonio Gangemi

University of Illinois, Chicago, IL, USA

Abstract

A rare case is being presented of jejunal perforation and intraluminal migration caused by the tip of the catheter left free-floating in the peritoneal cavity after removal of the infected port.

The surgeon who removed the port was unfamiliar with the patient's non-FDA-approved gastric band, which had been originally placed abroad, causing the major complications of this case.

This rare LAGB complication might be considered a consequence of one of the earliest cases of bariatric tourism so far described.

A review of the literature on bariatric surgery tourism is being presented and policy implications for health systems are being discussed.

Clinical & Vitamin Response to a Short-term Multi-micronutrient Intervention in Brazilian Children & Teens: From Population Data to Inter-individual Responses

Mariana Giarretta Mathias¹, Carolina de Almeida Coelho-Landell¹, Marie-Pier Scott-Boyer², Sébastien Lacroix², Melissa J Morine^{2,3}, Roberta Garcia Salomão¹, Roseli Borges Donegá Toffano¹, Maria Olímpia Ribeiro do Vale Almada¹, Joyce Moraes Camarinho¹, Elaine Hillesheim¹, Tamiris Trevisan de Barros¹, José Simon Camelo-Junior¹, Esther Campos Giménez⁴, Karine Meisser⁴, Alexandre Goyon⁴, Emmanuelle Bertschy⁴, Antoine Lévêques⁴, Jean-Marie Oberson⁴, Catherine Giménez⁴, Jerome Carayol⁵, Martin Kussmann⁵, Patrick Descombes⁵, Sylviane Métiron⁵, Colleen Fogarty Draper⁵, Nelly Conus⁵, Sara Colombo Mottaz⁴, Giovanna Zambianchi Corsini¹, Stephanie Kazu Brandão Myoshi¹, Mariana Mendes Muniz¹, Lívia Cristina Hernandez¹, Vinícius Paula Venâncio¹, Lusania Maria Gregg Anutnes¹, Rosana Queiroz da Silva¹, Taís Fontellas Laurito¹, Isabela Ribeiro Rossi¹, Raquel Ricci¹, Jéssica Ré Jorge¹, Mariana Leite Fagá¹, Driele Cristina Gomes Quinhoneiro¹, Mariana Chinarelli Reche¹, Paula Vitória Sozza Silva¹, Letícia Lima Falquetti¹, Thaís Helena Alves da Cunha¹, Thalia Manfrin Martins Demenice¹, Tâmara Hambúrguer Tambellini¹, Gabriela Cristina Arces de Souza¹, Mariana Moraes de Oliveira¹, Vicky Nogueira-Pileggi¹, Marina Takemoto Matsumoto¹, Corrado Priami^{2,3}, Jim Kapat⁵ and Jacqueline Pontes Monteiro¹

¹Department of Pediatrics, Faculty of Medicine, Nutrition and Metabolism, University of São Paulo, Ribeirão Preto, Brazil

²The Microsoft Research – University of Trento Centre for Computational and Systems Biology (COSBI), Rovereto, Italy

³Department of Mathematics, University of Trento, Trento, Italy

⁴Nestlé Research Center, Lausanne, Switzerland

⁵Nestlé Institute of Health Sciences, Lausanne, Switzerland

Abstract

The role of micronutrients in maintaining health and delaying the onset or preventing chronic diseases is highly controversial. We tested the hypothesis that micronutrients influence intermediate biomarkers of health by conducting a novel multi-micronutrient intervention that (i) used each individual as their own control accounting for genetic uniqueness, (ii) provided safe supplemental doses (DRIs) for 5 days per week for 6 weeks to 136 individuals aged 9 to 13 year olds, (iii) monitored compliance, (iv) analyzed 36 circulating vitamin forms, 30 clinical variables, anthropometric measurements, and food intake at baseline, after 6 weeks of intervention, and 6 week of washout, and (v) assessed participant's genetic ancestry as modifier of vitamin baseline or response. Same intervention was repeated the following year in 135 participants to test the

replicability of the results. 43.2% were overweight and 16% of all participants had dyslipidemia. Most vitamins responded positively and many clinical parameters changed in directions consistent with improved metabolic health to the intervention (fasting levels of LDL-c and glucose decreased). Simple and multivariate statistical models showed that starting baseline levels of any metabolite predicted response of that same metabolite to the intervention and predicted response to intervention on the basis of multiple vitamin/clinical baseline measures. Linear regressions between ancestral components and baseline vitamin levels show lower TMP with a higher percentage of European ancestry. Lower vitamin B₁₂ and folate levels were associated with a higher percentage of Native American ancestry as was folate response to intervention. The experimental design, computational methods, and results are a first step toward developing targeting recommendations for optimizing circulating vitamin levels and clinical parameters related to health.

Poster Presentations

D-lactate and Low Molecular AGEs are Elevated in Obese Adolescents: Evidence for Carbonyl Stress in Adolescent Obesity

Reyna Rodríguez Mortera^{1,2}, Yasmin Bains², Russell Caccavello², Claudia Luevano¹, Ma. Eugenia Garay-Sevilla¹ and Alejandro Gugliucci²

¹Department of Medical Science, University of Guanajuato, Mexico

²Glycation, Oxidation and Disease Laboratory, Dept. of Research, College of Osteopathic Medicine, Touro University, CA, USA

Abstract

Glycation and carbonyl stress produced by methylglyoxal (MG) as a consequence of triose flux in glycolysis has been implicated in the etiology of metabolic syndrome and diabetes complications. An integrated estimation of MG flux is provided by measuring concentrations of its catabolite D-lactate in serum. However, no studies have explored the pathway in childhood obesity.

Objective: Study serum concentrations of D-lactate and low molecular weight advanced glycation end-products (LMW-AGE) in lean vs adolescents with obesity.

Material and Methods: We conducted a cross-sectional study of 30 lean and 30 obese adolescents between the ages of 15-19 years. D-lactate was measured kinetically in serum ultrafiltrates by an adaptation of a colorimetric method from Sigma. Total and LMW-AGEs were measured by fluorescence (Excitation: λ 370 nm, Emission: λ 440 nm). The Ethical Committee of the Institution approved this study and informed consent was obtained from the participant adolescents and their parents.

Results: The obesity group showed significantly (* $p < 0.01$, ** $p < 0.001$) higher levels of: % body fat $35.0 \pm 9^{**}$, systolic BP 116.0 ± 8.1 mmHg** and diastolic BP, $72.9 \pm 7.1^{**}$ mmHg, waist 96.1 ± 11.6 cm** and hip circumferences 110.2 ± 8 cm**, HbA1c $5.1 \pm 0.6^{*}$. D-lactate was 4.5 ± 2.5 nmol/l in controls vs 7.4 ± 4.2 vs. nmol/l in obese subjects **. LMW/total AGE were 0.48 (0.44-0.52) AU in controls vs 0.61 (0.55-0.67) AU in obese subjects**.

Conclusions: D-lactate levels and LMW-AGEs are higher (64% and 27% respectively) in adolescents with obesity as compared to lean controls. Our data is compatible with the presence of an increased production of MG associated with protein modification that results in LMW-AGE (partial proteolysis of AGE proteins) increases in serum. This increased carbonyl stress may be of etiological significance. Sources of Research Support: Project supported by DAIP Universidad de Guanajuato (project 011/2015) and Touro University

Feeding Schedule does not Play a Role on Energy Homeostasis in Rats

Philip J. Scarpacc^{*}, Isabelle Cote, Hale Z. Toklu and Nihal Tümer

Department of Pharmacology and Experimental Therapeutics, University of Florida, FL, USA

Abstract

Evidence in mice indicates that limiting food access to the active phase, termed time-restricted feeding (TRF), can prevent diet-induced obesity without the necessity of reducing food intake (FI). We compared TRF with pharmacological treatment using Melanotan 2 (MTII), an appetite suppressor that decreases FI and body weight. We hypothesized that TRF would be as efficacious as MTII and that morning MTII treatment would be more efficacious than evening MTII. High-fat fed rats (6/group) treated with vehicle; MT II at ZT 0 (beginning of light phase) and vehicle ZT 12; or vehicle at ZT0 and MTII at ZT

12. The TRF approach utilized rats that had access to high-fat diet 24 hours/day (Control) or 12 hours/day only during dark phase (TRF). Body weight, FI, and body composition were assessed in light/dark for 22 days. Daily and cumulative FI was significantly lower in both MTII groups, compared to Control; however, no difference was detected between MTII AM and MTII PM groups. Timing of injection profoundly affected feeding patterns. With MTII AM, light phase feeding was lowest in MTII AM < MTII PM < Control. With MTII PM, dark phase feeding was least in MTII pm < MTII AM = Control. Despite differences in feeding patterns, both MTII groups had similar decreases in body weight and fat mass. Thus, feeding patterns do not influence MTII-induced body weight loss. As expected with TRF, cumulative FI was unchanged. Surprisingly, in contrast to mice, body weight and fat mass was unchanged by TRF. Thus, TRF does not protect against diet-induced obesity in rats.

The Functional State of the Vascular Wall and the Dynamics of Endothelial Nitric Oxide Synthase in Hypertensive Patients with Abdominal Obesity Based on use the Combination Antihypertensive Therapy

Andrieieva A, Babak O. Ya and Pluzhnykova O*

Kharkiv National Medical University, Ukraine

Abstract

Purpose: to improve the quality of diagnosis and treatment of patients with hypertension (HT) with or without abdominal obesity (AO), based on the study of the functional state of the vascular wall and the dynamics of endothelial nitric oxide synthase (eNOS).

Materials and Methods: The study enrolled the 106 patients. 3 groups were formed: 1st – HT patients (n = 27), 2nd – patients with HT and AO (n = 52), 3rd – healthy people (n = 27). The patients were divided by sex and age. The average age was (60 ± 4, 7) years. eNOs levels in serum – ELISA («Uscscn Life Inc. Wuhan», China) and endothelium-dependent vasodilation of the brachial artery (EDVD BA). Used a combination of olmesartan 20 mg with amlodipine 5mg per day.

Results: The lowest eNOs levels – in HT patients without AO, which amounted to (295, 4 ± 26,8) ng/ml (p < 0.05). HT patients with AO the essential difference of eNOs level compared to the control group was not found. The correlations between eNOs levels and EDVD BA in HT patients with AO (r = 0,68; p < 0,05) shown significant role of it in development disorders of endothelial vasoconstriction. Antihypertensive therapy increased the eNOs and EDVD BA levels in HT patients with AO by 18.9% and 3,63%, (p < 0,05) and HT patients without AO to 16.8% 2,8%, (p < 0,05).

Conclusions: The combination antihypertensive therapy makes the functional state of the endothelium better in both groups by increasing the eNOs blood level, but more in patients with AO.

The Impact of Neighborhood Crime on Childhood Weight Status Varies by Race/Ethnicity

Richard Suminski*, Rachel Blair, Nicole Slesinger and Shannon Robson

Center for Innovative Health Research, Department of Behavioral Health & Nutrition, University of Delaware, DE, USA

Abstract

Background: Although living in areas with high crime is thought to promote obesity, little is known about this phenomenon in children especially overtime.

Purpose: To explore the association between crime and weight classification in 5 to 13 year olds.

Methods: Height and weight measurements were made on 9,953 children in 2012 and on 995 children each year from 2008 to 2012. BMI percentiles (BMI%) were determined for all participants and crime index scores (CIS) for the zip codes where the children lived were based on current and historical data as well as modeling algorithms. Linear multiple regression was used to examine cross-sectional relationships between 2012 BMI% and 2012 CIS and longitudinal associations between BMI% change and average CSI from 2008-2012 by race/ethnicity while controlling for neighborhood-level factors (e.g., walkability).

Results: In the cross-sectional sample, BMI% and CIS were lower in whites than AA and Hispanics (p < 0.05) and lower in AA than Hispanics (p < 0.05). The CIS was related to BMI% only in whites (t = 3.39; p < 0.005, F (4,1908) = 4.57; p < 0.005, R² = 0.01). The same pattern of race/ethnicity differences was observed in the longitudinal sample. The average CSI was associated with greater increases in BMI% overtime only in whites (t = 3.3; p < 0.005, F (3,168) = 4.9; p < 0.005, R² = 0.081).

Conclusions: The results of this study indicate that higher crime levels are associated with higher BMI% in white, but not AA or Hispanic children. Focusing resources on crime prevention to reduce obesity among white elementary school children might improve intervention efficiency.

Impact of Modifiable Risk Factors in Escalation of Type 2 Diabetes and Related Complications in Asian Indian Population

Jasvinder Singh Bhatti^{1,2*}, Navneet Kaur Saini², Sumanpreet Kaur³, Sanjay Kumar Bhadada⁴, Rajesh Vijayvergiya⁴, Sarabjit Singh Mastana⁵, Gurjit Kaur Bhatti⁶ and P. Hemachandra Reddy¹

¹Garrison Institute on Aging, Texas Tech University Health Science Center, Lubbock, TX, USA

²Department of Biotechnology, Sri Guru Gobind Singh College, Chandigarh, India

³Department of Microbial Biotechnology, Punjab University, Chandigarh, India

⁴Postgraduate Institute of Medical Education & Research, Chandigarh, India

⁵School of Sport, Exercise and Health Sciences, Centre for Global Health and Human Development, Human Genetics Lab, Loughborough University, Leicestershire, United Kingdom

⁶UGC Centre of Excellence in Nano Applications, Panjab University, Chandigarh, India

Abstract

The prevalence of type 2 diabetes mellitus (T2DM) is continuously escalating over the world. India has become diabetic capital of the world. The present study was planned to investigate the risk factors associated with high prevalence of T2DM and related complications in Asian Indian population. We included 1667 non-diabetic and 1651 T2DM subjects from Indian population. Results observed a significant difference in the duration of diabetes in male and female diabetic subjects (7.65 ± 7.4 vs. 6.09 ± 6.6 , $p = .000$). BMI values differ significantly among diabetic and non-diabetics (26.72 ± 4.5 vs 25.59 ± 4.6 , $p = 0.000$). Diabetic patients had pronounced abdominal adiposity reflected by their significantly higher waist circumference (37.50 ± 4.3 in T2DM patients vs. 36.24 ± 4.4 in controls, $p = 0.000$) and higher waist/hip ratio (0.97 ± 0.1 in patients vs. 0.94 ± 0.1 in controls, $p = 0.000$). Dyslipidemia with a low level of high-density lipoprotein and elevated levels of triglycerides and very low-density lipoprotein were observed in T2DM subjects. Multiple logistic regression analysis of the data using T2DM as a dependent variable demonstrated various risk factors such as low HDL-C (OR(95% CI);1.334 (1.15-1.54), $p < 0.001$), elevated TG (3.273 (1.32-8.14), $p < 0.001$); Physical inactivity (1.473(1.21-1.79), $p < 0.001$); abdominal obesity (2.520(1.74-3.64) $p < 0.001$). Also, aging emerged as a major risk factor for type 2 diabetes and related complications. Cardiometabolic risks factors were significantly higher in T2DM subjects as compared to controls. In conclusions, present study documents that North Indians are at high risk of developing type 2 diabetes and its related complications, which in part are contributed by traits including advancing age, physical inactivity, familial aggregation, upper body adiposity and dyslipidemia. Aggressive public health awareness and strategies should be implemented to reduce the burden of T2DM and related complications.

Association of Health Behavior, Fat Intake and Predicted Ten-year Risk for Developing Coronary Heart Disease Using Framingham Risk Score in the 40-60s Korean Male

Clara Lee^{1*}, Yeri Kim¹, Kyung Soo Kim¹, Min Hee Kim¹ and Kyung Min Kwon²

¹Family Medicine, Seoul St. Mary's Hosp., Catholic University Medical Center, Korea

²Graduate school of public health, the Catholic University, Korea

Abstract

Heart disease is the leading cause of death among chronic diseases. The morbidity and mortality of cardiovascular diseases may be reduced through management of lifestyle and dietary habits. This study identified the associations between key lifestyle factors, such as health behaviors and fat intake, and risk of cardiovascular disease by using Framingham risk score, which assesses the risk of cardiovascular disease.

We enrolled 1,739 men in their forties to sixties, using the first- and second-year data of the sixth National Health and Nutrition Survey of South Korea. The participants were classified into low- and moderate-risk groups according to their risk percentages.

As a result, the odds ratio for cardiovascular disease was 2.16 among those who slept for ≥ 9 hours, and 0.62 and 0.57 for those who worked out 1–3 days per week and 4 days per week, respectively. No significant differences were found among the men in their forties. In the men in their fifties, the odds ratio for cardiovascular disease was 2.50 among those who had ≥ 9 hours of sleep, and 0.60 and 0.38 among the subjects who worked out 1–3 days and 4 days a week, respectively. Furthermore, the odds

ratio for cardiovascular disease among those with excessive saturated fat intake was 1.85.

This study demonstrated that sleep duration, muscle training, and saturated fat intake are associated with the risk of cardiovascular disease. These findings suggest that early discovery of risks and multilateral management of lifestyle habits may delay or prevent cardiovascular disease onset.

The Importance of Early Healthy Lifestyle Habits: Exploratory Data from Sicilian Mothers

Teresa Buccheri* and Maria C. Quattropani

Department of Humanities and Social Sciences – Psychology Unit, University of Messina, Italy

Abstract

Childhood obesity has been recognized as an increasing health worldwide problem. It has more than doubled in children and quadrupled in adolescents in the past 30 year. Despite many successful treatments of overweight and childhood obesity, many treated children also regain weight during follow-up; prevention and health education campaigns seem to be absolutely essential. Healthy lifestyle habits can lower the risk of becoming obese and developing related diseases and can be learnt in the early childhood so maternal feeding practices during weaning period seem to be crucial to be examined. The current exploratory study provided information about nutrition in the weaning period of a group of Sicilian mothers and their children. Participants included 15 mothers aged 27-42 years old and their children aged 4-24 months old. Measures were a questionnaire to collect sociodemographic information's and anthropometric measurements, the Infant Feeding Questionnaire (IFQ), the Food Frequency questionnaire (FFQ) and a semi-structured interview about the weaning period. Semi-structured interviews were audio-recorded and transcribed according to the standardized rules of psychotherapy by Mergenthaler and analyzed through the use of the software for textual analysis Atlas.ti.

Role of Apelin in Transition from Cardiac Metabolic Adaptation to Maladaptation in Obesity

Kunduzova O¹, Alfarano C¹, Foussal C¹, Lairez O², Calise D³, Attané C¹, Anesia R¹, Daviaud D¹, Wanecq E¹, Parini A¹ and Valet P¹

¹National Institute of Health and Medical Research (INSERM) U1048, Toulouse, France

²University of Toulouse, UPS, Institute of Metabolic and Cardiovascular Diseases, Toulouse, France

³US006, Microsurgery Services, Toulouse, France

Abstract

Background/Objectives: Alterations in cardiac energy metabolism contribute to the development of heart failure. Apelin, an adipocyte-secreted peptide, plays an important role in regulating cardiovascular and metabolic homeostasis. Here we explore the role of apelin in the transition from metabolic adaptation to maladaptation of the heart in obese state.

Methods: Adult male C57BL/6J, apelin knock-out (KO) or wild-type mice were fed a high-fat diet (HFD) for 18 weeks. To induce heart failure, mice were subjected to pressure overload after 18 weeks of HFD. Long-term effects of apelin on fatty acid (FA) oxidation, glucose metabolism, cardiac function and mitochondrial changes were evaluated in HFD-fed mice after 4 weeks of pressure overload. Cardiomyocytes from HFD-fed mice were isolated for analysis of metabolic responses.

Results: Pressure overload-induced transition from hypertrophy to heart failure is associated with reduced FA utilization ($P < 0.05$), accelerated glucose oxidation ($P < 0.05$) and mitochondrial damage in HFD-fed mice. Treatment of obese mice with apelin for 4 weeks prevented pressure overload-induced decline in FA metabolism ($P < 0.05$) and mitochondrial defects. In addition, apelin treatment lowered fasting plasma glucose ($P < 0.01$), improved glucose tolerance ($P < 0.05$) and preserved cardiac function ($P < 0.05$) in HFD-fed mice subjected to pressure overload. In apelin KO HFD-fed mice, spontaneous cardiac dysfunction is associated with reduced FA oxidation ($P < 0.001$) and increased glucose oxidation ($P < 0.05$). In isolated cardiomyocytes, apelin stimulated FA oxidation in a dose-dependent manner and this effect was prevented by small interfering RNA sirtuin 3 knockdown.

Conclusions: These findings suggest that obesity-mediated decline in cardiac function is associated with defective myocardial energy metabolism and mitochondrial abnormalities. Furthermore, our studies point for therapeutic potential of apelin to prevent myocardial metabolic and functional abnormalities in heart failure paired with obesity.

Ownership and Utilization of Smartphone Technology for TLC Among People with Schizophrenia

Kyunghee Lee¹, Ivy Lynne Alcazar-Bejerano¹ and Mihwa Han^{1,2}

¹Keimyung University, Korea

²Sunlin University College, Korea

Abstract

As technology advances at high speed, m-Health intervention has the potential to proliferate opportunities for rapid delivery of TLC Program (Therapeutic Lifestyle Change Program) of persons with schizophrenia. In order to develop an effective, evidence-based mobile TLC Program, we need a better understanding production possibilities associated with m-Health intervention. The purpose of this study was to assess production possibilities associated with smartphone use for participation in mobile TLC program and propose the tasks and directions to realize it among people with schizophrenia. A total of 958 patients were invited to take part in the survey. A paper-and-pencil survey that assessed the patients' mobile phone awareness and utilization of mobile applications for TLC program was done. Evidences have shown that the access, utilization and interest in mobile technology among people with schizophrenia are already high and increasing at a fast rate, thus can serve as a viable conduit for self-management of their condition. Health care providers, researchers, and mental health institution administrators could work together in augmenting existing mobile technologies and designing novel mobile interventions.

Histopathological changes in Laparoscopic Sleeve Gastrectomy Specimens: Prevalence, Risk Factors, and Value of Routine Histopathologic Examination

Tamer Saafan¹, Moataz Bashah², Walid El Ansari³ and Mohsen Karam²

¹Departments of General Surgery, Hamad General Hospital, Hamad Medical Corporation, Doha, State of Qatar

²Department of Bariatric Surgery, Hamad General Hospital, Hamad Medical Corporation, Doha, State of Qatar

³Department of Surgery, Hamad General Hospital, Hamad Medical Corporation, Doha, State of Qatar

Abstract

Background: Laparoscopic sleeve gastrectomy (LSG) is a common surgical therapeutic option for obese patients, with debate about the value of routine histopathologic examination of LSG specimens. We assessed: prevalence of different histopathologic changes in LSG specimens; risk factors associated with pre-malignant and frequent histopathologic changes; whether routine histopathologic examination is warranted for LSG patients with non-significant clinical history.

Methods: Retrospective review of records of all LSG patients operated upon at Hamad General Hospital, Qatar (February 2011 - July 2014, n = 1555). Risk factors (age, BMI, gender, *H. Pylori*) were assessed in relation to specific abnormal histopathologic changes.

Results: Mean age and BMI of our sample was 35.5 years and 46.8 respectively. Females comprised 69.7% of the sample. Normal histopathologic specimens comprised 52% of the sample. The most common histopathologic changes were chronic inactive gastritis (33%), chronic active gastritis (6.8%), follicular gastritis (2.7%) and lymphoid aggregates (2.2%). We observed rare histopathology in 3.3% of the sample (e.g. intestinal metaplasia, GIST). Older age was associated with GIST and intestinal metaplasia (P = 0.001 for both). Females were associated with chronic active gastritis (P = 0.003). *H. Pylori* infection was associated with follicular gastritis, lymphoid aggregates, GIST, intestinal metaplasia and chronic active gastritis (P < 0.001 for each).

Conclusion: Whilst older age, *H. Pylori* and female gender are risk factors for several abnormal histopathologic changes, and histopathologic examination of LSG specimens might harbor significant findings; however routine histopathologic examination of all LSG specimens, particularly in absence of suggestive clinical symptoms is questionable.

Sugar Sweetened Beverage Consumption in Elementary Schools Correlates with Free-reduced Lunch Eligibility Amongst Students: Preliminary Study Results

T. Sanborn^{1,2}, A. Tahir^{1,2}, A. Hassan^{1,2}, C. Collins², Y. Zhou¹, V. Benedict² and L. Chehab^{1,2}

¹The University of Chicago Medical Center, Pritzker School of Medicine, Chicago, IL USA

²*Evanston Hospital, NorthShore University HealthSystem, Evanston, IL, USA*

Abstract

Introduction: Sugar sweetened beverage (SSB) consumption is identified as a contributor to the childhood obesity epidemic. Socioeconomic status is a known barrier for access to healthier beverage choices. School free and reduced lunch eligibility is a recognized indicator of low socioeconomic status.

Hypothesis: We assessed the hypothesis that SSB consumption correlates with percent of students eligible for free and reduced lunch (FRL).

Methods: A survey was conducted across grades 5-6 in 15 suburban Chicago elementary public schools. Anonymous recall surveys were distributed to assess beverage intake over the prior 24-hours. The primary endpoints of the study included quantitative evaluation of SSB (i.e.: soda, sport drinks), real fruit juice (RFJ) (i.e.: juice boxes, orange juice), water and diet soda intake and their correlation to FRL eligibility. Scoring was analyzed and adjudicated by 2 separate reviewers.

Results: A total of 1284/1616 (79.5%) fifth and sixth graders participated in the survey. Students reported a daily mean beverage intake of the following: SSB (1.9), SSB plus RFJ (2.7), water (3.0) and diet soda (0.2). There was a significant correlation with increased SSB intake and schools with a higher percentage of FRL eligibility ($p = 0.0064$).

Conclusions: In conclusion, intake of SSB was significantly correlated with FRL eligibility. An educational program to describe the sugar content of SSBs using, easily visualized teaspoons of sugar and small candies will be implemented across the schools. A survey will be completed at the end to study the impact of an educational curriculum on SSB consumption.

Implication of Childhood Obesity and High Pro-Inflammatory Diets in South Carolinian Children: Survey and Data Stratification

Shanora Brown^{*}, Timothy Green, O'Quan Cross and Ashley Knowell

South Carolina State University, Orangeburg, SC, USA

Abstract

In South Carolina childhood obesity is growing at an alarming rate surpassing the national average. Forty percent of children in SC are classified as either overweight or obese. The rise of childhood obesity in the US is astounding due to factors such as socioeconomic status and poor nutritional choices. In SC, counties located within the I-95 Corridor is commonly referred to as the Corridor of Shame, due to years of being severely underfunded and underdeveloped; thereby, contributing to a variety of problems such as poverty, lack of health care, poor health choices, and obesity. Childhood obesity can lead to numerous health complications in adulthood that includes diabetes, high-cholesterol, chronic joint pain, and cancer. The purpose of this study is to address the epidemic of childhood obesity in SC. If the preventable risk factor of childhood obesity is targeted, it could play a significant role in reducing the number of adult cancer cases. Our study is enrolling South Carolinian children from varying degrees of rurality and backgrounds to determine if obesity and/or high-fat pro-inflammatory diets contribute to the increase level of pro-inflammatory markers, which in turn contributes to long term chronic inflammation leading to increased adult carcinogenesis. A screening survey, which gives a brief overview of the candidate's nutritional and physical activity background and demographics has been developed. Participants recruited from six counties will be stratified by rurality, lifestyle factors and socioeconomic status to assess the effect of these exogenous factors on adult cancer risk in children.

Acknowledgements: USDA/NIFA SCX-311-20-16.

Human Myxovirus Resistance B (MxB) Functionality: Consequences of Obesity?

Sydney Spry^{*}, J'lan Johnson and Shanora Brown

South Carolina State University, Orangeburg, SC, USA

Abstract

Obesity is an epidemic in the United States affecting over 30% of the adult population. Obesity is more prevalent among minorities, particularly black men. It has been associated with numerous chronic diseases such as hypertension, cardiovascular disease, diabetes and with several types of cancers. Recent evidence suggests that obese men have an increased risk of dying of prostate cancer. IFN pathways are significantly de-regulated in cancers, evidenced by the studies of RNASE L de-regulated/

mutated in hereditary prostate cancer. The human Myxovirus resistance 2 (MX2) gene encodes Interferon-inducible GTP-binding protein, MxB. MxB has not previously been recognized as having significant anti-viral function and literature provides evidence that Mx proteins have been involved in various other processes including cell development and evidence states that these proteins may have different functions in other species beside the antiviral defense. Obesity is associated with poor clinical outcomes, due to the increased levels of SOCS-3 which attenuates type I IFN signaling. MxA, has been shown to act as a possible tumor suppressor in prostate cancer; however, in obese patients, MxA may not be functional/expressed due to SOCS-3 expression. MxA shares approximately 63% sequence identity to MxB; therefore, this prompted us to investigate the expression/role and tumorigenic potential of MxB in prostate cancer. Meta-analysis of different expression databases e.g. NCBI GEO and Oncomine were analyzed for clinical evidence to investigate the association between MxB expression and prostate cancer. The databases suggested a strong direct association between MxB expression and prostate cancer. At present, there is no known role of MxB in prostate cancer or obesity. Data will be presented at the conference.

Acknowledgements: 5P20GM103499-16/ 22050-Z230

Analyzing the Role of High Pro-Inflammatory Diets and Childhood Obesity in the Risk of Adult Carcinogenesis in South Carolinian Children

Ashley Knowell¹ and Shanora Brown

1890 Research, South Carolina State University, Orangeburg, SC, USA

Abstract

In the US, childhood obesity has been a growing epidemic with, 1/3 of US children considered overweight or obese. The increased number of overweight and obese children can be linked to several factors including nutrition and social economic status. Households that do not have access to healthy, nutritious foods are significantly more likely to be obese earlier in life than other children. Obesity in children can lead to numerous health complications such as diabetes, high blood pressure, chronic inflammation and carcinogenesis. African American minorities are more likely to be diagnosed and die certain cancers. Therefore, eliminating or reducing preventable risk factors such as unhealthy nutrition and childhood obesity could have important implications for reducing clinical manifestations of adult cancer outcomes. Areas of South Carolina, such as the I-95 Corridor, have a long history of being under-developed which contribute to numerous problems such as obesity, poverty and sub-par health care. We have enrolled SC children from varying degrees of rurality to determine if obesity and/or high-fat pro-inflammatory diets contribute to increased levels of pro-inflammatory and obesity related markers. Subjects will be randomized into obese and non-obese groups based on BMI guidelines. The transcriptional levels of pro-inflammatory genes will be measured by quantitative Real-time polymerase chain reaction. Reducing childhood obesity and pro-inflammatory diets, while increasing physical activity and access to healthy foods are beneficial in the reduction of cancer risk and will serve as preventive measures for early-stage onset of adult cancers. Results will be presented during the conference

The Role of High-Fat Diets and Childhood Obesity on Chronic and Acute Pro-inflammatory Markers (ADP, CRP, IL1B, SAA1, and IL-12B and the Risk of Adult Carcinogenesis in South Carolinian Children

O'Quan Cross¹, Dejah Thomas¹, Maya Barbour, Shanora Brown and Ashley Knowell

1890 Research, South Carolina State University, Orangeburg, SC, USA

Abstract

Childhood obesity is the fastest growing epidemic in the United States, due to one-third of children (ages 2-19) being overweight or obese. Obesity has been linked to several health complications in children to include diabetes, high blood pressure, chronic inflammation and carcinogenesis. In South Carolina, childhood obesity is growing at an alarming rate. According to reports, the percentage of adults in South Carolina who are either overweight or obese is 66.2 percent and the percentage of children who are obese or overweight is 40 percent. If the preventable risk factor of childhood obesity is targeted, it could play a significant role in reducing the number of adult cancer cases. Collection days have been conducted to enroll South Carolinian children from varying backgrounds to determine if obesity and/or high-fat pro-inflammatory diets contribute to the increased level of pro-inflammatory markers. Increased expression of pro-inflammatory markers can contribute to long term chronic inflammation which may lead to increased adult carcinogenesis. Chronic and acute pro-inflammatory markers (ADP, CRP, IL1B, SAA1, and IL-12B) have been investigated via q-PCR. Preliminary data suggests that increased expression of these pro-

inflammatory markers seen are directly correlated to diet irrespective of weight class (normal, overweight, obese).

Work supported by USDA/NIFA Grant Number SCX-311-20-16.

Elderly Women: Prediction of the Lipid Profile, Inflammatory and Atherogenic by Comparing the Percentage of Body Fat and Body Mass Index

Silvana Scherz Funghetto¹, Alessandro de Oliveira Silva², Paulo Henrique Fernandes dos Santos Marina Morato Stival¹, Renata Freitas¹, Luciano Ramos de Lima¹, Cris Renata Grou Volpe¹ and Margô Gomes de Oliveira Karnikowski¹

¹University of Brasilia (UnB), Brasília, DF, Brazil

²Center University of Brasilia (UNICEUB), Brasilia, DF, Brazil

Abstract

Alterations in women's biophysical profile over the years, particularly during the menopausal and postmenopausal periods, may result in weight gain and increased body fat as well as in changes in the fat composition and distribution. This study selected 277 elderly women from a local community at the Brazil. Participants, they completed an anamnesis form and a physical activity questionnaire and underwent anthropometric measures and underwent body composition analysis by DEXA. Selection criteria included sedentary women aged 60 years or more and the completion of all anthropometric testing. 25% of the elderly women were classified as normal weight, 50% overweight, and 25% obese by the BMI. The obese group had higher levels of triglycerides and very low-density lipoproteins than did the normal weight group ($P \leq 0.05$) and lower levels of high-density lipoproteins (HDL) than did the overweight group ($P \leq 0.05$). According to the PBF, 49% of the elderly women were classified as eutrophic, 28% overweight, and 23% obese. Accurate identification of obesity, systemic inflammation, and atherogenic lipid profile is key to assessing the risk of cardiometabolic diseases. Classification based on DEXA measures, along with biochemical and inflammatory parameters, seems to have a great clinical importance, since it allows the lipid profile eutrophic distinction in elderly overweight women.

We thank the support of the Research Foundation of the Federal District (FAP-DF)

The Influence of Transcranial Direct Current Stimulation on Energy Homeostasis in Experimental Model of Obesity

Agata Ziomber¹, Jolanta Kaszuba-Zwoinska¹, Eugeniusz Rokita² and Lucyna Ankiewicz-Michaluk³

¹Chair of Pathophysiology, Jagiellonian University Medical College, Poland

²Department of Biophysics, Chair of Physiology, Jagiellonian University Medical College, Poland

³Department of Neurochemistry, Institute of Pharmacology Polish Academy of Sciences, Poland

Abstract

Obesity is worldwide epidemic. Bariatric surgery is nowadays the only effective option of obesity treatment however has limited indications. Noninvasive modalities to cope with excessive body fat are demanded. Transcranial direct current stimulation (tDCS) is a save and noninvasive technique of cerebral cortex activity modulation applied for treatment of several neuro-psychiatric disorders e.g. addictions. As obesity is nowadays considered as a neurological disease rather than strictly a metabolic disorder due to multiple interactions between brain, gut and fat tissue, tDCS may be used to change feeding behavior. 24 Wistar rats with initial body weight of 260 g and divided equally into four subgroups were used in the experiment. The rats were fed with standard or high-fat diet and received active tDCS versus sham tDCS versus no stimulation (intact). Body weight and feed intake were measured during the study and epididymal fat tissue, brain and blood samples were collected after the rats were sacrificed. Neither brain lesions or neurological deficits were detected in rats with tDCS. Active tDCS decreased appetite and reduced feed intake when compare with sham or no brain stimulation. The body weight did no differ among the groups, however epididymal fat tissue contents as well as some serum peptides levels involved in appetite regulation changed depending on applied procedure. We concluded that tDCS is able to change feeding behavior in rats, but further investigations are necessary to confirm these effects in humans.

Founding support of the study was provided by the National Science Centre Poland, grant number DEC-2013/09/B/NZ4/02539.

Gut Microbiota in Obese Rats after Transcranial Direct Current Stimulation

Agata Ziomber¹, Agnieszka Sroka-Oleksiak², Katarzyna Talaga-Cwiertnia² and Malgorzata Bulanda²

¹Faculty of Medicine, Jagiellonian University Medical College, Poland

²Faculty of Medicine, Jagiellonian University Medical College, Poland

Abstract

Recent evidence suggests that altered composition of gut microbiota may play an important role in the development of metabolic diseases due to energy dyshomeostasis. Transcranial direct current stimulation (tDCS) is a noninvasive technique of brain activity modulation. Changing feeding behavior tDCS was shown to influence energy homeostasis in animal and human studies. 28 Wistar rats were divided into 4 subgroups depending on diet effect (lean versus obese) and type of stimulation (active versus sham tDCS versus no stimulation) to evaluate the possible differences in quantity and quality of gut microbiota. The samples of small and large intestine were collected for the tests after the animals were sacrificed. Bacterial DNA was extracted using Genomic Mini Kit for small and large intestine samples. Obtained DNA templates were used to quantitative PCR real time amplification to estimate the total number of all bacterial cells, the number of *Firmicutes/Selenomonas noxia* and Bacteroidetes/Prevotella. High-fat diet/obesity increased the number of all bacterial cells in the intestines despite decreased *Selenomonas noxia* in large intestine compared with standard chow. Active tDCS enhanced Bacteroidetes/Prevotella proliferation in small intestine compared with lean and obese rats without stimulation. Sham and active tDCS increased *Selenomonas noxia* in large intestine to control levels. The changes observed in active tDCS were accompanied by decreased appetite and reduced body weight compared with not stimulated rats. We concluded that obesity is linked to altered quantity and quality of gut microbiota and tDCS, changing energy metabolism, may influence intestinal bacterial contents of the rats on high-fat diet.

DNA Methylation of Imprinted Genes in Mexican-American Newborn Children with Prenatal Exposure to Environmental Obesogens

Gwen Tindula¹, Susan Murphy², Carole Grenier², Zhiqing Huang², Karen Huen¹, Maria Escudero-Fung¹, Asa Bradman¹, Brenda Eskenazi¹, Cathrine Hoyo^{2,3} and Nina Holland¹

¹School of Public Health, CERCH, University of California, Berkeley, CA, USA

²Department of Obstetrics and Gynecology, Duke University Medical Center, Durham, NC, USA

³Department of Biological Sciences, Center for Human Health and the Environment, North Carolina State University (NCSU), Raleigh, NC, USA

Abstract

Shifts in DNA methylation can alter gene expression and are a proposed mechanism through which chemical and biological factors during gestation and childhood may influence disease etiology. Imprinted genes exhibit expression in a parent-of-origin-dependent manner and are involved in early growth and development. Recent limited evidence suggests that prenatal exposure to phthalates, suspected environmental obesogens, can affect epigenetic dysregulation of imprinted genes. We examined the associations between prenatal urinary concentrations of phthalate metabolites and imprinted gene DNA methylation in newborns from the well-characterized Mexican-American birth cohort followed by the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS).

We quantified DNA methylation of nine imprinted gene differentially methylated regions (DMRs) in 298 CHAMACOS newborn samples using pyrosequencing, adjusting for cord blood cell composition. Fetal exposure was estimated by concentrations of eleven phthalate metabolites previously measured in maternal urine samples across pregnancy.

Methylation of several imprinted gene DMRs in newborn blood was associated with prenatal high molecular weight phthalate exposure. Novel and consistent positive FDR-significant associations were observed for the relationship between di-2-ethylhexyl phthalate metabolites and Maternally Expressed Gene 3 (MEG3), a gene associated with tumorigenesis, birth outcomes, and diabetes.

The results of this study demonstrate associations between in utero phthalate exposure and methylation status of genes critical in fetal growth and child development, which could impact disease trajectories in adulthood.

Aster yomena Suppresses COX-2 and iNOS Expression Induced by LPS

Hyung-Sun Youn^{1*}, Hyeon-Myeong Shin¹, Ah-Yeon Kim¹, Sang-Il Ahn², Hyun-Jin Shim¹, Yoo Jung Lee¹, Kung-Woo Nam³ and Kyung-A Hwang⁴

¹Departments of Medical Science, College of Medical Sciences, SoonChunHyang University, Chungnam, Asan 31538, Republic of Korea

²Department of Biomedical Laboratory Science, College of Medical Sciences, SoonChunHyang University, Chungnam, Asan 31538, Republic of Korea

³Department of Life Science and Biotechnology, College of Natural Science, Soonchunhyang University, Asan 31538, Republic of Korea

⁴Department of Agrofood Resources, National Academy of Agricultural Science, RDA, Wanju 55365, Republic of Korea

Abstract

Inflammation is a pathological process that is known to be involved in numerous diseases. Microbial infection or tissue injury activates inflammatory responses, resulting in the induction of proinflammatory proteins including cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS). Aster yomena is used in traditional Korean remedies to treat cough, asthma, and insect bites. Here, we investigated the effects of *A. yomena* extract (EAY) on the expression of COX-2 and iNOS induced by LPS. EAY inhibited LPS-induced NF- κ B activation and COX-2 and iNOS expression. These results suggest that EAY has the potential to be developed as a potent anti-inflammatory drug.

This work was carried out with the Soonchunhyang University Research Fund and with the support of "Cooperative Research Program for Agriculture Science & Technology Development (Project Title: A study on anti-allergic mechanism of Aster yomena by clinical research, Project No: PJ0108262015)" Rural Development Administration, Republic of Korea.

Overexpression of PGC-1 α Increases Peroxisomal and Mitochondrial Fatty Acid Oxidation in Human Primary Myotubes

Tai-Yu Huang¹, Donghai Zheng¹, Joseph A. Houmard^{1,4}, Jeffrey J. Brault^{1,4}, Robert C. Hickner^{1,2,4} and Ronald N. Cortright^{1,2,4}

¹Department of Kinesiology, East Carolina University, Greenville, NC, USA

²Department of Physiology, East Carolina University, Greenville, NC, USA

³Department of Biochemistry & Molecular Biology, East Carolina University, Greenville, NC, USA

⁴Diabetes Obesity Institute, East Carolina University, Greenville, NC, USA

Abstract

Peroxisomes are indispensable organelles for lipid metabolism in humans and their biogenesis has been assumed to be under regulation by peroxisome proliferator-activated receptors (PPARs). However, recent studies in hepatocytes suggest that the mitochondrial proliferator PGC-1 α (peroxisome proliferator-activated receptor gamma coactivator-1 alpha) also acts as an upstream transcriptional regulator for enhancing peroxisomal abundance and associated activity. It is unknown whether the regulatory mechanism(s) for enhancing peroxisomal function is through the same node as mitochondrial biogenesis in human skeletal muscle (HskM) and whether fatty acid oxidation (FAO) is affected. Primary myotubes from vastus lateralis biopsies from lean donors (BMI = 24.0 \pm 0.6 kg/m², N = 6) were exposed to adenovirus encoding human PGC-1 α or GFP control. Peroxisomal biogenesis proteins (Peroxisins) and genes (PEXs) responsible for proliferation and functions were assessed by western blotting and real-time qRT-PCR respectively. 1-14C palmitic acid and 1-14C lignoceric acid (exclusive peroxisomal specific substrate) were used to assess mitochondrial oxidation of peroxisomal derived metabolites. Following overexpression of PGC-1 α , 1) Peroxisomal membrane protein 70kD (PMP70), PEX19, and mitochondrial citrate synthetase protein content were significantly elevated (P < 0.05) 2) PGC-1 α , PMP70, key PEXs, and peroxisomal β -oxidation mRNA expression levels were significantly upregulated (P < 0.05) and 3) A concomitant increase in lignoceric acid oxidation by both peroxisomal and mitochondrial activity was observed (P < 0.05). These novel findings demonstrate that, in addition to the proliferative effect on mitochondria, PGC-1 α can induce peroxisomes and accompanying elevations in long-chain and very-long-chain fatty acid oxidation by a peroxisomal-mitochondrial functional cooperation as observed in HskM cells.

Anti-biofilm Efficacy of Friedelane-based Pentacyclic Triterpenoids in Fighting against Chronic Disease

Yong-Bin Eom¹, Hye-Rim Kim¹, Hae-Won Cho¹, Kyoung-Hee Lim¹, Eun-Ju Ha¹ and Seung-Gyun Woo²

¹Department of Biomedical Laboratory Science, College of Medical Sciences, Soonchunhyang University, Asan 31538, Republic of Korea

²Department of Medical Sciences, College of Medical Sciences, Soonchunhyang University, Asan 31538, Republic of Korea

Abstract

Clinically relevant biofilms have gained interest recently, in part because of the epidemic rise in obesity and an aging population in the medical fields. The persistence of chronic infection is due primarily to an inability to complete the wound healing process owing to the presence of bacterial biofilms. New biofilm-inhibiting strategies are clearly needed which specifically target biofilms as an alternative to the use of antibiotics. The present study was aimed at identifying novel anti-biofilm and/or anti-virulence compounds in friedelane-based pentacyclic triterpenoids present in many edible and medicinal plants. As a result, natural extract compounds were found to both inhibit the biofilm formation of, and to disrupt the preformed biofilms. Additionally, corroborating phenotypic results, transcriptional analyses showed that Celastrol derivatives disturbed the expression of gene related to α -hemolysin (hla) and down-regulated the expressions of the crucial biofilm-associated genes (agrA, sarA, ica, RNA III, and rbf) in MRSA. The findings of this study suggest that friedelane-based pentacyclic triterpenoids have the potential to be candidates for use in controlling biofilm-related chronic infections.

DHL-HisZn, a Novel Antioxidant, Enhances Insulin Sensitivity and Antioxidative Response in Adipose-derived Stem Cells-its Application to Liver Transplantation

Shigeru Goto^{1,3*}, Toshiaki Nakano^{1,4}, Li-Wen Hsu¹, Chia-Yun Lai¹, Takeshi Goto², Naoya Ohmori², Syuji Sato², Masashi Inomata⁵, Seigo Kitano⁵ and Chao-Long Chen¹

¹Liver Transplantation Center, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan

²Josai International University, Faculty of Nursing, Japan

³Fukuoka Institution of Occupational Health, Fukuoka, Japan

⁴Graduate Institute of Clinical Medical Sciences, Chang Gung University College of Medicine, Kaohsiung, Taiwan

⁵Gastroenterological and Pediatric Surgery, Faculty of Medicine, Oita University, Yufu, Oita, Japan

Abstract

Reactive oxygen species (ROS) increased by liver transplantation leads to elevated systemic oxidative stress, resulting in the development of obesity-linked metabolic diseases as well as in insulin resistance and cardiovascular disease risk. This increased ROS levels in hypertrophied adipocytes are accompanied by a decrease in mRNA expression of antioxidant enzymes including glutathione peroxidase, superoxide dismutase (SOD), and catalase (CAT). It was also reported that PPAR γ plays a key role in transcriptional regulation of CAT gene in adipocyte. Here, we investigated the effects of sodium zinc histidine dithiooctanamide (DHL-HisZn), a strong antioxidant, on adipocyte differentiation, cellular antioxidant response, inflammatory cytokine expression and *in vivo* NASH model.

In ASCs, DHL-HisZn enhanced adipocyte differentiation and PPAR γ expression in a dose-dependent manner. DHL-HisZn also increased the relative abundance of insulin-responsive glucose transporter 4 (GLUT4) and adiponectin mRNA. Furthermore, DHL-HisZn upregulated PPAR γ downstream target gene expression. In addition, treatment with DHL-HisZn upregulated mRNA levels of endogenous antioxidants, such as glucose-6-phosphate dehydrogenase (G6PD), superoxide dismutase 2 (SOD2), catalase (CAT) and glutathione reductase (GR). DHL-HisZn treatment enhanced insulin signaling and inhibited NF- κ B activation, which subsequently suppressed inflammatory cytokine IL-6 expression. Recently, we found that DHL-HisZn is effective to prevent steatohepatitis in animal NASH model.

Our results indicate that DHL-HisZn enhances insulin sensitivity in adipocytes by increasing the expression of GLUT4 and IRS-1 via the activation of PPAR γ and improving the antioxidant response during adipogenic differentiation. *In vivo* NASH model, DHL-HisZn prevented steatohepatitis. Therefore, DHL-HisZn may have the capability to reduce insulin resistance and prevent NASH in pre-peri-post liver transplantation surgery.

Total Energy Expenditure Measured by Doubly Labeled Water Vs. Predictive Equations in Class III Obese Women

Michele N. Ravelli^{1*}, Alex H. Crisp¹, Natalie M. Racine², Dale A. Schoeller², Irineu Rasera-Jr³, Vladimir E. Costa⁴ and Maria Rita M. de Oliveira⁵

¹School of Pharmaceutical Sciences of São Paulo State University-UNESP, Brazil

²Biotechnology Center of University of Wisconsin – Madison, USA

³Clinic Bariatric – Gastroenterology Center of Obesity Surgery, Piracicaba-SP/Brazil, Brazil

⁴Stable Isotope Center of São Paulo State University-UNESP, Brazil

⁵Institute of Biosciences of São Paulo State University-UNESP, Brazil

Abstract

Objective: Compare the value of total energy expenditure (TEE) assessed by doubly labeled water (DLW) with seven predictive equations among women waiting for bariatric surgery.

Methods: Twenty obese (BMI > 40 < 45 kg/m²; age 29 ± 5 years) women from Brazil participated in this study. The predictive equations used to estimate TEE were Dietary Reference Intakes (DRI), and multiples of resting EE from World Health Organization (WHO), Oxford, Oxford with weight and height, Harris-Benedict, Mifflin and Horrie-Waitzberg & Gonzales. Physical activity level was estimated by self-report diaries from three non-consecutive days. To measure TEE, a fixed dose of DLW with deuterium and oxygen-18 was provided, and urine samples were collected at baseline and daily for 14 days. The samples were analyzed by isotope-ratio mass spectrometry. The accuracy of the equations was evaluated by mean percentage difference (bias), root mean squared prediction error (RMSE), concordance correlation coefficient (CCC) and the percentage of subjects predicted between 10% of the TEE measured by DLW.

Results: All the equations with self-report physical activities over-predicted TEE compared to measured TEE by DLW. The DRI equation provided higher accuracy (bias +14%; RMSE 466 kcal/day; CCC 0.405; individual accurate prediction 40%) and WHO equation provided the lowest accuracy (bias +63%; RMSE 863 kcal/day; CCC 0.315; individual accurate prediction 15%).

Conclusion: The predictive equation of DRI was the most suitable for estimation of TEE in clinical practice.

The Influence of Bariatric Surgery on Body Composition and Total Energy Expenditure: Doubly Labeled Water Study

Michele N. Ravelli^{1*}, Alex H. Crisp¹, Natalie M. Racine², Dale A. Schoeller², Irineu Rasera-Jr³, Vladimir E. Costa⁴ and Maria Rita M. de Oliveira⁵

¹School of Pharmaceutical Sciences of São Paulo State University-UNESP, Brazil

²Biotechnology Center of University of Wisconsin – Madison, USA

³Clinic Bariatric – Gastroenterology Center of Obesity Surgery, Piracicaba-SP/Brazil

⁴Stable Isotope Center of São Paulo State University-UNESP, Brazil

⁵Institute Of Biosciences of São Paulo State University-UNESP, Brazil

Abstract

Objective: Investigate the influence of Roux-en-Y gastric bypass (RYGB) surgery on changes in body composition and total energy expenditure (TEE).

Methods: Twenty obese (BMI > 40 < 45 kg/m²; age 29 ± 5 years) women from Brazil participated in this study. To measure the TEE and body composition (Fat Free Mass [FFM] and Fat Mass [FM]), a fixed dose of doubly labeled water (DLW) was provided. Urine samples were collected at baseline and daily for 14 days. TEE was measured at pre-surgery, 6 and 12 months post-surgery. The results of DLW analysis were used to determine TEE, FFM and FM in each period. The comparisons between the variables were tested by ANOVA followed by TUKEY post hoc test. The interaction between study variables, using TEE change from pre-surgery as the dependent variable, was assessed by linear regression analysis.

Results: A significant weight loss was evident during the post-surgery period (-31 ± 5 kg at 6 months and -37 ± 7 kg at 12 months). TEE reduced significantly from 2930 ± 524 kcal/day at pre-surgery to 2319 ± 430 kcal/day and 2538 ± 336 kcal/day at 6 months and 12 months post-surgery, respectively. Regression analyses suggested that body weight changes ($\beta = 56.1$; $r^2 = 0.29$; $p = 0.02$) and FM changes ($\beta = 61.9$; $r^2 = 0.28$; $p = 0.02$) correlated with TEE changes at 12 months post-surgery. No

significant association was observed between TEE changes and body composition changes at 6 months post-surgery.

Conclusion: TEE was reduced post-surgically, but body weight and FM changes were correlated with reduction in TEE post only at 12 months after RYGB surgery.

Regulation of Lipid Metabolism by Leptin through SUMO Specific Protease 2 (SEN2) in Skeletal Muscle

Sung Soo Chung¹, Young Do Koo¹, Ji Sun Lee¹, Kwang Yong Park² and Kyong Soo Park¹

¹Department of Internal Medicine, Seoul National University Hospital, Seoul, Korea

²Department of Chemical Engineering and Material Science, Chung-Ang University, Seoul, Korea

Abstract

Leptin, a hormone secreted from adipocytes, regulates energy metabolism mainly through decreasing appetite by its actions in the hypothalamus. Leptin, however, also directly increases energy expenditure in peripheral tissues such as skeletal muscle. Leptin increases fatty acid oxidation acutely by activating AMPK in skeletal muscle. In addition, it has been reported that chronic leptin treatment increases FAO in myotubes, which is related to the increase in the expression of FAO-related enzymes such as CPT1b and MCAD. We have reported that SUMO specific protease 2 (SEN2) increases FAO-related enzyme expression through desumoylation and subsequent activation of PPARs in muscle. In this study, we showed that leptin increases SEN2 transcription through the leptin receptor/STAT3 signaling pathway in C2C12 myotubes and mouse soleus muscle. Knockdown of SEN2 significantly suppressed expression of the FAO-related enzymes and the delayed effect of leptin on FAO in myotubes, but did not inhibit the acute increase of FAO by leptin. These results suggest that SEN2 plays an important role in an axis of lipid metabolism regulation by leptin in skeletal muscle.

Efficacy of Healthy Weight Management Program for Low Income Overweight Thai Children

Mayurachat Kanyamee^{*} and Penprapa Suthamma

Faculty of Nursing, Srinakharinwirot University, Bangkok, Thailand

Abstract

This experimental pretest-posttest control group design aimed to examine the effects of healthy weight management program among low income overweight Thai children. Overweight children in Nakornnayok province were randomized to experimental 40 children and control 40 children. The experimental group received the intervention which based on Theory of Planned Behavior (TPB). This group was promoted with healthy food such as vegetables and fruits for 12 weeks. The control group received the school's usual educational program. Data were collected via three questionnaires including: demographic characteristics; intention to perform eating behavior and eating behaviors at baseline and twelve week after baseline. Analyzed of the data included the use of: descriptive statistic and One-way repeated measure MANOVA.

Results demonstrated significant reduction of BMI for age and increasing vegetables and fruits consumption. Moreover, the result revealed the significant differences between the experimental and control group, regarding: intention to perform eating behavior, eating behavior, and nutritional status at twelve week after baseline. The findings suggest this intervention, based on TPB, appears to be effective to improve intention, eating behavior, and nutritional status among low income overweight Thai children. Community nurse in primary health care should hold activities to promote healthy eating behavior such as vegetable and fruit consumption in this group of children.

Insulin Resistance and Mitochondrial Dysfunction Induced by High-fat Diet is Partially Prevented by n-3 Polyunsaturated Fatty Acid Supplementation

Sandro M. Hirabara¹, Amanda R. Martins², Laureane N. Masi¹, Cátia L. Amaral³, Amanda R. Crisma², Bruno G. Teodoro², André L. Queiroz², Diogo A. A. Vasconcelos⁴, Gabriel N. Marzuca-Nassar^{5,6}, Lucas H. M. Bomfim⁷, Leonardo R. Silveira^{2,7}, Renata Gorjão¹ and Rui Curi^{1,2}

¹Cruzeiro do Sul University, Brazil

²University of Sao Paulo, Brazil

³State University of Goias, Brazil

⁴University of Cambridge, Cambridge, United Kingdom

⁵Maastricht University, Maastricht, Netherlands

⁶University of La Frontera, Chile

⁷State University of Campinas, Brazil

Abstract

Effect of fish oil (FO), rich in n-3 PUFAs, on mitochondrial function in skeletal muscle from mice fed a high-fat diet was investigated. C57Bl/6 male mice, aged 8 weeks, were divided into four groups: control (C), supplemented with FO (FO), high-fat diet (H), and H supplemented with FO (HFO). Mice were supplemented with FO by gavage (2 g per kg body weight, three times per week), during 12 weeks. High-fat diet was administered in the last 8 weeks. At the end, the following determinations were analysed in skeletal muscle: a) basal and insulin-stimulated glucose metabolism and Akt phosphorylation; b) mitochondrial function; c) lipid and glycogen accumulation; and d) expression of genes involved in mitochondrial function. Mice fed a high-fat diet (H group Vs C group) presented impaired insulin sensitivity (reduced ITT by 35% ($p < 0.01$) and muscle insulin-stimulated glucose metabolism by 31% ($p < 0.01$) and Akt phosphorylation by 30% ($p < 0.05$), mitochondrial dysfunction (decreased mitochondrial respiration by 41% ($p < 0.05$), ICAT content ($p < 0.05$), and gene expression associated with mitochondrial function and biogenesis ($p < 0.05$), increased hydrogen peroxide by 44% ($p < 0.5$), and no alteration in lipid and glycogen accumulation. These effects were partially attenuated by FO supplementation (HFO group vs H group). This intervention elevated muscle oxygen consumption by 76% ($p < 0.001$), ICAT content ($p < 0.01$), insulin-stimulated glucose metabolism by 36% ($p < 0.05$) and Akt phosphorylation by 33% ($p < 0.01$), and mRNA expression of PGC1 α , PPAR α , CPT1, and catalase ($p < 0.05$), as well as reduced muscle hydrogen peroxide production by 47% ($p < 0.001$). In conclusion, fish oil supplementation prevents, at least in part, the insulin resistance associated with obesity induced by high-fat diet in association with improved mitochondrial function in skeletal muscle.

Financial Support: CAPES, FAPESP, CNPq, INCT/INOD, Guggenheim Foundation, PRPGP/Cruzeiro do Sul University, and PRP/University of Sao Paulo.

Obesity, Protein Energy Wasting and Dietary Intake in Chronic Hemodialysis Patients

Mona Boaz^{1,2*} and Talia Weinstein^{3,4}

¹Department of Nutrition Sciences, Ariel University, Israel

²Epidemiology and Research Unit, E. Wolfson Medical Center, Israel

³Department of Nephrology, Tel Aviv Sourasky Medical Center, Israel

⁴Sackler Faculty of Medicine, Tel Aviv University, Israel

Abstract

Background: Protein energy wasting (PEW) is associated is a frequent finding in end stage renal disease patients on chronic hemodialysis (HD). The present study was designed to examine whether overweight/obesity is associated with PEW in HD patients.

Methods: Conducted in a subset of Status of Nutrition in Hemodialysis Patients Survey (SNIPS) participants, the present report estimates PEW prevalence, nutrient intake and proportion of participants compliant with international nutrition guidelines for HD patients. PEW was defined as the presence of at least one of the following: 1) serum albumin < 3.8 g/L; ideal body weight $< 90\%$; Nutrition Risk Screen 2002 score ≥ 3 . Dietary intake was estimated using a 24 hour recall.

Results: Patients were categorized by BMI: underweight (BMI < 18.5 kg/m², n = 3); normal weight (BMI 18.5- < 25 kg/m², n = 53); overweight (BMI 25-30 kg/m², n = 49); and obese (BMI > 30 kg/m², n = 35). PEW was marginally more prevalent among underweight (100%) and normal weight (71.7%) compared to overweight (51.0%) or obese (57.1%) subjects, $p = 0.08$. Differences in dietary intake measures or the proportion of patients meeting each of the international dietary guidelines were not identified across BMI categories. Differences in dietary intake or proportion of subjects meeting guidelines for nutrition intake were not detected between patients with vs. without PEW and were low in the entire study population.

Discussion: While PEW was less prevalent among overweight/obese patients than others, it was nevertheless a frequent finding ($> 50\%$ in all BMI categories). Dietary intake was poor across BMI categories. Overweight and obesity are not associated with increased dietary intake in this population.

Obesity in Preadolescent Children with EEG Signs of Functional Immaturity of Nonspecific Arousal Brainstem System Aggravates the Deterioration of Cognitive Outcomes

Gaukhar Datkhabayeva^{1*}, Akkumis Salkhanova¹, Maikul Kainarbayeva², Ainur Sadykova³, Balzhan Razuyeva¹, Guldana Dauletbakova¹, Aidana Malikova¹, Bakhitkul Kilibayeva¹ and Aliya Bidauletova⁴

¹Kazakh Academy of Nutrition, Kazakhstan

²Asfendiyaron Kazakh National Medical University, Kazakhstan

³Al-Farabi Kazakh National University, Kazakhstan

⁴Kazakh Medical University of Continuous Education, Kazakhstan

Abstract

Bilateral hypersynchronous alpha rhythm and/or group of sharp waves of theta band at the caudal zones on EEG is considered as a sign of functional immaturity of the nonspecific arousal system (INAS) and can occur at 9-10 years old children's EEG as an age norm but rarer than at earlier age ones. We hypothesized that INAS obese children have lower cognitive outcomes in compare to normal-weight INAS subjects due to negative influence of obesity. 48 9-10 years old children with obesity and 49 matched lean ones, all without history of head trauma and neurological disorders passed through battery of computer based (attention concentration, selectiveness and span, mental flexibility, accuracy of 2D visual objects size detection, working memory, reaction time) and manual (WISC and Cheremoshkina's memory test) tests and examination of functional brain status by means of EEG. Tests score and school performance of obese INAS children (21 ones) were compared to those of non-INAS 27 ones. The same was carried out for lean counterparts (30/19). The comparison between obese INAS children and lean INAS ones as well as between non-INAS children were fulfilled as well. Lean INAS children had lower attention concentration score than non-INAS counterparts whereas obese INAS children had lower score of attention concentration, flexibility, visual accuracy, verbal and general IQ than non-INAS counterparts. Non-INAS excessive weight children had lower score of school performance and cultural memory than normal-weight non-INAS ones. INAS obese children had lower score of reaction time, flexibility and visual accuracy than lean INAS subjects.

Citation: Proceedings of the 2nd International Conference on Obesity and Chronic Diseases (ICOCD-2017). *J Obes Chronic Dis* 1(Suppl 2): S1-S49.

Copyright: This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY) (<http://creativecommons.org/licenses/by/4.0/>) which permits commercial use, including reproduction, adaptation, and distribution of the article provided the original author and source are credited. Published by United Scientific Group.

Received: September 07, 2017 Accepted: September 21, 2017 Published: September 25, 2017