
Poster Presentation

Diabetes 2019

Diabetes Congress 2019



Joint Event on
28th International Conference on
Diabetes and Endocrinology
&
3rd International Conference on
Diabetes and Metabolism

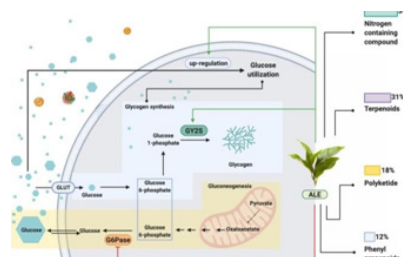
November 29-30, 2019 | Frankfurt, Germany

Investigation of molecular mechanism of glucose-lowering activity of *Aquilaria crassna* L. leave extract in HepG2 cells

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Type 2 diabetes mellitus is a chronic metabolic syndrome characterized by hyperglycemia which can further develop microvascular and macrovascular complications. *Aquilaria crassna* L. was reported as a traditional Thai medicinal plant that possesses an anti-diabetic effect in animal model. The present study revealed the mechanism by which this plant extract lowered glucose levels in cultured hepatocellular cell line, HepG2. ALE at a concentration of 6.25, 12.5 and 25 µg/mL significantly increased glucose consumption in a dose-dependent manner. The increase of glucose consumption of ALE-treated HepG2 cells was accompanied by 2-fold increase of the glycogen synthase 2 (GYS-2) mRNA expression and 50% suppressing of glucose-6-phosphatase expression. These data indicate that the anti-diabetic effect of ALE on HepG2 cells is mediated through the increased of glycogen synthesis and the decrease of gluconeogenesis. Gas-chromatography and mass spectrometry (GC-MS) analysis of the ethanolic extract of ALE consisted of nitrogen containing compounds (39%), terpenoids (31%), polyketide (18%), and phenylpropanoids (12%). Investigation of glucose-lowering effect of these

compounds is currently underway.



Mechanism of glucose-lowering effect of *A. crassna* leaves extract (ALE) in HepG2 cells, (↑; Increase, ↓; Decrease)

Speaker Biography

Phanupol Mongkolsiri is a graduate student in the Biochemistry Program at Mahidol University where he investigates biochemical activities of natural products which may be used as anti-diabetic drugs. He completed his B.Sc. in Chemistry from Mahasarakham University.

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Notes:

The association between osteoporosis and microvascular complications among egyptian type 2 diabetic patients

Hytham R Badr

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Objectives: Diabetes mellitus may adversely influence the bone quality through the regulation of bone cells. However, several studies have demonstrated increased risk of fracture in diabetic patients in spite of normal or even higher bone mass density BMD. The aim of this study was to evaluate the association between osteoporosis and micro vascular complications among Egyptian type 2 diabetic patients.

Methods: A prospective study of 78 patients with T2DM was enrolled. They were classified into two groups. Group I (Micro vascular group) included 39 diabetic patients with microvascular complications. Group II (control group) included 39 patients without microvascular complications. Group I was subdivided into 3 subgroups according to the number of microvascular complications. Age, gender, duration of diabetes, hypertension and BMI were documented. FBS, 2hPPBG, foot examination, Fundus examination and Albumin /creatinine ratio were calculated. Dual Energy X-ray Absorptiometry (DEXA) and serum osteocalcin were done to both studied groups.

Results: There was no significant difference between the two

studied groups in the DEXA scan results, the mean least T score of the microvascular group was -1.4 and that of the control group was -1.2 (P value = 0.27). The mean osteocalcin level of the micro vascular group was 35.8, while that of the control group was 13.8 showing significant difference between the two groups (P value = 0.03). The mean osteocalcin level of the microvascular1 subgroup was 17.8, that of the microvascular2 subgroup was 23.04 and that of the microvascular3 subgroup was 45.4 showing highly significant difference between the three subgroups (P value < 0.001).

Conclusion: Osteoporosis diagnosed by elevated level of serum osteocalcin is more prevalent in T2DM with microvascular complications and its prevalence increases with the increased number of these complications. However, DEXA scan is not reliable in diagnosis of osteoporosis.

Speaker Biography

Hytham R. Badr is a lecturer of diabetes and endocrinology, Menoufia University, Egypt. He has done MD of internal medicine in 2019 and Master of internal medicine in. 2016.

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 Notes:

The Impact of Oral Multivitamin Supplementation on Oxidative Stress and Lipid Profile among Sudanese Patients with T2DM

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Aim: The objective of the current study was to assess the influence of oral multivitamins supplementation on some oxidative stress parameters (serum Vitamin A, C, E, Zinc, Malondialdehyde (MDA)) and lipid profile among Sudanese patients with type- 2 diabetes mellitus (T2DM).

Material And Method: Three hundred Sudanese patients with T2DM and Hundred healthy subjects (control group) were enrolled in this cross-sectional study. Blood was collected after overnight fasting for 10-12 hrs. Fasting plasma glucose (FBG), lipid profiles, Glycosylated haemoglobin (HbA1c%), Serum zinc, Malondialdehyde (MDA), Vitamins A, E, and C levels were measured using standardised laboratory techniques. Data was collected with the help of a structured questionnaire and direct interview.


Results: Biochemical parameters of the study population were shown a highly significant difference (P value < 0.05), between the means of serum vitamin A, C, E, Zinc, MDA, HbA1c, triglycerides, HDL, FBG, total cholesterol and LDL. Significant differences in serum vitamin A, C, E, Zinc, MDA, triglycerides, HDL and FBG between people with diabetes who used multivitamins and diabetics who did not use it (P-value < 0.05).

Conclusion: The study observed a significant increase in serum levels of vitamin A, C & E and other biomarkers parameters in patients with T2DM who take oral multivitamins supplements; such improvement may lead to minimising the diabetic complications. Further studies are needed to explore the possible therapeutic role of multivitamins supplements for T2DM patients.

Speaker Biography

Abdelgadir Elamin is an Assistant Professor in Medical Laboratory Sciences Program of College of Health Sciences, Gulf Medical University. He has more than 15 years of teaching and research experience and published several scientific papers in reputed journals. Education B.Sc. Medical Laboratory Sciences (Clinical Chemistry) from University of Science and Technology, Sudan in 2002. M.Sc. Clinical Chemistry from Sudan University for Sciences and Technology, Sudan in 2008. Ph.D. in Clinical Chemistry from University of Science and Technology, Sudan in 2015. Research Interests focus on Oxidative stress-induced risk factors associated with the metabolic syndrome Diabetes Cardiovascular Disorders and Antioxidant.

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E-Poster

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METABOLIC ACTIVITY OF HUMAN CHORIONIC GONADOTROPIN (hCG) ON GLYCEMIA AND LEPTINEMIA IN CAFETERIA-FED DIET EXPERIMENTAL ANIMALS



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OBJECTIVE: The goal was to determine the modifications in plasmatic levels of adiponectins, glucose, and leptins in rats previously overfed with cafeteria diet. They were afterwards submitted to a hypocaloric diet combined with daily administration of either enteral or parenteral formulations of rHCG (recombinant) or uHCG (urinary) human Chorionic Gonadotropin (hCG).

Groups: 42 animals were selected for the study, and sorted as follows:

Group 0: control group.

Groups 1 to 6: fed with a hypercaloric and highly palatable cafeteria diet, as opposite to animals from group 0 which continued with standard laboratory diet.

- The amount of food provided with this diet was "ad libitum" and extended for a period of 45 days.
- After the fattening period, animals in group 1 to 6 were subjected to a restricted diet consisting in one-third of the average daily intake of balanced food for rats, calculated separately for both males and females.
- During the overfeeding period rats from groups 1 to 6 (group 0: standard diet) gained an average of 30% of their initial body weight. Thereafter, animals from groups 1 to 6 were administered a hypocaloric diet. Group 0 continued with standard diet.
- Animals in groups 2 to 6 received different hCG formulations – either urinary or recombinant – on a daily basis via intramuscular or intrarectal administration routes.

hCG administration: hCG was administered as follows during the five treatment weeks:

Group 0 did not receive any medication or diet, and continued with the standard diet throughout the course of the study.

Group 1 was submitted to a hypocaloric diet, without hCG administration.

Group 2 was submitted to a hypocaloric diet and received 125 International Units (IU) of hCG (urinary, Massone Laboratories, Argentina) dissolved in normal saline (NaCl 0.9%), administered intramuscularly, daily, including Sundays (Injectable A).

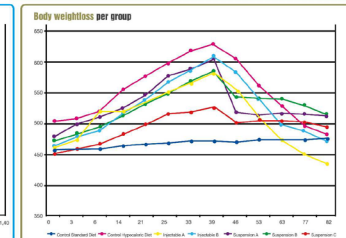
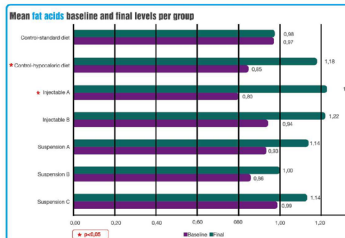
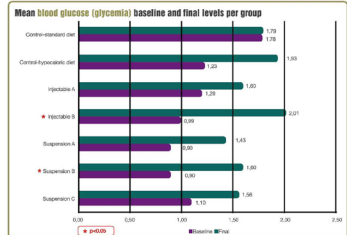
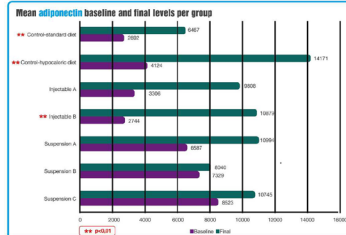
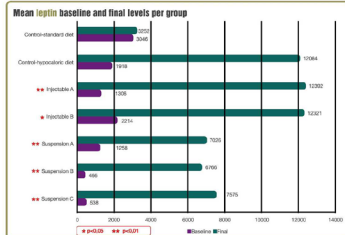
Group 3 was submitted to a hypocaloric diet and received 125 IU of r-hCG (Recombinant, Ovidrel, Serono Laboratories) dissolved in normal saline (0.9% NaCl) administered intramuscularly, daily, including Sundays (Injectable B).

Group 4 was submitted to a hypocaloric diet and received 300 IU of hCG (urinary, Massone Laboratories, Argentina) in intrarectal emulsion containing 8 mg/ml of cyclodextrin as enhancer, daily, including Sundays (Intrarectal Suspension A).

Group 5 was submitted to a hypocaloric diet and received 300 IU of hCG (urinary, Massone Laboratories, Argentina) in intrarectal emulsion containing 16 mg/ml of cyclodextrin as enhancer, daily, including Sundays (Intrarectal Suspension B).

Group 6 was submitted to a hypocaloric diet and received 300 IU of r-hCG (Recombinant, Ovidrel, Serono Laboratories) as intrarectal emulsion containing 8 mg/ml of cyclodextrin as enhancer, daily, including Sundays (Intrarectal Suspension C).

Assessments: Body weight determinations, as well as plasmatic glucose, adiponectin, leptin and non-esterified fatty acids (NEFA) determinations were assessed.



Leptin plays a key role in the regulation of energy metabolism. Serum leptin levels are increased in obesity in proportion to the amount of body fat. In disorders such as overweight and obesity, it is found elevated in plasma, suggesting that resistance to its action determines an impairment of the regulation of adipose tissue metabolism. Weight gain also determines the presence of hyperglycemia, a metabolic situation that clearly aggravates the underlying pathology (obesity). Selective leptin resistance contributes to obesity related hypertension and also contribute to other metabolic complications in obesity.

RESULTS

LEPTINS

- 1. At the end of the study, leptinemia levels were significantly higher in Control group; decreased in the group under hypocaloric diet and more noticeably in animals who received hCG.
 - 2. The group treated with intrarectal Suspension B achieved the lowest values (analysis per dose).
 - 3. The group treated with Injectable A/intrarectal Suspension A/intrarectal Suspension B groups displayed the lowest levels (analysis of the formulation).
 - 4. Intrarectal Suspension A/B/C groups displayed the lowest levels (analysis of the pharmaceutical formulation).
- No significant differences were observed between groups that did not receive hCG.

GLYCEMIA

- 5. At the end of the study, treated groups displayed lower significantly values, with lowest mean values in:
- 4. Animals treated with Intrarectal Suspension B (analysis per dose).
- 5. Animals treated with Injectable A/intrarectal Suspension A/intrarectal Suspension B (analysis of the formulation).
- 6. Animals treated with intrarectal Suspension A/B/C (analysis of pharmaceutical form).

CONCLUSIONS

Experimental animals previously submitted to fattening cafeteria diet displayed a significant reduction on glycemia and leptinemia levels after of either enteral or parenteral hCG administration. We conclude hCG may be considered a therapeutic approach for those pathologies associated with hyperglycemia and hyperleptinemia, such as obesity, type 2 diabetes and metabolic syndrome. Regarding weightloss, no significant differences were observed in all tested groups. No adverse pathologic events were observed even with the suprapharmacological doses administered (up to 400 times the dose/kg of body weight administered in humans). As far as we know, this is the first report demonstrating the enteral absorption and metabolic activity of either urinary (uHCG) or recombinant hCG (rHCG) on several plasmatic determinations related to obesity and its comorbidity.

Accepted Abstracts

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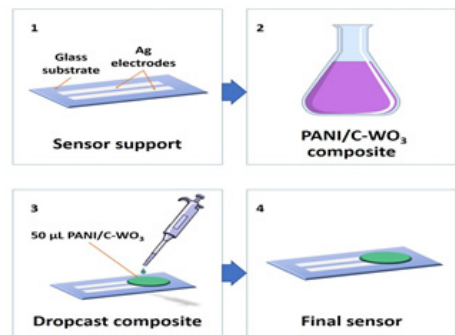
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Electrochemical PANI / cellulose / WO₃ sensor to detect acetone derivatives in the breath of patients with diabetes mellitus

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The concentration of acetone derivatives in human breath was reported within 300–900 ppbv for healthy subjects and 1800 ppbv for diabetic subjects [4, 5]. This is why acetone derivatives are proposed as biomarkers present in human breath for clinical analysis of diseases such as Diabetes Mellitus (DM). Chemical sensors based on semiconductor metallic oxides (SMO) have emerged as an active research area. In those sensors, the surface is modified by adsorption of gas species and space charge effects, affecting their conductivity. When SMO sensor is exposed to reducing conditions, the adsorbed oxygen is removed by reaction with the reducing gas and the reinjection of electrons reduces SMO resistance. Since acetone acts as a reducing gas, detection by sensors such as ZnO [7], In₂O₃ [8], and SnO₂ [9] has been previously studied but among SMO materials WO₃ has been proposed as the most

suitable material for acetone sensing [10]. WO₃ is a *n*-type semiconductor with a band gap between 2.6 and 3.0 eV [11]. Adsorbed oxygen species on WO₃ causes the transfer of electrons from WO₃ conduction band to form O₂⁻ and O⁻ species. The interaction of a reducing gas, such as acetone with the chemisorbed oxygen, releases an electron to the conduction band of WO₃, which decrease its resistance.



In order to improve the WO₃ sensitivity, doping with carbon sources such as glucose and cotton has been reported as an effective strategy to reduce the band gap value, improving WO₃ semiconductive characteristics [12]. In this work, a nanocomposite of PANI and WO₃ doped with carbon derived from cellulose (C–WO₃) was proposed for acetone detection at room temperature. The sensor was fabricated with two silver electrodes over an inert substrate with the PANI/C–WO₃ composite deposited in between. Sensibility of the device was evaluated by EIS at room temperature.

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Ethnobotanical and ethnotherapeutic investigations on plant species used in the treatment of T2D in Guinean traditional medicine


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As in other sub-Saharan Africa countries, the majority of Guinean population depend on traditional and herbal medicines, for their healthcare needs. Although traditional medicine knowledge have been passed on orally among traditional health practioners for many generations, concern has been often raised about the effectiveness and security of their remedies. Aiming to improve the health conditions of the populations through a rational use of the Guinean Pharmacopea and Traditional Medicine, an ethnobotanical Investigation, an ethnobotanical Investigation conducted in the middle and coastal lowlands of Guinea made it possible to contact 198 traditional healers, 108 herbalists and 397 diabetic patients. An inventory of 188 identified plant species belonging to 55 botanical families was made.

Based on their quotation over healers, herbalists and consumers, based also on their distribution, longtime use, 8 plant species were selected viz Englerina lecardii, Combretum glutinosum, Ficus glumosa, Jatropha gossypifolia, Anacardium occidentale, Hymenocardia acida, Bauhinia thonningii, Spathodea campanulata. When subjected to ethnotherapeutic evaluation on volunteer patients for a period of 2 to 6 months, slight, modest and significant declines in fasting blood sugar were recorded, depending on the species. The lowest blood sugar (2.14 from the baseline to 1.15 g/L at the end of treatment) were recorded with patients treated with he extract of « Sattagas ». Upon consideration of these results, Guinean medicinal plant species may constitute a source of new bioactive molecules for the management of type2 diabetes.

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 Notes: