Video Presentation
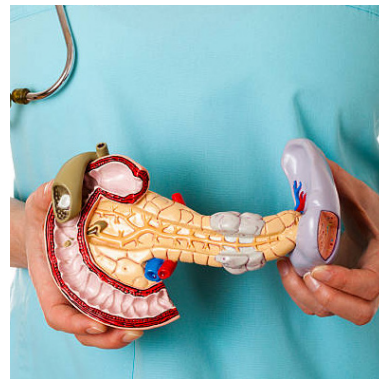
Diabetes 2019

Joint Event

International Conference on

Diabetes, Endocrinology and Metabolic Syndrome

&

Annual Summit on

Diabetes, Obesity & Heart

March 07-08, 2019 | London, UK

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Comparison of two clinic cases of using big data analytics and spatial analysis to investigate the relationships among weight, glucose, blood pressure (GH-Method: Math-Physical Medicine)

Gerald C Hsu
EclaireMD Foundation, USA

The author uses math-physical medicine approach to investigate three pairs of relationship between weight vs blood pressure (BP), weight vs glucose (daily averaged glucose, including both FPG and PPG) glucose and BP. There are two clinic cases to be presented here. Case A uses lifestyle management to control his metabolic disorders while Case B uses both medications and partial lifestyle management to control the same three chronic diseases. Both cases selected the same time periods for results comparison: 1,770 days (1/1/2014 - 11/6/2018) with big data of 17,700 metabolic syndrome (weight, BP, glucose) each. This paper utilized two statistical tools, i.e. time-series (x or y vs time, like EKG charts) and spatial analysis (in a two-dimensional x and y space, without "time" factor). In time-series graphs, if the correlation coefficient (R) is greater than 50%, then these two sets of data (or curves) are highly correlated to each other (i.e. strong). If R is smaller than 30%, then considered as weak-correlated. Since R can only be calculated for two sets of data (or curves), therefore, this paper investigated 3 separate sets of pair inter-relationships among these three metabolic elements. In spatial analysis, if the "data cloud" is concentrated within a long and narrow band and skewed with an angle (i.e. slope is obvious and greater than zero), then these two sets of data are highly correlated. On the other hand, if the angle of the plotted point cloud is either flat or vertical, then there is a very weak correlation between them.

Speaker Biography

Gerald C Hsu received an honorable PhD in mathematics and majored in engineering at MIT. He attended different universities over 17 years and studied seven academic disciplines. He has spent 20,000 hours in T2D research. First, he studied six metabolic diseases and food nutrition during 2010-2013, then conducted research during 2014-2018. His approach is "math-physics and quantitative medicine" based on mathematics, physics, engineering modeling, signal processing, computer science, big data analytics, statistics, machine learning, and AI. His main focus is on preventive medicine using prediction tools. He believes that the better the prediction, the more control you have.

e: g.hsu@eclairemd.com

e-Poster

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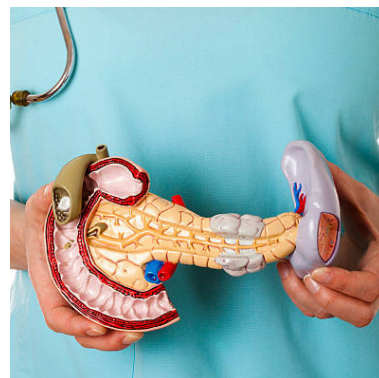
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Prevalence of overweight and obesity in Uzbek population depending on carbohydrates metabolism status

Anna Alieva
Republican Specialized Scientific and Practical Medical centre of Endocrinology, Uzbekistan

To assess prevalence of overweight and obesity in Uzbek population with and without type 2 diabetes mellitus (DM) and prediabetes. 2521 individuals aged 35 and older living in urban and rural settings of three regions of the Republic of Uzbekistan was examined: waist, hips circumference, height, weight were measured according to WHO recommendations, BMI was calculated. IGT, IFG and DM were diagnosed using oral glucose tolerance test according to IDF standards. In the whole observed population 28.7% (33.6% of men and 34.2% of women) had normal BMI (18-25kg/m2), 1.2% were underweight, 34.9% overweight, and 22.6%, 8.6%, and 4% had I, II and III stage of obesity. Among people without DM or prediabetes, 35.9% were overweight, 21.2%, 7.3%, and 3.2% had I, II and III stage of obesity. Among patients with IFG, 37.1% were overweight, 25.7%, 14.3%, and 11.4% had I, II and III stage of obesity. Among patients with IGT, 30.4% were overweight, 33.0%, 13.4%, and 8.9% had I, II and III stage of obesity. And among patients with type 2 DM, 22.5% were overweight, 34.0%, 19.1%, and 10.2% had I, II and III stage of obesity. There is a high prevalence of overweight and obesity in Uzbek population, and there is an increase in prevalence and worsening of obesity with deterioration of carbohydrates metabolism disorders.

Speaker Biography

Anna Alieva works as a scientific researcher on the field of diabetology and also as a clinical doctor at the intensive care unit of the Republican Specialized Scientific-Practical Medical Centre of Endocrinology. Her scientific interests are diabetes epidemiology and prevention of insulin resistance: Its pathophysiology and methods of treatment, insulin pumps therapy, and diabetic ketoacidosis. She is one of the authors of National standards of care for patients with acute endocrine complications.

e: annaalieva@yahoo.com

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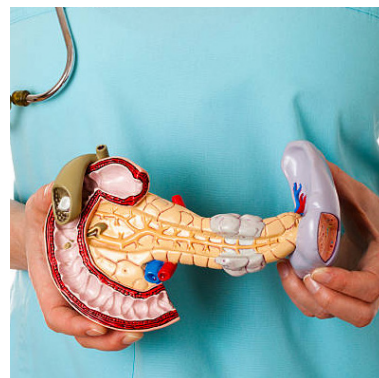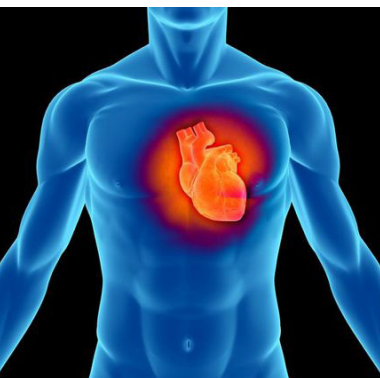
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Why is hyperglycemia bad?

David W Moskowitz
GenoMed Inc., USA

Since the isolation of insulin from dog pancreases by banting and best almost a century ago, treatment of diabetes has focused on controlling glucose. It is generally assumed that glucose's effect is mediated through an increase in blood osmolality and viscosity (PMID: 12871609), as occurs in the lens of the eye. But blood viscosity increases only 5% when glucose increases from 100 to 300 mg/dl. First, the 300% increase must be divided by 18 for the molecular weight of glucose (180g/mole), and, second, osmolality is due mostly to sodium and chloride. Blood is essentially sea water, not lemonade. There must be an amplification step, something beyond mere osmolality/viscosity. One amplification step appears to be ACE, which is activated by viscosity, since ACE appears to be a mechanosensor (PMID: 12685804). But there's another way ACE is activated, even more strongly by glucose. ACE appears to be glucose's partner in a redox reaction (PMID: 15379656). Raising glucose to 300mg/dl may increase osmolality by only 5%, but it should increase ACE activity one-for-one: for every glucose molecule oxidized from an aldehyde to a carboxylic acid, one active site of ACE is revealed. This appears to have special importance for the kidney (PMID: 12396747) and lung (PMID: 16510756); both organs sense oxygen levels. A corollary is that a "normal" glucose level of 100 mg/dl is still chemically active. Perhaps aging is due to glucose activation of ACE as redox partners. Diabetes looks like accelerated aging because the glucose level, and the amount of ACE activation, is increased. In other tissues, like nerves, where ACE inhibitors have no effect, glucose may have unknown redox partners responsible for local complications. We are still in the early steps of exploring this hypothesis. My hope is that retinopathy will respond to high-dose quinapril as diabetic kidney disease has done for the past 24 years. In summary, blocking glucose's amplification partners may be just as important clinically as controlling glucose.

e: dwmoskowitz@genomed.com

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Dyslipidemia alters HDL metabolism and function in NAFLD

T Kasumov, A McCullough and S Dasarathy
Cleveland Clinic, USA

Dyslipidemia and inflammation play key roles in the pathogenesis of both nonalcoholic fatty liver disease (NAFLD) and atherosclerosis. NAFLD, particularly its severe form non-alcoholic steatohepatitis (NASH) is associated with increased cardiovascular disease (CVD) risk. HDL (a CVD risk) are decreased in NAFLD but whether HDL function is abnormal in NAFLD is unknown. The aim of this study was to investigate HDL function and to examine the effect of dyslipidemia and inflammation on HDL metabolism in patients with biopsy proven simple steatosis (SS) and NASH. H_2O-metabolic labeling was used to study HDL function and HDL protein dynamics in SS, NASH patients (8/group) and matched healthy controls (n=9) in vivo. To assess the role of HDL maturation and remodeling on stability of HDL proteins, we quantified the activities of cholesterol ester transfer protein (CETP), the key HDL protein involved in HDL lipidation. HDL's anti-oxidant, anti-inflammatory and cholesterol efflux properties were measured using in vitro assays. Compared to controls, SS and NASH subjects had significantly higher levels of plasma triglyceride, insulin, and were more insulin resistant (HOMA, P<0.05) with no differences in total cholesterol, HDL cholesterol (HDLc), ApoB100 and ApoAI levels. NAFLD patients had increased production and degradation rates of both HDLc and ApoAI that kept their levels stable. The degradation rates also were increased of other HDL proteins. NAFLD patients had increased activities of CETP, indicating altered HDL lipidation. NAFLD induced alterations in HDL metabolism were associated with reduced anti-oxidant but increased pro-inflammatory activity of HDL (P<0.05)). However, no differences were observed in either HDL function or the kinetics of HDLc and HDL proteins between SS and NASH subjects. HDL turnover and function are altered in NAFLD without any differences between SS and NASH, indicating that dyslipidemia is more important than hepatic inflammation on altered HDL metabolism and functions in NAFLD.

e: tkasumov@neomed.edu

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Diabetes mellitus in Puerto Rican patients 50 years and older: Uncontrolled glucose levels during the holidays

Alberto R Ortiz Corrada
University of Health Sciences, USA

Diabetes mellitus has become a health care concern in Puerto Rico. Lifestyle modification, proper diet and appropriate pharmacotherapy are necessary to improve blood glucose levels, which are measured by testing HBA1C every three months. (a form of haemoglobin that is measured to identify the three-month average plasma glucose concentration). The holiday season in Puerto Rico particularly has been known as a weight gaining period; this due to increased intake of foods rich in carbohydrates and fats. Considering these factors, this study is aimed to determine differences in glucose levels of diabetic patients in the holiday season versus prior months. We conducted a cross sectional study to estimate the variation of glycaemic control and its relation to holiday times. Participants were diabetes mellitus patients 50 years or older recruited from six laboratories in San Juan. Patients who qualified and agreed to participate were given a written consent form and data such as age, gender, and HbA1C levels. Data of 651 patients was collected and included in the study. Glycaemic changes were examined in the preholiday and holiday periods. A one-way ANOVA was used to evaluate differences in HBa1C mean scores between the different months. Other statistical tests were used to compare mean scores of female vs male and differences in age groups. The mean values of HbA1c levels were significantly higher in February and March compared with October and November. Significant gender and age differences were also seen when comparing glucose levels. Patient's glucose levels increased after the holiday period suggesting poor glycaemic control during that period. Considering this, doctors should be aware of lifestyle changes and more emphatic in recommending proper dieting during the holiday season.

e: acorradamd@gmail.com

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Implications of blockchain technology on obesity and diabetes: Clinical research and care optimization

Heather Leigh Flannery
Blockchain in Healthcare Global, USA

This session will begin by summarizing blockchain applications for healthcare in general, then placing in context of complex chronic disease clinical research, research translation and evidence-based care coordination. It will then move into obesity and diabetes applications specifically, examining convergence of blockchain technology with artificial intelligence, the Internet of Medical Things (IoMT), telemedicine, and related converging innovations. Speaker will outline the implications on patient engagement, patient education, patient empowerment on protocol adherence and compliance, as well as the theoretical use of novel incentive structures to influence these factors. Places broader adoption of healthcare blockchain technology in context of the implications for obesity treatment on population health, in a new vision dependent on the integrated use of multiple new foundational technologies.

e: hflannery@blockchaininhealthcare.global

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Diagnosis and treatment of the postnecrotic phenomenon such as putrefaction and omificafion of the lower extremities in diabetic patients avoiding amputations

Elias Victor Chammah
University of Buenos Aires, Argentina

The necrotic pathology and postnecrotic phenomenon such as putrefaction (gangrene) is a serious problem in the world public health. 75-85% of surgical amputations are caused due to vascular complications of diabetes. From the patients that undergo amputatios, only 50% survive the first 3 years. By studying and classifying the temporal structural conformation of the necrotic pathology and postnecrotic phenomenons, using firstly anatomo-clinic macroscopic evidence in vivo, and then through serial macroscopic images valoration by computer scanning. It was possible to certify that kinetic progresion of necrotic phenomenons post-ischemia is not cyclic, regular, neither uniform. Therefore, once the ischemic focus has developed, the necrotic phenomenon does not affect the totality of the site at once, as little vascularization in the necrotic region is mantained for a short time. These regions can be repaired, and afterwards, revascularization can be carried out, reaching postnecrotic epidermization and avoiding surgical amputation.

A patient R J Age 86, diabetic patient type II. Necrotic pathology of mixed types 1 and 3 in calcaneous region of the left foot. Recent necrotic tissue, infiltrated with a bacterial infectious complication, with fluctuation, without crepitation. Inflammatory phenomenon around necrotic tissue can be observed. The end result after applying the surgical intranecrotic windows and total necrosectomy techniques, amputation was avoided.

Discussion: Necrotic pathology can not be studied through histopathology because it causes the destruction of vital tissues. In order to perform a non-invasive surgical procedure, it is necessary to recognize exactly the temporal structural conformation of the necrotic pathology and its topography. Otherwise an invasive procedure can cause complications. The serial macroscopic images valoration by computer scanning method, has proved to be fitting for the observation of important temporal structural modifications of the necrotic pathology and postnecrotic phenomenons and it allows to carry out Intranecrotic non-invasive interventions.

e: drevchammah@gmail.com

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Impact of Roux-en-Y gastric bypass on metabolomic profile of obese women with type 2 diabetes

Natasha Machado
University of Sao Paulo, Brazil

Type 2 diabetes (T2D) remission rates reach up to 60% after Roux-en-Y gastric bypass (RYGB) in obese patients, but the precise mechanisms are not fully understood. We developed a prospective clinical study to investigate the molecular basis of these metabolic alterations through metabolomics. Plasma and urine samples were collected from 23 obese women with T2D before and after 3 months of RYGB. Subjects were analysed together and divided according T2D remission. Metabolomic profile exhibited a discriminatory pattern of alterations, suggesting important differences between patients with and without T2D remission. The main metabolites involved in these alterations includes bile acids, uremic toxins produced by microbiota, dicarboxylic acids, and different lipid classes. The contrast of the metabolite alterations allowed us to suggest several hypotheses. T2D remission could be associated with metabolic flexibility improvement, stimulated by increased oxidation and nuclear receptors activation, modifying lipid and glucose metabolism. In contrast, non-remission of T2D in obese patients after RYGB could be related to a subclinical kidney dysfunction. This was hypothesized considering that metabolic alterations observed on T2D remission rely on kidney function and its local enzymes and metabolite alterations of patients who do not present T2D remission could be associated to kidney disturbances. Thus, we suggest that RYGB deeply changes metabolomic profile and develop a functional role, including – but not limited to – regulation in the substrate flux and utilization, microbiota composition or activity and activation of nuclear receptors. These metabolic alterations seem to act together to form a circuit of alterations that activate triggers that lead to T2D improvement, which deserves future investigations.

e: natashamachado@gmail.com

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Refractory Coeliac Disease in Diabetes Mellitus

Paul J Ciclitira
University of East Anglia, United Kingdom

Coeliac disease (CD, gluten-sensitive enteropathy) affects 1% of people in the EU and USA including 6% of subjects with type one diabetes mellitus. The pathogenesis of CD involves aberrant immune response, both adaptive and innate to gluten proteins from wheat and related cereals in the small intestinal mucosa of affected subjects. Refractory coeliac disease (RCD) is a complication of coeliac disease (CD) and involves malabsorption and villous atrophy despite adherence to a strict gluten-free diet (GFD) for at least 12 months in the absence of another cause. RCD is classified based on the phenotype of the T-cell morphology within the small intestinal intra-epithelial lymphocytes (IEL), into type 1 with normal polyclonal T cell receptors (TCR) of the IEL and type 2 with aberrant monoclonal TCR by PCR (polymerase chain reaction) for TCR at the β/γ loci. RCD type 1 is made do with strict nutritional and pharmacological administration.

RCD type 2 can proceed to ulcerative jejunitis or enteropathy associated lymphoma (EATL), the latter resulting in a 50% five-year mortality of subjects with RCD2. Management options for RCD type 2 and response to treatment vary between centres; there have been debates over the best treatment options. Therapy that have been utilized consists mycophenylate, azathioprine and steroids, cyclosporine, methotrexate campath and cladribine or fluadribine with or without autologous stem cell transplantation. We have treated RCD2 with prednisilone and azathioprine, replacing the latter with mycophenylate when there is azathioprine sensitivity in the treatment of RCD2. Our results employing prednisilone and azathioprine reveal a good response with histological recovery in 56.6% of treated individuals and without any mortality.

e: pciclitira@btinternet.com

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The possible role of diabetes in the etiology of Laryngeal Cancer

Roberto Menicagli[1] and **Ortensio Marotta[2]**
[1]Roma Biomed Research, Italy
[2]Naples University, Italy

Laryngeal cancer and oral cancer are not always correlated with genetic mutations, HPV infection, smoking, and alcohol abuse. In the absence of these risk factors, there is an increase on these cancers with a parallel increase of diabetes. The aim of this study is to verify if diabetes could be a risk factor for the laryngeal cancer. A questionnaire was given to a group of ninety laryngectomees to verify if these patients have presented diabetes and xerostomia before surgery. In two groups, diabetics and healthy persons, the values of the salivary mucins and the pH were evaluated. The results were statistically analysed using Fisher Exact Test and Chi square Test. Diabetes is a risk factor: $p = 0.0445$ for laryngectomees male vs control group. Xerostomia in laryngectomees male is a risk factor: $p = 0.050$. The values of mucins and pH in diabetic group show significant difference: $p = 0.05$ vs control group. In all autoimmune diseases, a decrease in the value of pH and salivary flow consequently decreases the value of spinnbarkeit which measures the capacity of the mucous layer to adhere to the epithelium and alter the protective oral mucin layer. We find that diabetes is epidemiologically correlated with laryngeal cancer. In fact, only diabetes increases the concentration of salivary mucins with a formation of mucin layer even more reduced, and so completely ineffective in protecting the mucosa.

e: menicagli@libero.it

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The prevalence of complications in type 2 diabetics in diabetes centers in Dubai

Haleama Al Sabbah and **Moza Alketbi**
Zayed University, UAE

Diabetes complications have been increasingly prevalent among type 2 diabetics during the past decades causing high rates of morbidity and mortality. Measures of the prevalence of diabetes complications will lead to preventive decisions and planning of health care. This study was made to assess the prevalence rates of complications in Type 2 diabetics in two Diabetes Centers in Dubai. A cross-sectional descriptive analytical study conducted among type 2 diabetics attending diabetes centers in Dubai. Data was collected form secondary source using patient's records from two diabetes centers involved in the study. Random sampling technique was used to collect 150 patients proportionally allocated according to the total patients (4700 attending patients) available in the two diabetes centers. The study showed that the most dominant prevalence type of complications: Hyperlipidemia (84%), Neuropathy (34%), Dyslipidemia (32%), Retinopathy (28%), Lethargy (21.3%), and Nephropathy (16.7%). The associations made between three variables each separately (Date of First Visit, HbA1c, and Fasting Blood Glucose) with the prevalence type of complications, showed significant differences in some types: Dyslipidemia, Hyperlipidemia, Neuropathy, Retinopathy, and Joint & Bone pain.

e: haleemah.alsabah@zu.ac.ae

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Smoking (waterpipe and cigarette) and obesity among university students in UAE and Palestine: Cross sectional study

Haleama Al Sabbah
Zayed University, UAE

To assess the prevalence rate of waterpipe smoking behaviour among university students in West Bank and Dubai, and determine the factors associated with waterpipe smoking among young people. A cross-sectional study was made to understand the real-time behaviour of the student. 5 Universities in West Bank-Palestine and 5 Universities in Dubai-UAE was chosen for this study. 3800 students randomly selected with a response rate of 87.6%. The self-administered questionnaire was used to collect the data. The key measures were waterpipe smoking, weight, height, cigarettes smoking, dieting to reduce weight, perception and knowledge related to waterpipe smoking. Weight, height and waist circumference were measured from a subsample of 500 students. Body mass index (BMI) was calculated using the WHO cut-offs to identify obese, overweight and underweight students. In total, 3327 students (54% West Bank and 46% Dubai) included in this analysis. In Dubai, 22% were overweight and 9% were obese. In West Bank, 14% were overweight, and 4% were obese. 16% in Dubai and 18% in West Bank smoke cigarettes. The quarter of the students in Dubai (26%) and 32% in West Bank smoke waterpipe. 17% in Dubai and 18% in West Bank smoke water pipe in order to reduce their weight. Significant associations were found between smoking waterpipe and obesity, overweight, and abdominal obesity (p<0.001).

e: haleama.alsabah@zu.ac.ae

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Vascular complications in type 2 diabetes mellitus in children and adolescents

Hesham Fouad
International Clinic, Kuwait

Type 2 diabetes in in children and adolescents is different, not only from type 1 diabetes, but also from type 2 diabetes in adults, as it has a more rapidly progressive reduction in β-cell function and accelerated development of diabetes complications. Accordingly, secondary comorbidities like hypertension, nephropathy, the leading cause of end-stage renal disease, hyperlipidaemia, stroke, 2- to 4- fold increase in cardiovascular mortality, cardiovascular disease, diabetic neuropathy, a leading cause of non-traumatic lower extremity amputations and retinopathy, the leading cause of blindness in working age adults, are anticipated and their development and progression might be especially rapid because of the early onset of type 2 diabetes in such patients. This will raise the possibility of a serious public-health challenge in the next few decades and we must begin to understand the extent of this upcoming challenge. Risk factors for development of diabetic angiopathy are disease duration, poor metabolic control, hypertension, hyperlipidemia, smoking, puberty and genetic factors. Furthermore, the mechanism by which poor glycemic control predisposes to vascular disease is incompletely understood. The pathogenesis of diabetic vascular complications include accumulation of advanced glycosylation end products in plasma, induced by hyperglycemia, that contribute to microvascular disease, accumulation of cellular sorbitol, which interferes with cellular metabolism because of a rise in cell osmolality and a decrease in intracellular myoinositol, end-organ response with activation of cytokines, profibrotic elements, vascular growth factors, inflammation, and protein kinase C. Specific end organ responses include mesangial matrix expansion and glomerular hypertension in the kidney, and impairment of retinal blood flow and microthrombus formation in the eye. The role of these factors in advancement of diabetic vascular problems and the feasible therapeutic goals for these illnesses has been explained within this presentation. Improved glycemic control and control of hypertension delay the progression of microvascular disease. Therefore, all patients with T2DM should be screened for microvascular complications to identify those with microvascular disease and initiate treatment when complications are discovered to delay or prevent further progression of disease. The role of growth factors in the pathogenesis of diabetic angiopathy and their relation to later development of microalbuminuria in a pathway to vascular complications will be illustrated. This presentation will review the contribution of dysfunction of the vascular endothelium to the pathogenesis of diabetic micro- and macroangiopathy in children and adolescents with type 2 diabetes. The biochemical basis for the effects of hyperglycemia on the pathogenesis of diabetic angiopathy will be discussed. Recently, it is found that the metabolic milieu that are the key factors leading to vascular complications in T2DM. In this lecture, an attempt has been made to comprehensively compile updated information available in context of endothelial and platelet dysfunction in T2DM in children and adolescents. The data presented in this presentation were obtained from published literature presented at scientific meetings, clinical trials and review articles using the search terms Hyperglycemia, Insulin resistance, Inflammation, Oxidative stress, vascular complications, 'type 2 diabetes mellitus', 'children', and 'adolescents' in a MEDLINE search from 1995-2018. Additionally, the bibliographies in the identified articles were reviewed.

e: heshamfouad547@hotmail.com

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Potential of medicinal plants against multidrug resistance *Staphylococcus aureus*

Rida Zainab[1], Muhammad Akram[1] and **Muhammad Daniyal[2]**
[1]Government College University, India
[2]University of Chinese Medicine, China

Unbalanced approaches to health and healing by overuse of antibiotics give rise to a generation of drug resistant bacteria i.e. *Staphylococcus aureus* that can cause localized infection to toxic shock syndrome. This incidence of resistance among microbes against pharmaceutical antibiotics and high cost of these medicines make them unaffordable for poor people and prompts the search for alternative medicine. This review paper aims to address the use of medicinal plants in managing infections due to multi-resistant S. aureus. Efforts are made to aggregate previously published and relevant literature pertaining to each plant with reference to multi-resistant S. aureus. Also, most of the literatures cited address the issue of S. aureus multi-resistance. Medicinal plants meet these criteria as they are considered to be more readily available, affordable and effective. Unlike pharmaceutical antibiotics, herbal medicines contain hundreds of secondary metabolites such as terpenoids, alkaloids, tannins, and flavonoids that make their chemistry highly complex for resistance to occur. Antibacterial activity of various plants is reported against Staphylococcus species. The herbs show promise as an alternative anti-biotic.

e: ridazainab357@gmail.com

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Type 2 diabetes in children and adolescents - The next epidemic?

Hesham Fouad
International Clinic, Kuwait

The incidence of type 2 diabetes mellitus in youth (T2DM) has increased worldwide and its incidence rates vary markedly among different racial and ethnic groups. It has a major impact on public health, costing billions of dollars and shortening life expectancy as it has an earlier onset with a large opportunity for complications. As a result, it is important to identify and treat children and adolescents with this disorder. In the early 1990s, T2DM represented about 3% of pediatric diabetes in the United States. By 2003, T2DM represented about 20 percent of pediatric diabetes and nearly half of the cases of diabetes among adolescents aged between15 and 19. The overall burden of diabetes due to type 2 diabetes, in study, increased with age groups from all races and ethnic groups, and among 15-19year old, type 2 diabetes was more common than type 1 diabetes among American Indian Alaskan Native youth. Asymptomatic (about 40%), symptomatic e.g. polydipsia and polyuria without ketonuria or acidosis (about 57-70%), diabetic ketoacidosis (about 5-13%), hyperglycemic hyperosmolar state (uncommon but serious). Obesity, positive family history, specific racial and ethnic groups, female gender, genetic susceptibility and conditions associated with insulin resistance. Prenatal exposure, gestational diabetes and low birth weight are other proposed risk factors. According to The American Diabetes Association (ADA) testing of asymptomatic, children and adolescents for T2DM after the onset of puberty or ≥10 years, whichever occurs earlier, if they are overweight or obese, and have T2DM mellitus in a first or second degree relative, member of a high-risk racial/ethnic group, signs of insulin resistance or conditions associated with insulin resistance (e.g. hypertension, dyslipidemia, acanthosis nigricans, polycystic ovary syndrome (PCOS) or small for gestational age birth weight), maternal history of diabetes or gestational diabetes during the child's gestation and repeating the screening at a minimum of every three years, or more frequently if BMI is increasing. Test for diabetes in patients with typical presenting symptoms, such as polydipsia, polyuria, blurred vision, or weight loss, should be done regardless of risk factors. Hemoglobin A1C (A1C), fasting plasma glucose (FPG), and an oral glucose tolerance test (OGTT) are used. The diagnostic criteria, based upon the guidelines of ADA, are the same as those used in adults. Unless unequivocal symptomatic hyperglycemia is present, the diagnosis should be confirmed by repeat testing on a different day. Considerable overlap exists regarding both insulin resistance and pancreatic autoantibodies. The differentiation is based upon a combination of the clinical presentation and history, supported by laboratory studies. Similarly, T2DM is differentiated from maturity onset diabetes of the yung (MODY). FPG or A1C is used to diagnose the prediabetics, especially in patients with multiple risk factors for T2DM because of its higher sensitivity. For prediabetes annual rescreening for T2DM is recommended unless there is a change in symptoms or signs (e.g. weight change or polydipsia/polyuria) that need earlier retesting. Prediabetics should be engaged in intensive lifestyle interventions. It has not been established whether metformin should be used in adolescents with prediabetes or with other evidence of insulin resistance. Including hypertension, dyslipidemia, and nonalcoholic fatty liver disease (NAFLD). They may be present before the diagnosis of T2DM, like T2DM of adults, and are associated with excessive weight. The data presented in this presentation were obtained from published literature presented at scientific meetings, clinical trials and review articles using the search term 'type 2 diabetes mellitus', 'metabolic syndrome', 'obesity', 'children', and 'adolescents' in a MEDLINE search from 1995-2018. Additionally, the bibliographies in the identified articles were reviewed.

e: heshamfouad547@hotmail.com

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Investigation of aldose reductase inhibitory and anti-hyperglycemic potential of 2, 4-thiazolidinedione derivatives and evaluation of their protective effect against galactose induced and STZ diabetic cataract in rats.

Chirag Prajapati
APMC College of Pharmaceutical Education & Research, India

Cataract is viewed as a major cause of visual impairment in diabetic patients as the incidence and progression of cataract is elevated in patients with diabetes mellitus. This is the reason for highly required biochemical solutions or pharmacological intervention that will maintain the transparency of the lens and delay the progression of cataract. Polyol pathway has been implicated as a major contributor in the pathogenesis of diabetic cataract along with chronic hyperglycemia as the root cause. Male SD rats were selected for this study. In the present study, we have investigated the novel effect 2, 4- thiazolidinedione derivatives that have potential to inhibit the aldose reductase enzyme and to act as a ligand of PPAR-γ against galactose-induced and single dose (55 mg/kg i.e.) of streptozotocin induced diabetic cataract in rats. All the above models of cataract showed development of mature cataract in the disease control group at the end of the respective study. Levels of aldose reductase, polyols, sodium, calcium and malondialdehyde in the lens had significantly elevated whereas antioxidant enzymes, total proteins, soluble proteins and potassium levels had significantly decreased in disease control rats as compared to the age-matched control rats, this indicates the accelerated polyol pathway and associated oxidative stress in lens. The treatment with Compound A (80 and 200 mg/kg, p.o.) and compound B (80 and 200 mg/kg, p.o.) significantly ameliorated the alterations in polyol pathway and oxidative stress with clear delay in the onset and progression of cataract. Results of the present study suggest the potential of these compounds as pharmacological intervention against diabetic cataract.

e: chirag11_pharma@yahoo.co.in

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Joint Event

International Conference on
Diabetes, Endocrinology and Metabolic Syndrome
&
Annual Summit on
Diabetes, Obesity & Heart
March 07-08, 2019 | London, UK

Challenges and novel applications for biomarkers and new technologies: Positioning diabetes research in the 4th industrial revolution

Etheresia Pretorius
Stellenbosch University, South Africa

A strong correlation exists between type 2 diabetes mellitus (T2DM) and cardiovascular disease (CVD), with CVD and the presence of atherosclerosis being the prevailing cause of morbidity and mortality in diabetic populations. T2DM is joined by different coagulopathies, including atypical clot development or amyloid fibrin, and the existence of dysregulated inflammatory particles, and blood platelets, including blood cells are especially vulnerable, to these dysregulated inflammatory cytokines. Although T2DM is arguably, the most studied condition, the prevalence has now reached staggering levels, with a steady increase also in developing countries. Researchers therefore need to look at novel technologies and biomarkers to address the T2DM pandemic. We should therefore actively participate and use technologies from the 4th industrial revolution, which is characterized by a fusion of technologies that is blurring the lines between the digital, physical and biological spheres, collectively referred to as cyber-physical systems. In this talk, I will discuss novel biomarkers, as well as point-of-care devices for early identification of T2DM, the use of big machine learning to find disease, inflection points, leading to the ultimate goal in T2DM, that of both personalized and precision medicine.

e: resiap@sun.ac.za

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