Poster Board 1

Cancer - Metabolic Pathways and Signaling

## REPROGRAMMING CANCER CELL METABOLISM, REVERSING ONCOGENIC PROPERTIES AND INDUCING DIFFERENTIATION IN GLIOBLASTOMA

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Glioblastoma (GBM) is an aggressive brain cancer with high rates of relapse and mortality, mutational diversity and poor treatment options. Like many cancers, GBM cells acquire oncogenic properties, including metabolic reprograming, vital for growth. As such, tumour metabolism is an emerging avenue for cancer therapy. One relevant target is the voltage-dependent anion channel 1 (VDAC1), a mitochondrial protein found at the crossroads of metabolic and survival pathways.

VDAC1 mediates the metabolic cross-talk between mitochondria and the cytosol, transporting metabolites, ions, nucleotides, $Ca^{2+}$ and more, regulating mitochondrial activity. VDAC1 also plays a key role in apoptosis, participating in the release of apoptotic factors from mitochondria and interacting with anti-apoptotic regulators. VDAC1 is highly expressed in different tumours, including astrocytic tumours, pointing to its significance in high energy-demanding cancer cells. Here, we used VDAC1-specific siRNA (si-VDAC1) to treat GBM cell lines and subcutaneous or intracranial-orthotopic GBM xenograft mouse models. Silencing VDAC1 expression using si-VDAC1 in eight cell line, including patient-derived cells, led to marked decreases in VDAC1 levels and cell growth. Using si-VDAC1 in subcutaneous or intracranial-orthotopic GBM models inhibited tumour growth and reversed oncogenic properties, such as reprogramed metabolism, stemness, angiogenesis, epithelial-mesenchymal transition and invasiveness, and induced differentiation into astrocyte- and neuron-like cells. These VDAC1 depletion-mediated effects involved alterations in transcription factors regulating signaling pathways associated with cancer hallmarks. VDAC1 thus offers a target for GBM treatment via attacks on the interplay between metabolism and oncogenic signaling networks, leading to tumour cell differentiation, thereby preventing tumour invasion and relapse. Simultaneously attacking all of these processes, VDAC1 depletion can replace several anti-cancer drugs separately targeting angiogenesis, proliferation or metabolism. Such treatment overcomes GBM heterogeneity and recurrence, offering an innovative and potent therapeutic strategy.

Poster Board 2

Cancer - Evaluation of Current and Novel Candidate Interventions (Nutritional, Pharmacologic, Life Style)

**TARGETING CELLULAR GLUCOSE TRANSPORT TO LIMIT GLYCOLYSIS IN CANCER CELLS - A MOLECULAR APPROACH**

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Background

A variety of small molecules inhibit passive sugar transport in human erythrocytes and cancer cell lines and, by limiting glycolysis, inhibit tumor growth in mice.

Objective

This study explores how these molecules inhibit the erythrocyte sugar transporter GLUT1 and examines the transporter isoform-specificity of inhibition. Inhibitors can act on glucose transport in one of 5 ways: 1) by interacting at the exofacial or endofacial substrate binding sites; 2) by interacting at the transporter's nucleotide binding site; 3) by interacting at other, as yet unknown binding sites; 4) by altering GLUT1 trafficking to or from the cell membrane; 5) by interfering with GLUT1 expression or folding.

Methods

We show how to distinguish these small molecule effects using the relatively simple experimental models of human erythrocytes, HEK292 cells and murine immortalized, cerebral microvessel endothelial cells and provide examples of each.

Results & Conclusion

We demonstrate that these studies not only give rise to the development of more potent anti-cancer drugs, they show how targeting specific glucose transporter isoforms can reduce off-target effects and reveal important new insights into the structure and mechanisms of glucose transporters.

Poster Board 3

Cancer - Clinical studies

## IMPACT OF BODY MASS INDEX ON PROGNOSIS IN WOMEN WITH BREAST CANCER

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Background: Many studies have shown that body mass index (BMI) is correlated with risk of recurrence in breast cancer in Western countries. The prevalence of obesity is relatively low in Japan and there are few studies about the prognostic importance of BMI in Japanese women with breast cancer. The aim of this study was to examine the relationship between BMI at diagnosis and clinical outcome in women with invasive breast cancer.

Patients and methods: 1130 women with stage I-III breast cancer treated from 2003 to 2014 at Fujita Health University hospital were analyzed. BMI was divided into 4 categories as follows: underweight (BMI  18.5 Kg/m$^2$), normal weigh (BMI 18.5–24.9 Kg/m$^2$), overweight (BMI 25–29.9 Kg/m$^2$), and obese (BMI ≥ 30 Kg/m$^2$). Distant disease-free survival (DDFS) curves and overall survival (OS) curves were generated using the Kaplan-Meier method and survival comparisons were performed using the log-rank test. The chi- square test was used to examine differences with categorical variables.

Results: Of these 1130 patients, 10.9% (n=123) were underweight, 68.2% (n=771) were normal weigh, 17.2% (n=194) were overweight, and 3.7% (n=42) were obese. No correlation was found between BMI and stage, pathological lymph node status, hormone receptor status, Ki67 labeling index, and histological grade. BMI at diagnosis did not affect the risk of distant recurrence and death.

Conclusions: In our study the incidence of obesity is lower than that in Western countries and prognostic significance of BMI at diagnosis was not observed in terms of DDFS and OS. Our study was a retrospective analysis of a limited patient group. A larger cohort study in Japanese women might provide additional data in terms of outcome.

Poster Board 4

Diabetes - Metabolic Pathway and Signaling

## PYROPHOSPHATASE 1 (Ppa1) A POSSIBLE NOVEL REGULATOR OF ADIPOGENESIS

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**Introduction.** In the past decades research in treatment of obesity has become a center point, due to the fact that increasing numbers of people all over the world suffer from this disease which is rich in complications. C-Jun N-terminal kinase (JNK), a member of mitogen activated protein kinase (MAPK) family, is one of the involved kinases in obesity development, based on adipocyte hypertrophy and hyperplasia. Pyrophosphatase 1 (Ppa1), a high expressed gene in our transcriptomic data sets, is described to act as a dephosphorylation kinase and an inactivator of JNK pathway in mouse neuroblastoma cells. Now it is obvious to examine that Ppa1 might also influence the phosphorylation state of JNK in adipogenesis.

**Methods.** Cell culture of 3T3-L1 pre-adipocytes was observed for of cell growth and differentiation. Conditional knock down via siRNA transfection by electroporation was conducted to show differences in development without Ppa1 expression. Furthermore the cells were used in qPCR, Western Blot and Oil Red O staining to statistically examine the role of Ppa1 in adipogenesis.

**Results.** Our study showed, that Ppa1 is highly expressed in the final states of adipogenesis. Furthermore the conditional knock down of Ppa1 leads to enhanced adipogenesis of 3T3-L1 pre-adipocytes via potential innervation in JNK phosphorylation, which is activated in obesity by different types of intracellular stresses like obesity-induced inflammation.

**Conclusion.** Ppa1 is involved in adipogenesis, due to complete the role of Ppa1 in adipogenesis and further in the epidemic obesity future studies are necessary.

Poster Board 5

Diabetes - Metabolic Pathway and Signaling

### *SARCOPOTERIUM SPINOSUM*: AN ANTIDIABETIC MEDICINAL PLANT WITH A NOVEL MECHANISM OF ACTION

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Background: Our previous studies demonstrated that *Sarcopoterium spinosum (S.spinosum)*, a medicinal herb used by Bedouin traditional medicine, increased glucose uptake to myotubes, adipocytes and hepatocytes.

Objective: To clarify the mechanisms of action mediating the effects of *S.spinosum* on glucose uptake.

Methods: Experiments were performed using differentiated 3T3-L1 adipocytes and L6 myotubes treated by *S.spinosum* extract (70 μg/ml).

Results: Bioinformatic analysis of Phosphoproteomics of serine/threonine residues phosphorylated by *S.spinosum* predicts the activation of insulin-receptor pathway. However, *S.spinosum* facilitates glucose uptake by a different mechanism from that induced by either insulin or metformin; *S.spinosum* increased glucose uptake through a mechanism involving Glut4 translocation, independent of AMPK or PI3K. Akt activation is required to induce *S.spinosum*-dependent glucose uptake, however its mechanism of activation is still unclear; while neither ser473 nor thr308 were phosphorylated by *S.spinosum*, translocation of Akt from cytoplasm to membrane or nucleus was detected. In addition, substrates of Akt were phosphorylated by the extract.

The hypothesis that *S.spinosum* utilizes a different set of proteins to induce glucose uptake was supported by results demonstrating that differentiating adipocytes respond differently to insulin or *S.spinosum*; while insulin enhanced glucose uptake from the 11th day of differentiation, *S.spinosum* increased glucose uptake from the 8th day of differentiation. In addition, *S.spinosum* and insulin had an additive effect on glucose uptake in differentiated adipocytes.

Conclusions: Active ingredients in *S.spinosum* activate insulin signaling by a unique mechanism. Clarifying this mechanism of action may lead to the development of new agents for the treatment of diabetes.

Poster Board 6

Diabetes - Animal Model Studies

**SARCOPOTERIUM SPINOSUM IMPROVED INSULIN SENSITIVITY IN MICE MODELS OF GLUCOSE INTOLERANCE AND DIABETES**

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Background: The glucose lowering properties of *Sarcopoterium spinosum*, a traditional medicinal plant, were previously validated by us, using KK-Ay mice as a genetic model for type 2 diabetes (T2D).

Objective: To clarify the effects of *Sarcopoterium spinosum* extract (SSE) on diet-induced glucose intolerance and on carbohydrate and lipid metabolism in target tissues of two insulin-resistant mice models.

Methods: 6 weeks old KK-Ay and HFD-fed mice were given SSE (70 mg/day) for 6 weeks.

Results: SSE improved glucose tolerance and insulin sensitivity in high-fat-diet (HFD)-fed mice as was demonstrated before in the genetic model. Higher insulin sensitivity was validated by lower serum insulin, improved insulin tolerance and activation of insulin signaling cascade in skeletal muscle and liver of SSE-treated mice in both models.

Beside these similarities between models, there were several model-specific effects of SSE;

Hepatic mRNA expression of PEPCK, a gluconeogenic gene, was reduced in SSE-treated KK-Ay mice. Triglyceride accumulation was lower and mRNA expression of proinflammatory genes and CD36 was reduced.

HFD-fed mice treated by SSE had an elevated hepatic glycogen stores. Gluconeogenic gene expression was not affected, while GCK expression was increased. HFD-induced hepatic steatosis was not affected by SSE. However, while genes involved in hepatic lipid metabolism were downregulated by HFD, this was not found in HFD-fed mice given SSE, demonstrating an expression profile which is similar to that of standard diet-fed mice.

Conclusion: Our study supports the insulin sensitizing activity of SSE and suggests that this extract might improve additional manifestation of the metabolic syndrome.

Diabetes - Animal Model Studies

## ISLET CELL REORGANISATIONS DURING BETA CELL MASS RECOVERY IN PDL MODEL OF STZ-DIABETIC RATS

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Streptozotocin (STZ) administration alone is often used to mimic type 1 diabetes mellitus in animals – it selectively destroys beta cells. But, the remodelling of the endocrine component of the pancreas occurs as a response. However, remodelling of islets in normal pancreas by replication or neogenesis from non-beta cells has been reported in model of duct ligation pancreas (PDL).  In this study, we compared islet remodelling in STZ-induced diabetes alone (DC) with STZ-induced diabetes in combination with PDL (EX) for 30 days. Islet cell composition and architecture in both portions of the pancreas – the splenic (P1) and duodenal (P2) portions of the pancreas – were established using quantitative image analysis. Serial sections obtained from the pancreata were stained for insulin, glucagon, somatostatin and pancreatic polypeptide. The insulin geometric mean (GM) and islet cells distribution were also determined. Results show that the GM was very low in both the DC- and the EX groups. The P1 portion of the pancreas in EX animals had a significant decreased beta and delta cell fractions. While there were significant increases in the PP cell and alpha cell fractions in the P2 portion, with a highly significant decrease in the beta cell fraction. Apart from this, PDL did not restore body weight or normoglycemia in the animals. We conclude that in STZ-induced diabetic rats treated with PDL, there is a disruption in the islet composition and architecture despite a recovery in its morphology.

Poster Board 8

Diabetes - Animal Model Studies

## DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF NOVEL AND SELECTIVE SGLT2 INHIBITORS FOR THE TREATMENT OF TYPE 2 DIABETES

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Diabetes mellitus is a progressive metabolic disease characterized by chronic hyperglycemia due to a decrease of insulin secretion from the pancreas and insulin resistance. Selective SGLT2 inhibition is a glucose-dependent and insulin-independent mechanism that is associated with loss weight; it has emerged as a very promising approach to the pathophysiologic treatment of type 2 diabetes.[1] Herein, we report our efforts towards the design, synthesis, and biological evaluation of the *O*-spiroketal *C*-arylglucosides SGLT2 inhibitors.

The *in vitro* cell-based SGLT2 AMG (methyl-$\alpha$-*D*-glucopyranoside) inhibition assay was subjected to evaluate the inhibitory effects of all 31 synthesized compounds on hSGLT2 activities. Among them, compounds **8t**, **8u**, and **8w** showed excellent in vitro inhibitory activities against hSGLT2 (**8t**, $IC_{50}$ = 3.6 nM, **8u**, $IC_{50}$ = 4.5 nM, and **8w**, $IC_{50}$ = 1.4 nM), and good selectivities against hSGLT1. After single dose (1 mg/kg) administration on SD rats of compounds **8u** and **8w**, the results indicated that **8u** and **8w** treatment obviously increased urine glucose excretion (UGE) by 134 mg/24 h and 166 mg/24 h per 100 g, respectively (Fig. 1). Further work concerning optimization of SGLT2 inhibitors is ongoing.

Poster Board 9

Diabetes - Clinical Studies

**EIGHT WEEKS OF EXERCISE TRAINING RESTORES METABOLIC DEFECTS IN NORMOGLYCEMIC HISPANIC MEN WITH A FAMILY HISTORY OF TYPE 2 DIABETES**

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**Background:** El Paso, TX, located on the US-Mexico border (population 844,769; 81% Hispanic) is characterized 67% adults being overweight/obese, 12% with diabetes 23.7% child food insecurity rate and physical inactivity.
**Objective**: To (i) determine if sedentary, normoglycemic, healthy, Mexican-American males with (FH+) and without (FH-) a family history of type 2 diabetes improve glucose tolerance and glucose profiles after a combined (aerobic and resistance) exercise intervention and (ii) examine the barriers related to translating these findings to public health intervention design in high-risk Hispanic US- Mexico border communities.

**Methods**: Age and BMI matched FH- (n=8) and FH+ (n=7) participants, underwent 8 weeks of combined exercise training (3x/week). Fasting blood samples were collected and oral glucose tolerance test (OGTT) was conducted before and after the exercise training intervention. All participants were provided with 5 days of standard diet before test days.

**Results**: Baseline fasting glucose was similar between groups. Participants with FH+ had a significantly lower glucose tolerance (p0.05) and tended to have higher fasting insulin (p=0.05) compared to FH- at baseline. Impairments in fasting insulin (FH- 9.4±1.0 to 10.4±1.4 uIU/mL, p=0.63; FH+ 14.1±2.4 to 10.6±1.7 uIU/mL, p0.05) and glucose tolerance (FH- 354.6±18.8 to 382.4±6.3 AU, p=0.49; FH+ 405.3±8.73 to 365.17±19.64 AU, p=.0.12) were restored in FH+ after 8 weeks of exercise training.

**Conclusion and implications**: Exercise seems to mitigate risk despite familial risk of diabetes by positively impacting glucose tolerance and fasting insulin. However, in low-income, low-access US-MX border communities characterized by food deserts and suboptimal built environments, translating such evidence to community-wide intervention design poses unique barriers. The authors examine the social determinants of health, structural violence, cultural norms, and transborder mobility in relation to translating the evidence in the above study to effective public health approaches for addressing obesity and diabetes in minority communities globally.

Neurodegeneration - Methods to Enhance Translation of Animal Results

## PROTECTION AGAINST RAGE-MEDIATED NEURONAL CELL DEATH BY sRAGE SECRETING HUMAN MESENCHYMAL STEM CELLS IN 5XFAD TRANSGENIC MOUSE MODEL

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Alzheimer`s disease (AD), which is the most commonly encountered neurodegenerative disease, causes synaptic dysfunction and neuronal loss due to various pathological processes that include tau abnormality and amyloid beta (Aβ) accumulation. Aβ stimulates the secretion and the synthesis of Receptor for Advanced Glycation End products (RAGE) ligand by activating microglial cells, and has been reported to cause neuronal cell death in amyloid beta1-42 treated rats and in mice with neurotoxin-induced Parkinson`s disease. The soluble form of RAGE (sRAGE) is known to reduce inflammation, and to decrease microglial cell activation and Aβ deposition, and thus, it protects from neuronal cell death in AD. However, sRAGE protein has too a short half-life for therapeutic purposes. We developed sRAGE-secreting umbilical cord derived mesenchymal stem cells (sRAGE-MSCs) to enhance the inhibitory effects of sRAGE on Aβ deposition and to reduce the secretion and synthesis of RAGE ligands in 5xFAD mice. In addition, these cells improved the viability of injected MSCs, and enhanced the protective effects of sRAGE by inhibiting the binding of RAGE and RAGE ligands in 5xFAD mice. These findings suggest sRAGE protein from sRAGE-MSCs has better protection against neuronal cell death than sRAGE protein or single MSC treatment by inhibiting the RAGE cell death cascade and RAGE induce inflammation.

Metabesity — General Approaches and Tools

## BIOCHEMICAL PARAMETERS CHANGES IN PATIENTS SUBMITTED TO BARIATRIC SURGERY

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**Background:** According to the World Health Organization obesity it`s a result of an abnormal or excessive body fat accumulation, which presents a high risk for the health. Bariatric surgery appears as an alternative to the conventional treatment for the morbid obese individuals. However, this type of intervention causes changes in the anatomy and physiology of the gastrointestinal tract, which may lead to the development of nutritional deficiencies in patients. **Objective:** To evaluate micronutrient deficiencies in patients submitted to bariatric surgery in preoperative and postoperative periods. **Methods:** In this longitudinal study, we evaluated, retrospectively and prospectively, patients who attended the nutrition consultation at Centro Hospitalar São João. We completed preexisting database containing anthropometric and biochemical data, adding biochemical data, at various periods: pre and post-surgery 6th, 12th, 18th, 24th, 30th and 36 months. Results: from the 12 patients submitted to bariatric surgery, 79,3% were female. The most prevalent deficiencies were vitamin D, magnesium and zinc. There was more than 85% adhesion to take the multivitamin supplementation and frequent use of specific supplementation.
**Conclusion:** The prevalence of nutritional deficiencies is high, with a tendency to persist over time even with use of multivitamin supplementation, leading to the need for complementary supplementation. Hence, periodic and long term monitoring is fundamental. Future studies are needed, with long follow-up times, to clarify the clinical impact of deficiencies.

Poster Board 12

Metabesity — General Approaches and Tools

### EVALUATION OF SEGMENTAL BODY COMPOSITION IN OBESE PATIENTS SUBMITTED TO BARIATRIC SURGERY

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**Background:** Obesity is an important public health issue. Bariatric surgery appeared to aid the treatment of this chronic disease. Body composition assessment plays an important role in the evaluation of the nutritional status of patients submitted to bariatric surgery. However, changes in the segmental body composition of these patients are not fully understood.

**Objective:** To assess the segmental body composition of obese patients submitted to bariatric surgery and to study their evolution along the time.

**Methods:** In this retrospective study, we studied patients who attended Nutrition appointments at Centro Hospitalar de São João, E.P.E., throughout 36 months. We performed anthropometric evaluation and body composition analysis by bioelectrical impedance

**Results:** The sample consisted of 170 patients, 71.8% females and 28.2% males, with a mean age 39 years. Between the initial to the evaluation 36 months after surgery, there was a decrease in BMI from 43.9 kg/m² to 30.5 kg/m² (p 0.001), a decrease of 15.2% in the percentage of body fat (p = 0.002) and a decrease in the waist-to-height ratio to 0.572 (p0.001). Regarding the percentage of segmental fat mass, there was a significant decrease in all segments up to the 12th month after surgery. However, in the last months of follow-up, there was increases all these indicators.

**Conclusion:** Our results showed a greater decrease in the percentage of body fat in the arms when compared with the other body segments.

Poster Board 13

Metabesity — General Approaches and Tools

### EVOLUTION OF BODY COMPOSITION OF OBESE PATIENTS UNDERGOING BARIATRIC SURGERY

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**Introduction:** Bariatric surgery is increasingly common in the fight against morbid obesity. However, the success of maintaining weight loss after this intervention, as well as how the body composition changes, are not fully understood. **Objective:** To study body composition of obese patients undergoing bariatric surgery and verify their evolution after surgery. **Methods:** In this retrospective and prospective study, patients who attended nutritional appointments at Centro Hospitalar São João E.P.E., where they underwent anthropometric evaluation, body composition assessment and personal data collection were evaluated for 60 months. **Results:** The sample consisted of 793 patients, of which 86.5% were female and 13.5% were male, with a mean age of 43 years (SD = 10.5 years) and mean height of 1.62m (SD = 0.079m). Patients undergoing gastric band, sleeve gastrectomy and gastric bypass had a BMI reduction of 6.3 kg/m2, 13.2 kg/m2 and 15.4 kg/m2 and a fat mass of 4.4%, 14.3% and 17.3%. On the other hand, they had an increase of 3.2%, 10.8% and 12.4% of water, 1.4%, 3.9% and 4.6% of fat and water-free mass, and 1.9%, 7.3% and 8.9% of skeletal muscle mass, respectively. BMI and fat mass% on average had a large decrease in the first 12 months, increasing slightly from 24 months onwards. The water%, fat and water-free mass% and skeletal muscle mass% happened the opposite. **Conclusions:** Bariatric surgery initially allows a substantial decrease in BMI as well as beneficial changes in the overall body composition of the individuals. Gastric bypass was the method that caused the most changes, followed by sleeve gastrectomy and, finally, gastric band. In the last months of follow-up, regardless of the surgery, there was a regression of the different variables demonstrating that these values are not always maintained.

**Key-words:** Body composition; obesity; bariatric surgery; gastric bypass; sleeve gastrectomy; gastric band

Poster Board 14

Metabesity — Biomarkers and Imaging

## PLASMA PENTRAXIN-3 LEVELS IN PREMENOPAUSAL OBESE WOMEN

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**Background:** Pentraxin 3 (PTX3) is produced in macrophages, endothelial cells, and adipocytes in response to inflammatory stimuli, whereas hepatocytes are the main source of CRP. Because obesity and metabolic syndrome (MetS) are considered chronic inflammatory states, PTX3 might be involved in the pathogenesis of obesity and MetS as well as CRP.

**Objective:** In this study, we aimed to investigate the relationships between PTX3, CRP, body fat distribution and carotis intima media thickness.

**Methods:** Anthropometric measurements including waist circumferences (WC) were obtained in 86 obese and 56 non-obese premenopausal women (aged 17-55 years). Plasma fasting glucose, insulin, Pentraxin 3 and CRP levels were measured. HOMA-R is also calculated to determine insulin resistance. Body fat distribution was evaluated by ultrasonography. Body fat thickness in four regions were measured. Total fat and fat ratio were also measured by Bioelectrical Impedance Analysis (BIA).

**Results:** PTX3 was similar in both groups. PTX3 was also similar in obese patients with or without insulin resistance. CRP is significantly higher in obese patients ($p$ 0.01). It was also significantly higher in insulin resistance obese patients ($p$ 0.01). There was not any correlation between BMI and the inflammatory markers. Multiple regression analysis showed that PTX3 is positively correlated with WC (p=0,036, beta=+0,436) and negatively correlated with SCF (p=0,011, beta=-0,310).

**Conclusion:** Although PTX3 levels were not higher in obese patients and has no correlation with visceral fat, it is correlated with WC. In premenopausal obese women PTX3 levels were not related to subclinical atherosclerosis measured by CIMT.

Metabesity — Biomarkers and Imaging

## QUANTIFICATION OF SUBCUTANEOUS AND VISCERAL ADIPOSE TISSUE IN ABDOMINAL CT AND ITS RELATION TO RENAL FUNCTION AND VARIOUS METABOLIC PARAMETERS

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### Background:

Increased adipose tissue is the primary phenotypic characteristic of obesity. The amount and distribution of adipose tissue is associated with many adverse consequences, such as hypertension, type 2 diabetes etc. Abdominal CT with semi-automated software can quantify adipose tissue and predict the risk for metabolic diseases.

### Objective:

To determine the association of CT quantified visceral (VAT) and subcutaneous adipose tissue(SAT) with estimated glomerular filtration rate (eGFR) using CKD-EPI formula, diabetes mellitus, body mass index(BMI), proteinuria, lipid profile, and hypertension.

### Methods:

Ongoing single-center, cross-sectional study of 72 individuals (55 M /17 F) with mean age of 59.36 ± 14.68 years. Axial sections of non-contrast CT abdomen between L4-5 intervertebral disc (10mm) were selected to quantify VAT and SAT utilizing GE advanced workstation software. Normal BMI for Indian population is 18.5-22.9 kg/m2. Hypertension was defined as per JNC 8 guidelines. Independent sample t-test and Pearson's correlation used for statistical analysis.

### Results:

The mean eGFR of hypertensives was 77.5 ± 37.9, compared to 109.9 ± 27 in normotensives (p0.001) as depicted in figure 1. A trend observed towards lower eGFR with higher VAT (r= -0.16, p= 0.182) (figure 2) and in diabetics (86.8 ± 38), compared to non-diabetics (101.9 ± 33.4, p=0.079). No association of eGFR with SAT (p=0.831) and total abdominal adipose tissue (TAF)(p=0.987). High TGL and low HDL showed a trend towards increased adipose tissue in subcutaneous and visceral compartment. BMI showed positive association with VAT (p0.002), SAT(p0.001) and TAF(p0.001). Table 1 and 2 demonstrates the influence of CT quantified adipose tissue with various metabolic parameters.

### Conclusion:

CT quantification of adipose tissue can be used as a predictive tool to assess risk for metabolic diseases and decline in renal function. Further, it can help in early implementation of pharmacological or life-style modification for better quality of life.
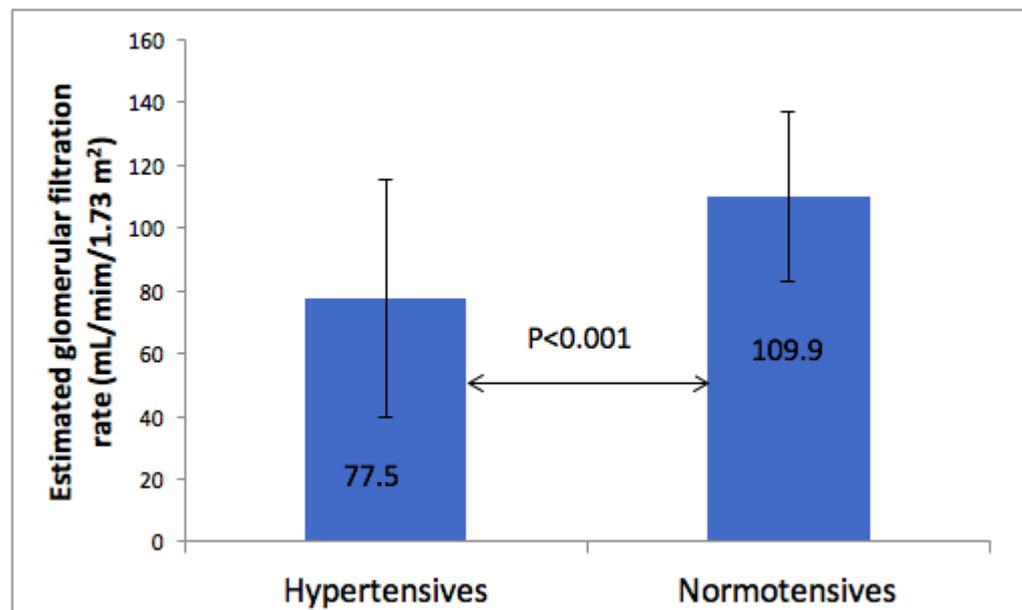
| VARIABLE | | n | VAT (cm³) | p value | SAT (cm³) | p value | TAF (cm³) | p value | eGFR | p value |
|---|---|---|---|---|---|---|---|---|---|---|
| BMI > 23 kg/m2 | Yes | 21 | 158.7±68.4 | **0.002** | 261.8±103.3 | **<0.001** | 420.5±136.2 | **<0.001** | 93.8±34.7 | 0.981 |
| | No | 51 | 106.5±39.1 | | 182.2±56.1 | | 288.7±80.2 | | 93.6±41.6 | |
| Systemic hypertension | Yes | 36 | 148.3±72.8 | 0.536 | 243.7±108.3 | 0.661 | 392±136.4 | 0.538 | 77.5±37.9 | **<0.001** |
| | No | 36 | 138.7±58 | | 233.4±97 | | 372.1±137 | | 109.9±27 | |
| Diabetes mellitus type 2 | Yes | 39 | 138.9±52.6 | 0.526 | 245.1±109.4 | 0.548 | 383.9 ± 142.6 | 0.897 | 86.8±38 | 0.079 |
| | No | 33 | 148.9±78.7 | | 230.9±85.2 | | 379.8 ± 130.1 | | 101.9±33.4 | |
| Proteinuria | Yes | 26 | 128.4±49.8 | 0.251 | 225.6±81 | 0.716 | 353.9±112.1 | 0.451 | 85.8±39.6 | 0.211 |
| | No | 34 | 145.9±64 | | 235.3±115.5 | | 381.3±155.3 | | 97.8±33.9 | |
| Triglycerides > 150 mg/dL | Yes | 12 | 159.8±76.3 | 0.495 | 256.7±92.7 | 0.542 | 417.5±128.2 | 0.451 | 97.3±39.7 | 0.846 |
| | No | 38 | 143±71.2 | | 235.1±115.9 | | 378.4±162.4 | | 95.1±32.1 | |
| LDL > 100 kg / mL/dL | Yes | 12 | 136.2±43.1 | 0.547 | 238.8±81.6 | 0.951 | 374.9±110.663 | 0.746 | 95.9±21.3 | 0.969 |
| | No | 38 | 150.7±79.1 | | 241.1±118.9 | | 391.819±167.121 | | 95.5±36.9 | |
| HDL <40 mg/dL in men <50 mg/dL in women | Yes | 40 | 147.9±77.1 | 0.908 | 248.7±117.6 | 0.294 | 396.6±164.4 | 0.423 | 95.3±35.8 | 0.916 |
| | No | 10 | 144.9±49.1 | | 207.458±68.5 | | 352.3±106.2 | | 96.6±25 | |

**Table 1: Association of various metabolic parameters with VAT, SAT, TAF**

**Table 2: Correlation of HbA1c, eGFR with VAT, SAT, TAF (n=55)**

| VARIABLE | r | P value |
|---|---|---|
| VAT (cm$^3$) | -0.165 | 0.227 |
| SAT(cm$^3$) | -0.087 | 0.525 |
| TAF(cm$^3$) | -0.139 | 0.311 |
| eGFR (ml/min/1.73m$^2$) | -0.003 | 0.981 |

**Figure 1: Comparison of eGFR among hypertensives (n=36) and normotensives (n=36)**

**Figure 2: Association between eGFR and visceral adipose tissue by Pearson's correlation coefficient (r=-0.16, p=0.182)**

Metabesity — General Issues Related to Repurposing Approved Therapies

**IMPROVEMENT OF THE BLOOD CIRCULATION OF *ECKLONIA CAVA* EXTRACT IN A THROMBOSIS MOUSE MODEL**

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The blood circulation carries oxygen, nutrients and hormones throughout blood flow. When the vessels are blocked by genetic factor, hypertension, diabetes and obesity, it induces arteriosclerosis, stroke, and cerebral cardiovascular disease.

Endothelial cells and smooth muscle cells of the vessels secrete chemoattractants such as low density lipoprotein (LDL) which effect the monocytes migration into the subendothelial space. These monocytes differentiated to macrophages, which activated by oxidative LDL uptake. Activated macrophages secrete RAGE and its ligands that induce inflammation.

*Ecklonia Cava* Extract (ECE), is derived from a specific species of brown algae found off the coasts of Korea, has long been used to treat weight loss and Diabetes-related symptoms. We evaluated the effect of ECE on the improvement of blood flow using a thrombosis mouse model.

As the results, ECE reduced cholesterol rate and blood pressure, attenuated inflammation factor, RAGE ligand accumulations and activated macrophages expression. In addition, ECE decreased platelet aggregation, thrombus formation and medial wall thickness of the vessels.

It was suggested ECE has beneficial effect by improving blood circulation related disease because it can improve blood flow by attenuating platelet aggregation and thrombus formation through the RAGE pathway in the vessels. These findings suggest ECE is a candidate for the treatment of blood circulation disorder and inflammation of related disease.

Metabesity — Education

## NON-SURGICAL TREATMENT OF OBESE PATIENT

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Obesity is a gateway to serious and even life-threatening conditions. It`s an epidemic which affects the health of millions of people worldwide. Treating obesity is crucial as it will ultimately result in the prevention of many related chronic diseases and will decrease morbidity and mortality. The list of possible complications or concomitant diseases is vast and alarming. Lifestyle intervention is the basis for the treatment of overweight and obesity, whenever possible. Despite the fact that treatment of obesity is very thankless, because the patient always requires or is awaiting for the stable result in a very short time-period, or is awaiting for the "miracle" of minus 20 kg in 2 weeks, and the lifelong change of the lifestyle is not his/her aim, still there will be always a group of "manageable" patients who - change their lifestyle and will follow the "eat smart strategies" lifelong. Weight loss objectives should always be realistic, individualized, and aimed at the long term. The transdisciplinary approaches, including dietary, exercise and behavior modifications, while also consider psychosocial characteristics of patients are of great help. We have always to remember that - Obesity is a chronic disease, a follow-up and continued supervision is necessary to prevent weight regain, and to monitor disease risks and treat co-morbidities. We know that without changes in lifestyle it`s impossible. Here we try once again to clarify all those "healthy lifestyle steps/tips" which all of our obese patients should know and follow.

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Metabesity — Education

**COMPARISON OF ISRAELI ADOLESCENTS WITH AND WITHOUT LEARNING DISABILITIES (LD) ON OBESITY, PHYSICAL FITNESS AND WELLBEING**

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Background: Obesity among children and adolescents has been increasing worldwide, affecting their health, educational attainment and quality of life. Poor physical fitness has been also associated with obesity. Initial study 1 found that among Israeli and US children aged 6-11 those with Developmental Coordination Disorder (DCD) were less fit and more obese than typical children did. Within the Israeli children, girls were more obese than boys were.

Objective: To examine the effect of age and gender on obesity, physical fitness and wellbeing among Israeli adolescents with and without LD.

Methods: Study 2, Participants were 72 typical adolescents; and 60 with LD. Measures: Motor coordination assessed with DCDQ`07 (AAC-Q) according to age. Strength and physical fitness with subtest of the Bruininks-Oseretsky Test (BOT-2) and the 6 Minute Walk Test (6MWT); Wellbeing (WB) questionnaire and BMI.

Results The findings of both studies showed significant differences between typical young children and adolescents on BMI (t=-4.13, p=.00). The average BMI of adolescents was higher (children $M$BMI=18.37, adolescent $M$BMI=21.2. Comparing adolescents with LD and typical, differences were found in BMI (t=-2.033 p.045); WB (t=1.960 p.050). As for physical fitness NPar was used because the LD had smaller numbers BOT-2 (Z=-2.687 p.007); 6MWT was not significant.

Conclusion Data collection comparing between typical adolescents and those with LD, is ongoing and be presented in full at the conference. As obesity is now a worldwide problem, our understanding of these issues would allow creating appropriate prevention and treatment programs for children and adolescents with and without learning disabilities.

Metabesity — Public Policy and Public Health Approaches

## BEST PRACTICES AND LESSONS LEARNED FROM ADDRESSING OBESITY PREVENTION THROUGH THE RESTAURANT INDUSTRY IN A U.S.-MEXICO BORDER COMMUNITY

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**Background:** El Paso, TX (population 844,769; 81% Hispanic) located on the US-MX border, has high prevalence of obesity, diabetes and cardiovascular disease. The El Paso Department of Public Health implemented a city-wide restaurant initiative to promote healthy eating.

**Objective:** The Eat Well! El Paso (EW!EP)  program aimed to assist locally owned restaurants in providing healthier, and nutritionally balanced meals that have reduced fat, sodium, and sugar, smaller portions, no trans fats or sugar sweetened beverages. Restaurant staff were provided nutrition education to implement healthy menus.

**Methods:** 23 restaurants participated; 66 staff and cooks were trained on healthy nutrition topics including portion control, sugar sweetened beverages, increasing fruit and vegetable intake and implementing healthy menus. Healthy menu options were created for children (in year 1) and adults (in Year 2). The best practices, lessons learned and immediate outcomes were assessed.

**Results:** Best practices observed include: ensuring that the restaurants' profit margin was not compromised by changing child menus first, making culturally appropriate menu changes, and including the restaurant staff *and* cooks in nutrition education. The need for actively promoting the healthy menu options to patrons by restaurant staff, involving food prep, serving staff and the restaurant owners in training to promote ownership, flexibility in training logistics, and social media campaigns to promote the healthier menus were observed. Knowledge/skills gained in restaurant staff include incorporating correct serving size (93%), healthier substitutions including sugary drinks (91%), and increasing vegetable servings (94%).

**Conclusion:** The restaurant setting can be effective for initiating community-wide culturally appropriate healthy nutrition awareness and behaviors in high-risk minority/binational communities like El Paso, TX, USA. Buy-in from restaurant owners and staff promoted through regionally sensitive nutrition education,  pragmatic approaches that ensure the profit margin is not compromised and, social media marketing of the program are vital to attaining intended program outcomes.

Metabesity — Public Policy and Public Health Approaches

## A PUBLIC HEALTH APPROACH TO ADDRESSING METABESITY IN HISPANIC US-MEXICO BORDER COMMUNITIES AT RISK FOR HIV AND SUBSTANCE USE DISORDER

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**Background:** El Paso, TX (85% Hispanic), located on the US-MX border is characterized by high obesity and diabetes rates, substance abuse and HIV risk, low healthcare access, and poverty. The "Mujer Saludable, Familia Feliz" (Healthy Woman, Happy Family) is a regional program that addresses HIV prevention among minority women.

**Objective:** Implemented since October 2016, this holistic and culturally sensitive program addresses nutrition and metabesity as a component of HIV risk reduction and improving health outcomes in priority communities.

**Methods:** The "Salsa de la Vida" curriculum was designed to promote healthy nutrition in the priority communities. Four main components of the curriculum, delivered in Spanish and English since 05/2017 are: (i) reducing sugar-sweetened beverages intake; (ii) increasing vegetable-fruit intake; (iii) incorporating beneficial herbs and spices; and, (iv) food groups. Feedback from two pilot presentations was utilized to refine the curriculum.

**Results:** Participants reported some interesting behaviors: 83% participants (N=48 as of date; presentation will include analysis of larger sample) stated that they consume 1 or more sugar-sweetened beverages daily and 44% reported at least 3 or more sugar-sweetened drinks/day. Moreover, 94% indicated daily "Family" intake of 1 or more sugary drinks. Majority of the participants Strongly Agreed/ Agreed that they learned the importance of increasing fruit and vegetable intake (83%), and benefits of herbs/spices (88%), (Overall Mean= 4.27) while 80% indicated that the intervention motivated them to eat healthy and that they are confident in practicing the healthy eating skills learned.

**Conclusion**: The link between nutrition and risk for HIV/AIDS has been well documented in literature. The preliminary findings indicate the need for improving nutrition in the high risk priority communities. Participant feedback also indicates potential for knowledge and skills gain particularly in relation to reducing sugar consumption, and increasing veggie and fruit intake as a result of the curriculum implemented.

Metabesity — Public Policy and Public Health Approaches

## EXAMINING NUTRITION-RELATED RISK PREDICTORS OF HIV IN COMMUNITIES ENDEMIC FOR HIV AND TUBERCULOSIS IN COLON, PANAMA

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**Background:** Poverty and food insufficiency have been associated with engaging in high-risk sexual behaviors in high-HIV burden communities worldwide. Hispanics in Latin America are disproportionately affected by HIV /AIDS and nutrition-related disparities on a global context. Panama remains with highest incidence of HIV and highest mortality rates of Tuberculosis among the Central American countries. Malnutrition also increases biological susceptibility to both HIV and TB and, affects treatment outcomes.

**Objective:** This aim of this pilot international minority health disparities research study (NIMHD Grant No. 2T37MD001376-10)- a collaboration between The University of Texas at El Paso, USA and INDICASAT, Panama- is to understand factors shaping nutrition related needs and behaviors among individuals 18 years and above, at high risk for HIV or living with HIV/AIDS in Colon city, Panama**.**

**Methods:** We conducted three focus groups in June 2017 (n=30), and a standardized survey developed based on focus groups findings is being administered among participants (n=50) in Colón, Panama.

**Results:** Focus group emergent themes include: cultural norms (high carbohydrate, processed, high-fat, low-fruit and veggie consumption) promoting unhealthy eating behaviors; structural barriers to healthy nutrition such poverty, lack of access to healthy foods, and increased access to unhealthy foods; and, health literacy needs related to nutrition. The preliminary survey data indicate that lack of economic resources (40%) and access to grocery stores (50%) are barriers in acquiring adequate and/or healthy nutrition. Final results will be available in September 2017 and presented.

**Conclusions**: Micro and macro level factors including lack of awareness, access to unhealthy foods, cultural norms, poverty and health communication needs seem to shape malnutrition in relation to HIV and TB in study communities. The need for HIV and TB interventions in Colón, Panama and similar communities worldwide to incorporate nutrition education and, policy to address access to healthy foods will be discussed.

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Metabesity — Public Policy and Public Health Approaches

## ADDRESSING MALNUTRITION IN PREGNANT HIV POSITIVE ADOLESCENT MOTHERS IN RURAL UGANDA TO ENHANCE MATERNAL AND CHILD HEALTH OUTCOMES

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**Background:** Located in southwestern Uganda, Kanungu District, has high prevalence for HIV/AIDS, malnutrition and malaria. The maternal mortality rate is 700/100,000 live births, nearly double the national average. Malnutrition shapes HIV risk and treatment outcomes. In HIV+ve pregnant women, malnutrition can cause adverse pregnancy outcomes like child stunting and low birth-weight, as well as increase T-cell counts in the women thereby, further magnifying susceptibility to HIV and poverty.

**Methods:** Currently, Innovation Program for Community Transformation (INPACT), a community based organization, provides perinatal health services to mothers from poor households at subsidized rates to promote safe deliveries. Specific attention is given to HIV positive adolescent mothers who are assessed to be moderately or acutely malnourished during ante-natal visits.

**Results:** As of date, 30 HIV+ adolescent mothers are enrolled in INPACT's Nutrition Program. Preliminary evaluation findings reveal that fear of stigma compels some HIV+ mothers (33%) to take on some risky dietary choices especially alcohol consumption as social obligation while 91% of mothers did not have any prior knowledge of healthy eating/nutritional value of different foods. Although nutrition education was provided, 75% of mothers enrolled still feed on largely carbohydrate meals (mostly maize flour) because they cannot afford healthier alternatives; 45% of mothers also indicated that not having decision-making powers in their households affects/limits their food choices. Overall, 25% of mothers followed up have improved feeding varieties and options.

**Conclusions**: The preliminary findings indicate the need to engage and empower young mothers AND their partners on the benefits of healthy nutrition in relation to improving perinatal outcomes. Linking participants to existing economic strengthening and food security programs including a lightly conditional cash transfer programme may help address dietary needs. Implications for addressing socio-economic factors in relation to nutritional risk factors for maternal and child health outcomes for HIV+ve mothers are discussed.