

**ABSTRACTS OF THE  
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**OMEGA - 3 FATTY ACIDS MITIGATE  
OXIDATIVE AND INFLAMMATORY EVENTS IN  
LEAD - TREATED RATS**

**\*W.J. Adeyemi, and L.A. Olayaki.**

Physiology Department, University of Ilorin, Ilorin, Nigeria  
Corresponding author: [adeyemiwalej@gmail.com](mailto:adeyemiwalej@gmail.com); +2348062599755

Lead remains a constant threat to our environment because of its non-biodegradable nature (Olayaki *et al.*, 2018). Therefore, the study investigated the effects of omega-3 fatty acids (N-3) in lead-treated rats. Twenty male Wistar rats of five animals per group were used for this study. The control group received saline (0.1ml, *po*, daily) during the four weeks duration of the experiment, while group 2 received lead chloride (PbCl<sub>2</sub>) and saline during the first and last two weeks of the experiment respectively. Groups 3 and 4 were administered lead during the first two weeks; afterwards, they were treated with N-3 during the subsequent two weeks. PbCl<sub>2</sub> was administered at 50mg/kg bw/day(*po*), while N-3 were administered at a low and high dose of 100 and 300mg/kg b.w./day(*po*) respectively. The results showed that there were significant elevations in the plasma levels of TNF- $\alpha$ , IL-6, CRP and MDA, and significant decreases in SOD, catalase and total antioxidant capacity (TAC) in the lead untreated group (Kim *et al.*, 2007). Post-treatment with N-3 after lead exposure caused significant diminutions in TNF- $\alpha$ , IL-6, CRP, ROS, and MDA, and significant increases in catalase, SOD and TAC, relative to lead untreated group. The low dose of N-3 had more significant effects on TNF- $\alpha$ , IL-6, CRP, MDA and TAC, compared to the high dose. However, the latter demonstrated more significant effects on catalase, SOD and ROS. The study concluded that dietary supplementation with N-3, preferably at a low dose, mitigate the adverse effects of lead via antioxidative and anti-inflammatory mechanisms

**MODULATORY ROLE OF SELENIUM YEAST ON  
OXIDATIVE STRESS BIOMARKERS OF  
CHOLESTEROL DIET INDUCED TYPE 2  
DIABETES MELLITUS IN WISTAR RATS**

**<sup>1</sup>A. Adam, <sup>1</sup>S. Abdullahi, <sup>1</sup>A. Jimoh, <sup>1</sup>Y. Tanko, <sup>1</sup>L. Ekeh, <sup>1</sup>A. Mohammed, and <sup>2</sup>J. O. Ayo.**

<sup>1</sup> Department of Human Physiology, <sup>2</sup> Department of Veterinary Physiology, Ahmadu Bello University, Zaria, Nigeria  
Corresponding author: [adamabdulhameed0507@gmail.com](mailto:adamabdulhameed0507@gmail.com);  
+2348039148189

Selenium is an antioxidant that prevents oxygen radical from damaging cells from chronic diseases that can develop from cell injury and inflammation such as diabetes

mellitus. The aim of the study is to investigate the possible protective effect of selenium yeast on oxidative stress biomarkers of cholesterol diet induced type-2 diabetes mellitus in rats. Twenty male wistar rats were divided in to four groups of five animals each: Group 1: (Negative control) received standard animal feed only, Group 2: received cholesterol diet (CD) only, Group 3: received CD and 0.1 mg/kg selenium yeast orally, Group 4: Received CD and 0.2 mg/kg selenium yeast orally for six weeks. At the end of the study period, the animals were sacrificed and the serum samples were collected and evaluated for estimation of blood glucose levels and antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx). The results showed a significant ( $P < 0.05$ ) decrease in blood glucose level in the groups co-administered CD and selenium yeast when compared to CD group only. Antioxidant enzymes status recorded significant ( $P < 0.05$ ) decrease in SOD, CAT and GPx activities in CD and selenium yeast administered when compared to CD group only. In Conclusion, Selenium yeast administrations prevent free radical formations which are potent inducers of diabetes mellitus.

**AGE-DEPENDENT CHANGES IN VASCULAR  
REACTIVITY IS INDUCED BY ARGINASE IN  
SPONTANEOUSLY HYPERTENSIVE RATS**

**<sup>1,2</sup>O. Arishe, <sup>1</sup>J. McKenzie, <sup>1</sup>F. Priviero, <sup>2</sup>A. Ebeigbe, and <sup>1</sup>R.C. Webb.**

Departments of Physiology, <sup>1</sup>Medical College of Georgia at Augusta University, Augusta, GA, USA and <sup>2</sup>College of Medical Sciences, University of Benin, Benin City, Nigeria.  
Corresponding author: [oarishe@augusta.edu](mailto:oarishe@augusta.edu); +17063943582

Arginase activity reduces substrate (L-arginine) availability for nitric oxide formation while enhanced vascular arginase activity contributes to endothelial dysfunction in Dahl-S rats with salt-induced hypertension. There is a paucity of information on vascular arginase activity of aged normotensive and spontaneously hypertensive rats (SHR). This study tests the hypothesis that the age-dependent vascular endothelial dysfunction in thoracic aorta from SHRs is mediated by Arginase. Acetylcholine (ACH) [ $10^{-9}$ – $3 \times 10^{-5}$ M] - induced concentration-dependent relaxation responses of thoracic aortic rings from young and old SHR and control rats were evaluated, using wire myography, in the absence and following incubation for 30 minutes with L-Arginase (0.5U/ML). Endothelium-independent relaxation was also evaluated using sodium nitroprusside (SNP) [ $10^{-12}$  –  $3 \times 10^{-10}$

5 M]. Vessels were pre-constricted with 10- $\mu$ M phenylephrine. Data are expressed as mean  $\pm$  S.E.M. of 6 rats per group; statistical differences were calculated using Student's t-test and two-way ANOVA with repeated measures followed by Bonferroni post hoc test. Significance was set at  $p < 0.05$ . ACH and SNP-induced relaxation responses were significantly decreased in aortic rings from old SHR incubated with L-arginase compared with the rings without L-arginase ( $p < 0.0001$ ) but were unchanged in the young SHRs. ACH and SNP relaxation responses were also unchanged in aortic rings from old and young control rats, in the absence or presence of L-Arginase [0.5U/ML]. Results suggest that arginase promotes vascular endothelial dysfunction in the old SHR as well as vascular smooth muscle dysfunction.

### **EFFECT OF HEXANE LEAF EXTRACT OF LAUNAEA TARAXACIFOLIA, RESVERATROL AND THEIR COMBINATION ON SERUM PROLACTIN AND OXYTOCIN LEVELS OF LACTATING FEMALE WISTAR RATS**

**\*1N.A. Sani, 1M.U. Kawu, 2I.G. Bako, and 3A.M. Tauheed.**

<sup>1</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria  
<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medicine, Ahmadu Bello University, Zaria  
<sup>3</sup>Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria

\*Correspondence: [saninaimatu@gmail.com](mailto:saninaimatu@gmail.com); +2348065942924

Lactogenesis, a neuro-endocrine event, is a complex neurophysiological process that involves interaction of a number of physical and emotional factors along with the action of multiple hormones, mainly prolactin. The aim of this study was to evaluate the comparative effects of *Launaea taraxacifolia* and resveratrol on serum prolactin (Prl) and oxytocin (Oxt) levels of lactating female Wistar rats. Twenty-five mature nulliparous female rats weighing 150-200 g were bred for the study. Following parturition, the number of pups per dam was adjusted to 5 and the dams were randomly allocated into five groups of 5 dams each. Dams in groups I, II, III, IV and V were administered distilled water (DW: 2 ml/kg) and metochlopramide (MET: 15 mg/kg), resveratrol (RES: 5 mg/kg), n-hexane leaf extract of *L. taraxacifolia* (LTF: 250 mg/kg) and their combination (CO; RES + LTF: 5+250 mg/kg) for 12 days (Cai *et al.*, 2015). Serum was harvested and assayed with rat specific Prl and Oxt ELISA kits. The concentration of Prl was highest ( $P < 0.05$ ) in LTF group when compared to other groups. Paradoxically, CO had lower ( $P > 0.05$ ) concentration of Prl when compared to LTF and RES groups. However, Oxt concentration was highest ( $P < 0.05$ ) in CO group when compared to other groups. The LTF group had higher ( $P < 0.05$ ) Oxt concentration than MET and RES groups. In conclusion, *L. taraxacifolia* stimulated hyper prolactinaemia, while its combination with resveratrol caused increased serum oxytocin levels. Therefore, it is recommended that LTF could be beneficial as a galactagogue, while its coadministration with RES could serve as a potent stimulator of the milk let down reflex.

### **EFFECTS OF SOYA BEAN SUPPLEMENTS ON BLOOD GLUCOSE LEVELS AND LIPID PROFILE OF ALLOXAN INDUCED DIABETES MELLITUS IN WISTAR RATS**

**\*1N.M. Sada, 2Y. Tanko, 1A. Abdulrazak, 2A. Jimoh, and 1K.A. Mohammed.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medicine, Kaduna State University, Kaduna State, Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Science, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

Corresponding author: [maryamnaiya@gmail.com](mailto:maryamnaiya@gmail.com); +2348033655327

Uncontrolled diabetes leads to several complications that affect many organs of the body. The health- beneficial effects of dietary fibres and antioxidants derived from plant food sources including soya beans are being extensively studied. This study aimed to evaluate the effects of soya bean supplements on blood glucose levels and lipid profile of alloxan-induced diabetes mellitus in Wistar rats. Twenty albino Wistar rats of both sexes between 120-150 grams were used for this study. Diabetes mellitus was induced by a single intraperitoneal injection of alloxan monohydrate at a dose of 150mg/kg body weight. Rats having fasting blood glucose levels of 200mg/dL and above after the induction were used for the study. The diabetic rats were grouped into four groups of five rats each: Group 1 (negative control) received distilled water orally for two weeks; Group 2 (positive control) were administered 5mg/kg body weight of glibenclamide orally for two weeks; Groups 3 and 4 were fed with 25% and 50% soya bean supplements respectively for two weeks. The fasting blood glucose levels were determined at intervals of 0, 1, 3, 6, 9 and 12 days respectively using a digital glucometer based on the glucose oxidase method. The animals were anaesthetised at the time of sacrifice by being placed in a sealed inhalation jar containing chloroform-soaked cotton wool. Blood samples were taken from all the groups for the determination of lipid profile. Data obtained were analysed using analysis of variance (ANOVA). The fasting blood glucose levels and lipid profile were significantly reduced ( $P \leq 0.05$ ) in the soya beans supplemented group as compared with the control group after the two weeks of supplementation. Soya bean supplementation was found to have blood-glucose lowering potential and anti-lipidaemic activity in Alloxan-induced diabetic Wistar rats.

### **MODULATORY ROLE OF TAURINE IN ALLOXAN-INDUCED OXIDATIVE STRESS, BODY WEIGHT AND BLOOD GLUCOSE CHANGES IN WISTAR RATS**

**\*1K.I. Salihu, 1J. Abdulazeez, 1Y. Tanko, 2R. Yusuf, 1J.A. Tende, 1S. Abdullahi, 1A. Mohammed, and 3J.O. Ayo.**

<sup>1</sup>College of Health Sciences, Faculty of Basic Medical Sciences, Human Physiology Department, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

<sup>2</sup>College of Health Sciences, Faculty of Clinical Sciences, Chemical Pathology Department, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

<sup>3</sup>Faculty of Veterinary Medicine, Department of Veterinary Physiology, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

\*Corresponding author: [deejah212@gmail.com](mailto:deejah212@gmail.com); +2348032234631

In this study, the preventive effect of taurine on body weight, blood glucose level, oxidative stress and lipid peroxidation in alloxan-induced diabetes mellitus in wistar rats was determined. Diabetes was induced by single intraperitoneal injection of alloxan monohydrate (150 mg/kg). Blood glucose level was measured after 72 hours of induction and diabetes was considered in animals with blood glucose level greater than 200 mg/dl with Accu-Check Active Glucometer. The rats were grouped into (5) groups of five animals each n = (5) Group 1: Normal control, Group 2: diabetes untreated, Group 3: diabetes treated with 100 mg/kg taurine, Group 4: diabetes treated with 200 mg/kg taurine, and Group 5: diabetes treated with glibenclamide (1 mg/ml). Blood glucose and body weight of the rats were measured on weekly basis for three consecutive weeks. At the end of the treatment, all animals were sacrificed and blood samples were collected for serum extraction and determination of oxidative stress biomarkers and lipid peroxidation. The result of the present study shows a significant (P < 0.05) decrease in body weight and blood glucose level in groups that received 100 and 200 mg/ kg of taurine compared with diabetes untreated group alone at 21 days of the experiment. For oxidative stress biomarkers superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx), P values < 0.05 were considered significant. Lipid peroxidation activities also showed a significant (P < 0.05) decrease in serum malondialdehyde (MDA) concentrations in the treatment groups. In conclusion, this study revealed that taurine could be a preventive supplement against oxidative stress in alloxan-induced diabetes and could be a potent supplement to mitigate against its occurrence.

#### EFFECT OF SELENIUM YEAST SUPPLEMENTATION ON SOME OXIDATIVE STRESS BIOMAKERS IN STZ-INDUCED DIABETIC NEUROPATHY IN WISTAR RATS

\***H. S. Abubakar, 2A. Mohammed, 2Y. Tanko, and 2A. S. Isa.**

<sup>1</sup> Department of Human Physiology, Faculty of Basic Medical Sciences, Yusuf Maitama Sule University, Kano, Nigeria

<sup>2</sup> Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria, Nigeria

\*Corresponding author: [hajab21@gmail.com](mailto:hajab21@gmail.com); +2348065825740

Diabetic neuropathy is a long-term complication of diabetes, which affects half of the diabetic population. There is no prophylactic therapy against painful diabetic neuropathy. Current approaches are restricted to alleviating established pain by using drugs that are effective in other pain conditions and hoping to find one with enough efficacy and minimal side effect to be useful. The study investigated the effect of selenium yeast supplementation, an antioxidant and anti-inflammatory compound on some oxidative stress biomarkers in streptozotocin-induced diabetic neuropathy in Wistar rats. Thirty (30) adult Wistar rats with an average weight of 150 g were randomly divided into groups of five rats each (n=5). Diabetic neuropathy was induced by single intraperitoneal injection of 60 mg/kg streptozotocin dissolved in 0.1ml citrate buffer (pH 4.5). Groups I, II and III received 1mg/kg distilled water and aspirin (300mg/kg) while groups IV and V received 0.2 mg/kg and 0.3 mg/kg selenium yeast respectively. Blood plasma glucose

concentration was determined weekly for four weeks. At the end of the fourth week, rats were euthanized and blood samples were collected and used to estimate for Malondialdehyde, glutathione peroxidase and superoxide dismutase concentration. The result showed that Streptozotocin (STZ) significantly (p < 0.05) increased MDA concentration while SOD and GPx levels were significantly reduced. Selenium yeast supplementation significantly enhanced antioxidant enzyme activity (p < 0.05). The results demonstrated that selenium yeast supplementation was beneficial in diabetic neuropathy via attenuation of oxidative stress. This suggests that Selenium yeast (0.2mg/kg) has potentials for the prevention of diabetic-induced neuropathy.

#### INVESTIGATION OF EFFECTS OF HYDROMETHANOLIC LEAF EXTRACT OF *CNIDOSCOLUS ACONITIFOLIUS* ON SOME LIVER ENZYMES AND HISTOLOGY IN STREPTOZOTOCIN INDUCED DIABETIC WISTAR RATS.

\***I.I. Welch, N.A. Chuemere, and F. S. Amah-Tariah.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port-Harcourt, Nigeria.

\*Corresponding author: [lyke\\_welc@yahoo.com](mailto:lyke_welc@yahoo.com); +2348038908881

The potency of plants are largely due to their phytochemicals constituents. These phytochemicals often times affects biochemical activities in animals and humans, thus the reason for the attention due to possible adverse effects or benefits, especially on liver enzymes and histology. This study is aimed at investigating the effects of hydromethanolic leaf extracts of *Cnidioscolus aconitifolius* on liver enzyme and histology in streptozotocin induced diabetic wistar rats. Thirty wistar rats with an average weight of 230grams were randomly assigned into five groups of six animals each. Group 1, served as negative control (non-diabetic) and received normal chow and water *ad libitum*, group 2 served as positive control group and received 10mg/kg bw of glibenclamide, groups 3, 4 and 5 served experimental group and received 100mg/kg bw, 150mg/kg bw and 200mg/kg body weight induced of C.A orally for 28days after being induced with diabetes using streptozotocin. Phytochemical screening of the extract revealed the presence of highly abundant level of alkaloids and flavonoids with moderate levels of tannins, phlobotannins, saponins, terpenes cardiac glycoside and cynogenetic glycoside. Administration of the extract shows significant (p< 0.05) increase in AST, ALT, ALP concentrations and alteration of the hepatic cells in the experimental group. The biological active phytochemicals in the hydromethanolic leaf extract of C.A may disrupt the liver enzymes, thus inducing cell rupture in the hepatocellular architecture, and might be hepatotoxic.

#### EFFECT OF AQUEOUS CRUDE EXTRACT OF *SENNA OCCIDENTALIS* LEAVES ON ANGIOTENSIN CONVERTING ENZYME (ACE) ACTIVITY IN HIGH-FAT-DIET INDUCED OBESITY IN WISTAR RATS

\***N.M. Gidado, 2A. Adam, and 2S. Ibrahim.**

<sup>1</sup>Department of Human Physiology, Yusuf Maitama Sule University, Kano, Nigeria.

<sup>2</sup>Department of Biochemistry, Ahmadu Bello University, Zaria, Nigeria.

\*Corresponding author: Email: [nmgidado@gmail.com](mailto:nmgidado@gmail.com); +2347037731956

Hypertension is one of the most common diseases across the globe responsible for many deaths resulting from some of its serious complications. There is a constant quest for better and safer medications in order to improve patients' quality of life. *Senna occidentalis* is extensively used in folklore medicine to treat several illnesses with little validation of its therapeutic benefits. Thus, the scientific evaluation of the effect of aqueous extract of *Senna occidentalis* on angiotensin converting enzyme (ACE) in obese Wistar rats was carried out in the present study. Samples from kidney, lung and heart tissues from 30 animals were used for the study which lasted for 3 weeks. Experimental animals were grouped into six (n=5) as normal control, obese control, Captopril 1.07mg/kgbw/day, obese + 100 mg/kgbw/day extract and obese + 250 mg/kgbw/day extract groups. Obesity was induced by feeding the animals with high-fat diet for eight weeks after which treatment was embarked upon. From the result of the present study, ACE activity was found to increase significantly ( $P < 0.05$ ) in lung, kidney and heart in obese control rats when compared to those of normal control group. ACE activity in kidney, lung and heart of obese Wistar rats treated with aqueous crude extract of *Senna occidentalis* at doses of 100mg/kg bw/day and 250mg/kg bw/day was found to decrease significantly ( $P < 0.05$ ) at the dose of 250mg/kg bw/day when compared to obese untreated group. ACE activity of normal group treated with 250mg/kg bw/day was found to decrease but not significantly ( $P < 0.05$ ) when compared to both normal control and obese untreated groups. The observed effect in the present study could be attributed to active principles present in the extract. Thus, aqueous extract of *Senna occidentalis* can be relevant in the management of hypertension.

#### EFFECT OF L-CITRULLINE ON HYPERLIPIDEMIC WISTAR RATS

V. Ajibade, Y. Tanko, A. Muhammed, J. Abdulazzez, and N.S. Emmanuel

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University Zaria, Kaduna Nigeria

Hyperlipidemia is a common predicament in society due to change of lifestyle and food practice. The study was designed to evaluate the effect of L-citrulline on hyperlipidemia. Twenty five male Wistar rats were divided into five groups of 5 animals each. (n=5) and treated for 21 days every 48hr interval. Group I (Normal Control), Groups II (Hyperlipidemic control), Group III (P-407+ Atorvastatin), Group IV (P-407+ 400mg L-citrulline), Group V (P-407+ 800mg L-citrulline). At the end of the experiment, blood samples were collected and the serum separated for evaluation of lipid profiles. L-Citrulline decreases total cholesterol (796.84±42.962 mg/dl) vs (732.21±13.77 mg/dl, 721.63±9.293 mg/dl) but however, was not significant ( $P < 0.05$ ). Triglyceride level was significantly ( $p < 0.05$ ) decreased in a dose dependent manner (319.60 ± 11.58) vs (147.60±15.52, 139.40±15.13) However, was not significant ( $P < 0.05$ ). High

density lipoprotein was increased (274.75±20.4) vs (319.30±27.2, 320.80±7.94) but however, was not significant ( $P < 0.05$ ). Low density lipoprotein cholesterol decreased significantly ( $p < 0.05$ ) in a dose dependent manner (333.53 ± 30.24) vs (234.73±31.12, 175.30±8.21). In conclusion, L-citrulline decreases lipid profile in hyperlipidemia induced male wistar rats after 21 days oral administration.

#### COMPARATIVE EVALUATION OF GALACTOPOIETIC EFFECTS OF HEXANE LEAF EXTRACT OF *LAUNAEA TARAXACIFOLIA* AND RESVERATROL IN LACTATING FEMALE WISTAR RATS

\*<sup>1</sup>N.A. Sani, <sup>1</sup>M.U. Kawu, <sup>2</sup>I.G. Bako, and <sup>3</sup>A.M. Tauheed.

<sup>1</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medicine, Ahmadu Bello University, Zaria

<sup>3</sup>Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria

\*Corresponding author: [saninaimatu@gmail.com](mailto:saninaimatu@gmail.com); +2348065942924

The inadequacy of milk supply to meet the increasing human population coupled with a decreasing livestock population has necessitated the need for a potent galactogoue, particularly from plant origin. This study was aimed at evaluating the galactopoietic effects of n-hexane leaf extract of *L. taraxacifolia* (LTF), resveratrol and their combination in Wistar rats. Twenty-five mature nulliparous female Wistar rats were bred and following parturition, the number of pups per dam was adjusted to 5. The dams and pups were divided into five groups of 5 dams each. The dams in groups I, II, III, IV and V were treated by gavage daily at 7:00 pm with distilled water (DW, 2 ml/kg), metochlopramide (MET, 15 mg/kg), resveratrol (RES, 5 mg/kg), LTF (250 mg/kg) and the combination of RES and LTF (CO, 5 + 250 mg/kg), respectively. The administration commenced on day 2 through to day 14 of lactation. Pups were weighed three times daily at 13:00 (W<sub>1</sub>), 17:00 (W<sub>2</sub>) and 18:00 (W<sub>3</sub>) hours, respectively. The W<sub>1</sub>, W<sub>3</sub> - W<sub>2</sub> and (W<sub>1</sub> - W<sub>0</sub>)/W<sub>0</sub> denote daily weight of pups, milk yield and percentage growth rate, respectively. The results showed that milk yield was non significantly ( $P > 0.05$ ) higher in CO and LTF than the yield obtained in RES, MET and DW groups. The daily weight gain of pups was significantly greater ( $P < 0.05$ ) in LTF, RES and CO groups when compared to DW group. Although the LTF group had higher daily weight gain than the RES and CO groups, it was not significant ( $P > 0.05$ ). However, percentage growth rate was significantly lower in MET and LTF groups compared to other groups; while RES had significantly higher percentage growth rate than CO. In conclusion, *Launaea taraxacifolia* and resveratrol exhibited galactopoietic potentials individually, and synergistically when co-administered.

#### IMPAIRMENT OF CARDIOVASCULAR FUNCTION INDICES IN MALE WISTAR RATS INDUCED BY ALUMINIUM-TAINTED WATER: ATHEROGENIC INDICES AND PREDICTOR RATIO ASSESSMENT

\*<sup>1</sup>A. N. Chuemere, and <sup>2</sup>O.N. Ilochi.

<sup>1</sup>Department of Human Physiology, College of Health Sciences, University of Port Harcourt, P.M.B 5323 Choba Port Harcourt, Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Madonna University Elele, Rivers State, Nigeria.

\*Corresponding author: [arthur.nwafor@uniport.edu.ng](mailto:arthur.nwafor@uniport.edu.ng);

Cardiovascular disease (CVD) epidemic is an ever-growing health problem and remains the leading cause of death in all regions of the world. Currently, there is growing evidence that exposure to metal pollutant is a risk factor that disturbs lipid metabolism with increase risk for CVD. The present work aimed to evaluate the toxicity of aluminium chloride - tainted drinking water (AlCl<sub>3</sub>) on lipid profile in male wistar rats in assessing cardiovascular risk by using atherogenic indices and prediction ratio. Fifty (50) male Wistar rats were randomly assigned to five groups of 10 rats each. Group A was given normal drinking water whilst AlCl<sub>3</sub> treated groups B, C, D and E received 200, 400, 600 and 800mg/kg of AlCl<sub>3</sub> respectively via orogastric route once daily for 28 days. Thereafter, blood samples were collected for lipid profile analysis. Atherogenic indices like Castelli's Risk Index (CRI), Atherogenic Index of Plasma (AIP), and Atherogenic Coefficient (AC), lipid ratios and predictor ratios were determined. With values significantly different at P≤0.05, the estimated atherogenic indices- CR1-11, AC and CR1-1, ratios TG/HDL-c, TC-HDL-c/HDL-c, TC/HDL-c and low HDL-c/LDL-c, dose-dependently rose approximately and significantly differently determined cardiovascular risk in rats by AlCl<sub>3</sub>. Predictor ratio however, revealed that AIP did not significantly impact the risk of cardiovascular disease in rats. In conclusion, exposure to AlCl<sub>3</sub> elicited concurrently dose-response proliferation of both dyslipidaemia and atherogenic indices differentially with resultant deleterious effect in cardiovascular cells and tissues in rats. AIP may not be an independent factor in AlCl<sub>3</sub> impacting the risk of CVD in rats. These might be the various possible mechanisms of aluminium toxicity in male rat cardiovascular risk.

#### **CLOTTING TIME AND CALCIUM HOMEOSTASIS AMONGST POSTPARTUM HEMORRHAGE PATIENTS ATTENDING MURTALA MUHAMMED SPECIALIST HOSPITAL, KANO**

<sup>1</sup>T. Danjuma, <sup>1c</sup>M.A.G. Zakariyyah, <sup>1b</sup>S. Muhammad, <sup>1L</sup>L. Sani, <sup>1F.D</sup>F.D. Taura, and <sup>\*1a</sup>G.M. Dissi.

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Bayero University, Kano, Nigeria: <sup>a</sup>Environmental Physiology Unit, <sup>b</sup>Endocrinology and Reproduction Unit, <sup>c</sup>Cardiopulmonary and Exercise Physiology Unit

\*Corresponding author: [dissigambomahdi@yahoo.com](mailto:dissigambomahdi@yahoo.com); +2348032210235

According to the World Health Organization, 15 women dies every hour as a result of obstetrics hemorrhage, with large proportion of these deaths occurring in developing countries. Several factors have been outlined as possible causes of postpartum hemorrhage (PPH) among which includes uterine atony. Serum calcium has been known to play a central role in vascular spasm, clotting mechanism and uterine tonicity, both of which affects uterine bleeding; hence disrupted calcium homeostasis may perhaps contribute to the incidence of PPH. Few local data is available on the relationship between PPH and clotting

time, serum calcium and serum proteins. This study therefore assessed clotting time, serum calcium and phosphate levels as well as serum proteins among PPH patients and their normal delivery cohorts in Murtala Muhammad Specialist Hospital (MMSH), Kano, using a cross sectional comparative study design. Thirty (30) post partum hemorrhage patients matched with 30 cohorts of normal delivery were recruited after signing an informed consent. Blood samples were collected from the ante-cubital vein and transferred to a plain sample container for the estimation of serum analytes while clotting time was estimated using Dukes method. Sample analysis were done using specific kits obtained from Randox laboratories LTD, UK, all, according to the manufacturer's instructions. Data analysis was done using SPSS (v.20.0) and was summarized using mean±SD. An independent samples t-test was used to compare variables between the groups and statistical significance was set at 5% margin of error. The results indicated that PPH patients had significantly (p=0.001) higher clotting time, lower serum calcium, lower albumin and total serum protein than the controls. Serum phosphate was however not statistically different between the groups. In conclusion, the findings may point to an abnormality in calcium homeostasis of the PPH patients.

#### **ASSESSMENT OF MODULATORY ROLE OF CLOVE SUPPLEMENT ON LEAD INDUCED MEMORY IMPAIRMENT IN WISTAR RATS USING ELEVATED T AND Y MAZES.**

<sup>1</sup>M. A. Sabiu, <sup>1A</sup>A. H. Umar, <sup>2</sup>Z. Muhammad, <sup>1A</sup>Abdulzeez, <sup>1H</sup>H. Sulaiman, <sup>1H</sup>H. Abba, <sup>1M</sup>Abdulwahab

<sup>1</sup>Department of Human Physiology, College of Medicine, Ahmadu Bello University Zaria, Nigeria.

<sup>2</sup>Department of Human Physiology, College of Medicine, Yobe State University Damaturu, Nigeria.

Corresponding author: [Sabiu.amina@gmail.com](mailto:Sabiu.amina@gmail.com); +2348144435403

Cloves are dried flower buds of *syzygium aromaticum*, a tree of the myrtle family, which is evergreen tropical plant that flowers twice every year. It's an important medicinal plant due to it's wide range of pharmacological effects. Lead intoxication affects many systems of the body including the cardiovascular, renal, and reproductive systems. Its most detrimental effects occur in the nervous system, where it blocks N-Methyl-D-aspartate receptors. This study assessed the modulatory effect of clove supplement on lead induced memory impairment in Wistar rats. Twenty wistar rats (100-150g) were randomly divided into four groups (IIV) of five rats each. Group I served as control. Group II was treated with 0.1mg/kg of distilled water after pre-treatment with 10mg/kg of lead acetate. Grouped III was treated with clove supplement, 3% of clove supplement was mixed with the animal feed and 10mg/kg of lead acetate was administered. Group IV was also treated with clove supplement, where 6% was mixed with the animal feed and 10mg/kg of lead acetate was administered. Lead treatments were via oral gavage for 14 days. Neurobehavioural paradigms of Y and elevated plus mazes were employed to assess the spatial learning and memory. Findings revealed that, lead induced memory impairment was reduced at 6% and 3% respectively. It can be concluded from these results that lead induced memory impairment can be modulated using clove supplement.

## EVALUATION OF ANTI-DIARRHOEAL ACTIVITY OF L-CITRULLINE IN MICE AND ITS ANTISPASMODIC EFFECT ON ISOLATED RABBIT JEJUNUM

\*S. Saminu, M. I. A. Saleh, A. Abdulwahab, U. Farra'u, and A. I. Babale.

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria, Nigeria

\*Corresponding author: [saminusamaila@yahoo.com](mailto:saminusamaila@yahoo.com); +2348032812902

L-citrulline is a non-essential amino acid that plays a vital role in the metabolism and regulation of nitric oxide. It is majorly synthesized in the small intestine and considered safe for consumption. However, there is paucity of literature on its anti-diarrhoeal and antispasmodic effects. Hence, these study investigates the anti-diarrhoeal activity of L-citrulline in mice and its antispasmodic effect on isolated rabbit jejunum. Castor oil induced diarrhoea model was used for the antidiarrhoeal studies. Test groups received L-citrulline 300 and 600 mg/kg respectively, positive control group received Loperamide 5 mg/kg while negative control group received normal saline 2 ml/kg. All administrations were via oral route. The antispasmodic effect was evaluated using isolated tissue experiment. L-citrulline 300 and 600 mg/kg caused a reduction in the mean number of wet faeces when compared to the normal saline treated group. Diarrhoeal protections of 93.33% and 55.49% were observed at 300 and 600 mg/kg of L-citrulline, respectively. L-citrulline showed more anti-diarrheal effect at the lower dose of 300mg/kg and the result obtained was similar to that of Loperamide which showed higher percent protection. L-citrulline in the antispasmodic studies showed a concentration dependent decrease in strength of contractions of the rabbit jejunum which was similar to what was observed on administration of Adrenaline. When L-citrulline was interacted with Acetylcholine, there was a blockade of effect similar to that observed on interaction of the same concentration of Acetylcholine with Atropine. This indicates that L-citrulline might have inhibited the contractions of the rabbit jejunum via stimulating adrenoceptors and/or blocking cholinergic receptors. Therefore, from the results obtained in this study it may be suggested that L-citrulline possesses some antidiarrhoeal potentials.

## SOME HEMATOLOGICAL INDICES AND LIVER FUNCTION PARAMETERS AMONG WORKERS EXPOSED TO CHRONIC INHALATION OF LIQUEFIED PETROLEUM GAS (COOKING GAS) IN CALABAR, NIGERIA

E.A. Archibong, E.J. Ani, and J.T. Njoku.

Department of Medical Physiology, College of Medical Sciences, University of Calabar, Calabar, Nigeria

Corresponding author: [archibongefiok@gmail.com](mailto:archibongefiok@gmail.com); +2347035381180

Gas workers in Calabar, Cross River State are chronically exposed to Liquefied Petroleum Gas (LPG) or cooking gas. This gases being lipophilic in nature, after inhalation, are absorbed into the blood, and enters into the tissues of their body. This study investigated some hematologic and liver function parameters among workers exposed to chronic inhalation of LPG in Calabar. A total of ninety (90) male subjects consisting of 45 control and 45 LPG Workers

were used for this study. FBC, liver enzymes, plasma proteins and bilirubin concentration were assessed. Air quality studies were carried out and questionnaires were filled. The results showed a significant increase in RBC, PCV, Hb conc. MCV, MCHC and MCHC of the test group when compared to the control ( $P < 0.001$ ). A significant increase in the total WBC, Lymphocyte and ESR of the test group was found when compared to the control group ( $P < 0.05$ ). A significant increase in total bilirubin, Conjugated bilirubin ALP, and globulin ratio of the test group was observed when compared to the control ( $P < 0.001$ ), while a significant decrease in total protein and albumin ratio was found in the test group compared to the control group ( $P < 0.001$ ). Other health related complaints such as Fatigue, itches, headache, rashes, abdominal pains, jaundice and dizziness were also more common in the LPG exposed workers than the controls. In conclusion, chronic inhalation of LPG without necessary precautions causes several changes on hematological indices and liver function parameters of gas workers and could lead to blood diseases and liver malfunction.

## BIOSIGNATURE OF TOLUENE DIISOCYANATE-INDUCED ASTHMA IN FEMALE BALB/C MICE: THE ROLE OF $\beta$ -CATENIN MEDIATED AIRWAY EPITHELIAL INTEGRITY

\*I. Sulaiman, <sup>2</sup>K. Tan, <sup>3</sup>N. Mohtarrudin, <sup>3</sup>J.C.W. Lim, <sup>3</sup>J. Stanslas.

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Bayero University, Kano,

<sup>2</sup>Faculty of Pharmaceutical Sciences, International Medical University, Kuala Lumpur, Malaysia,

<sup>3</sup>Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia.

\*Corresponding author: [ibrahimbnsulayman@yahoo.com](mailto:ibrahimbnsulayman@yahoo.com); +2348030811892

Highly reactive low molecular weight compound, toluene diisocyanate (TDI), is a common inducer of work-related asthma especially in industrialised nations. Oxidative stress, airway dysfunction and inflammation have been related to chemical-induced occupational asthma. The role of adherence junction proteins in the maintenance of airway integrity was previously reported. This study evaluated in-depth pathophysiology of TDI-induced airway epithelial desquamation as it relates to T-helper cell endotype. Female Balb/c mice were dermally sensitised and intranasally exposed to TDI following a 21-day exposure regimen. After the final exposure, bronchoalveolar lavage fluid (BALF), lung samples and serum were collected. Analysis of BALF leukocytes showed a significant rise in both total and differential leukocyte counts, with predominant airway neutrophilia. Similarly, BALF reactive oxygen species were significantly increased by TDI exposure. Lung tissue inflammatory cells infiltrates, mucus production and collagen deposition were similarly higher among TDI-exposed animals. In addition to epithelial desquamation, aberrant distribution of E-cadherin and  $\beta$ -catenin complexes were observed upon TDI exposure. A significant increase in Th2 cytokines (IL-4, IL-5 and IL-13) coupled with rise in IFN- $\gamma$ , IgE and IgG inferred Th1/Th2 asthma endotype. Phenotypically, airway resistance and dynamic compliance were significantly altered by TDI-exposure. Whereas, the expression of upstream and downstream oxidative and inflammatory

mediators such as Akt, p38, Nrf2 activation and HO-1 were similarly affected by TDI exposure. These findings have delineated molecular targets for the management of chemical-induced asthma.

### **EVALUATION OF AGE- AND SEX-RELATED EFFECTS OF RAMADAN FASTING ON BODY WEIGHT OF APPARENTLY HEALTHY PERSONS IN KANO METROPOLIS, NIGERIA**

**<sup>1</sup>A.B. El-ta'alu, <sup>2</sup>L.H. Adamu, <sup>1</sup>D.M. Gambo, and <sup>3</sup>A.J. Alhassan.**

<sup>\*</sup><sup>1</sup>Department of Human Physiology, <sup>2</sup>Department of Anatomy, <sup>3</sup>Department of Biochemistry, Bayero University, Kano, Nigeria.

<sup>\*</sup>Correspondence author: [abbassido@gmail.com](mailto:abbassido@gmail.com); +2348109716223

Fasting in the Month of Ramadan is physiologically a robust non-genetic, as well as non-pharmacological observance that is defined as a complete abstention from eating any solid foods or liquids every day between the months of May and June every year, or as the case may be depending on Geographical location. The purpose of the study was to investigate age- and sex-related variability in weight and BMI before and after Ramadan Fasting. Ages, weights and heights of all subjects were taken and BMI calculated using the *Adolphe Quetelet's standard formula* ( $Kg/m^2$ ). Paired sampling and independent sample t-test were used to determine changes in ages and sexual dimorphism, respectively. There were significant increases in body weight and BMI in male participants after fasting observances. Based on age group, the increase in weight and BMI was only significant among male participants within middle-aged. Gender wise comparison of weight and BMI revealed significant sexual dimorphism in weight only after Ramadan fasting, with higher mean value in males compared to females. However, sexual dimorphism based on age group showed significant differences in BMI among the middle age group, before the Ramadan Fasting, with higher mean value in females. It was concluded that, Ramadan Fasting has positive effects on body weight and BMI in middle-aged males; sexual dimorphism in body weight and BMI affects only the middle-age group.

### **EVALUATION OF POSSIBLE ANTI-DEPRESSANT EFFECT OF ALPHA-LIPOIC ACID ON CHRONIC MILD STRESS MOUSE MODEL OF DEPRESSION**

**<sup>\*</sup> <sup>1</sup>A.A. Abbas, <sup>1</sup>Y. Yusha'u, <sup>1</sup>A. W. Alhassan, <sup>1</sup>M.I.A. Saleh, <sup>2</sup>J. Ya'u, <sup>1</sup>U.A. Muhammad, <sup>1</sup>K. Abdulazeez, <sup>1</sup>B.I. Sani, and <sup>1</sup>Z. Umar.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria-Nigeria.

<sup>2</sup>Department of Pharmacology and Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria-Nigeria.

<sup>\*</sup>Corresponding author: [abbasaminat@gmail.com](mailto:abbasaminat@gmail.com); +2348065688588

World Health Organization (WHO) reported that depression is the 4<sup>th</sup> highest contributor to the global burden of disease and is predicted to be the first by 2030. Alpha-Lipoic Acid (ALA) is a potential antioxidant; synthesized in the mitochondria, it has the potential to increase insulin sensitivity as one of its wide range of benefits. Increase in insulin sensitivity is found to elevate

serotonin level via increasing its precursor tryptophan. This research was aimed to evaluate effects of ALA on chronic mild stress model of depression. Fifteen mice of both sexes were used in this study. They were grouped into three groups of five mice each. Group 1 received 10 ml/kg Normal Saline (NS), Group 2 received ALA 200 mg/kg and Group 3 received Flouxetine 20 mg/kg. At the end of two weeks application of Chronic Mild Stressors (CMS), treatment was administered for another two weeks. Tail Suspension Test (TST) was conducted before and after application of CMS and treatments. Result of TST after treatment revealed a statistically significant difference between ALA and NS in immobility time (behavioral despair). In Open Field Test (OFT), no statistically significant difference was observed between NS and treatment groups in line crossing (locomotor activity). In Novel Object Recognition Test (NORT), no significant difference was observed in percentage preference between NS and ALA but there was statistically significant difference between Flouxetine and NS. In conclusion, ALA 200 mg/kg has shown a potential anti-depressant like effect in TST by decreasing the immobility time of mice subjected to CMS but has no effect on locomotor activity (line crossing) and cognitive function as seen in OFT and NORT respectively.

### **EFFECTS OF PHOSPHODIESTERASE 5 ENZYME INHIBITORS ON COGNITION IN MALE ADULT WISTAR RATS**

**<sup>1</sup>A.A. Ladan, <sup>2</sup>I. B. Gaya, <sup>2</sup>F. A. Dawud, and <sup>3</sup>F. Khan.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Health Sciences, Bauchi State University Gadau, Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Basic Health Sciences, College of Medical Sciences, Ahmadu Bello University Zaria, Nigeria.

<sup>3</sup>Department of Pharmacology and Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University Zaria, Nigeria.

Corresponding author: [ahmadladan21@gmail.com](mailto:ahmadladan21@gmail.com); +2348034998613

Neurodegenerative diseases are said to be associated with dementia and treatment has not been fully successful. Phosphodiesterases (PDEs) are class of enzymes that reverse the formation of second messenger cyclic AMP and cyclic GMP thereby terminating the physiological response of their first messengers. PDEs inhibitors such as sildenafil and tadalafil are hypothesized to prolong the physiological action of glutamate thereby believed to partake in long term potentiating (LTP). In this study we explore the possibility of using these drugs to enhance memory. Twenty four 24 male wistar rats (150g) were divided into four groups of six each (n=6). Group I, II, III and IV received 10 ml/kg of distilled water (Negative control), 5 mg/kg of sildenafil, 5 mg/kg of tadalafil and 20 mg/kg of piracetam (positive control) respectively. All administrations were done via oral gavage for two weeks. Y maze and NORT paradigms were used to assay cognitive functions. The result of our finding showed a statistically significant decrease on short term memory in the sildenafil and tadalafil treated rats groups when compared with the control groups. Using Nobel Object Recognition Task (NORT), sildenafil and tadalafil treated groups were found have significantly increased preference core indicating memory enhancement when compared with the negative control group. The piracetam treated group which is a

standard memory enhancer showed statistically significant increase in the preference score compare to all other groups. In conclusion the study illustrates that sildenafil and tadalafil posses potentials for memory enhancement in rats treated groups. The study also indicated that tadalafil has more potent memory enhancement capability on the rats treated group.

### **ELECTROLYTE AND OXIDATIVE STRESS PROFILE OF HEALTHY ADULT POPULATION IN ZARIA, NIGERIA AND THEIR RELATIONSHIP WITH EXPERIMENTAL PAIN RESPONSE**

**<sup>1</sup>A.H. Umar, <sup>1</sup>A. Mohammed, <sup>2</sup>J.O. Ayo, <sup>3</sup>N.M. Danjuma, <sup>1</sup>A.S. Isa, <sup>1</sup>I. Suleiman, <sup>4</sup>M.S. Muhammad, <sup>1</sup>U.A. Muhammad, <sup>1</sup>A. Muhammad, and <sup>1</sup>Y. Yusha'u.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Ahmadu Bello University, Zaria

<sup>2</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria

<sup>3</sup>Department of Pharmacology and Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria

<sup>4</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Gombe State University, Gombe

Corresponding author: [ahumar@abu.edu.ng](mailto:ahumar@abu.edu.ng); [ahumar09@gmail.com](mailto:ahumar09@gmail.com)

Oxidative stress (OS) results from accumulation of reactive species, beyond the endogenous anti-oxidant capacity. OS is known to impair physiological functions, which can alter health and wellbeing. This reactive species are detoxified by endogenous anti-oxidant enzymes, which help to keep the system in a state of homeostasis. Electrolytes are known to serve crucial functions in the body that include regulation of water balance, maintaining pH, and transport of substances. Electrolyte imbalance can be a marker of many disorders. This study investigated the electrolyte and oxidative stress profile of a healthy adult population in Zaria, Nigeria and their relationship with experimental pain outcome. Participants were apparently healthy adult volunteers between the ages of 20 to 65 years, and drawn from the city of Zaria and its environs. Experimental pain was induced using pressure algometry. About 5 ml of blood was collected for determination of serum electrolytes, MDA, GSH and SOD. The results showed that serum concentrations of sodium, potassium and chloride as well as oxidative stress profile did not vary with sex, age and ethnicity among the study population. There was a significant negative correlation between pressure pain threshold and serum concentration of potassium ( $r = 0.2330$ ,  $p = 0.003$ ) and chloride ( $r = 0.2126$ ,  $p = 0.007$ ), while serum sodium correlated positively ( $r = 0.3439$ ,  $p = 0.000$ ). Serum MDA, SOD and GSH did not show statistically significant correlation with pressure pain threshold ( $p > 0.05$ ). In conclusion, serum electrolytes correlate significantly with experimental pressure pain threshold among healthy adult population in Zaria, Nigeria.

### **LEVELS OF CYTOKINES IN RELATION TO MATERNAL GROUP B *STREPTOCOCCUS* COLONIZATION AT DELIVERY**

**<sup>1,2</sup>J. Muhammad, <sup>4</sup>G. Kwatra, <sup>2</sup>K. Scheuemiaer, <sup>3,4</sup>S.A. Madhi, <sup>5</sup>H. Steel, <sup>2</sup>L.M. Harden.**

<sup>1</sup>Department of Physiology, College of Health Sciences, Federal University Birnin Kebbi, Kebbi State, Nigeria.

<sup>2</sup>Brain Function Research Group, School of Physiology, University of the Witwatersrand, Johannesburg, South Africa.

<sup>3</sup>Department of Science and Technology/National Research Foundation, Vaccine Preventable Diseases, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa.

<sup>4</sup>Medical Research Council: Respiratory and Meningeal Pathogens Research Unit, University of the Witwatersrand, Johannesburg, South Africa.

<sup>5</sup> Institute for Cellular and Molecular Medicine, Department of Immunology, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa

Corresponding author: [lois.harden@wits.ac.za](mailto:lois.harden@wits.ac.za); +27731517448

Infection with Group B *Streptococcus* (GBS) causes high morbidity and mortality among newborn babies. Maternal GBS colonization during pregnancy is a leading risk factor for neonatal GBS disease. Apart from the culture and the polymerase chain reaction (PCR) methods recommended by Centers for Disease Control and Prevention, studies have shown that cytokines produced by immune cells in response to the presence of bacteria may also be useful at detecting bacterial infections. We therefore investigated whether maternal serum interleukin (IL)-6, IL-8 and IL-10 are useful indicators to predict GBS colonization at delivery. Healthy HIV negative pregnant women, free of any medical condition and not receiving antibiotics, were recruited for the study ( $n = 136$ ). Vaginal swabs and venous blood were collected at the time of delivery. Swabs were used to isolate GBS using two methods: culture method and quantitative PCR. A mother was deemed colonized by GBS if either the PCR or the culture were positive. Maternal serum was used for cytokine analysis using high sensitivity premixed magnetic Luminex performance assays (R&D Systems). Cytokines values were normalized using a logarithm transformation. Of the 136 Participants, 47 (35%) were colonized with GBS. At delivery, there was no statistically significant difference in logged concentrations of IL-6 ( $P=0.8$ ), IL-8 ( $P=0.5$ ) or IL-10 ( $P=0.9$ ) according to colonization status. Our results show that maternal serum IL-6, IL-8 and IL-10 are not reliable markers to predict GBS colonization at delivery.

### ***IN VITRO* AND *IN VIVO* ANTIDIABETIC PROPERTY OF MORINGA OLIEFERA CYCLOTIDE FRACTION**

**<sup>1</sup>E.E.W. Nabofa E.E.W, <sup>2</sup>E.O. Ngozi, <sup>3</sup>A.F. Attah, <sup>4</sup>A. Oyagbemi, <sup>4</sup>T.O. Omobowale, <sup>1</sup>C.A. Nlerum, <sup>1</sup>S.T. Ray-toyo, <sup>1</sup>E.D. Kingsley, and <sup>5</sup>A.R.A. Alada.**

<sup>1</sup> Department of Physiology, Bencarsen (snr) School of Medicine, Babcock University.

<sup>2</sup> Department of Nutrition and dietetics, Babcock University.

<sup>3</sup> Department of Pharmacognosy, University of Ilorin.

<sup>4</sup>Department of Veterinary medicine, University of Ibadan.

<sup>5</sup>Department of Physiology, College of Medicine, University of Ibadan.

Plant cyclotides are chemically stable and beneficial for medicinal application if they possess such properties. *Moringa Oliefera* exhibits anti-diabetic activity; however whether its cyclotide fraction also exhibits anti-diabetic effects is unknown. The present study was thus designed to determine the *in vitro* and *in vivo* anti-diabetic effect of *Moringa Oliefera* cyclotides (MOC). MOC fraction was obtained by solvent extraction and peptide purification. Toxicity assessment was carried out using the brine

shrimps lethality test (BST). *In vitro* antidiabetic property of MOC was assessed by  $\alpha$ -amylase inhibitory activity using the dinitrosalicylic acid method. *In vivo* antidiabetic property of MOC was assessed in a type 2 diabetic (T2D) guinea pig model. BST of MOC was non-toxic (LC<sub>50</sub>; 37561.3  $\mu$ g/ml). MOC exhibited maximum  $\alpha$ -amylase inhibitory activity of 88.3 % at 400  $\mu$ g/ml. T2D animals presented elevated fasting blood glucose (FBG) (134.3 $\pm$ 13.7 vs 89 $\pm$ 9.8 mg/dl), reduced glucose utilization, normal insulin levels but reduced hepatic insulin receptor substrate-1 (IRS-1) (3.4 $\pm$ 0.7 vs 11.1 $\pm$ 1.7 %) and skeletal muscle Glut 4 expression (21.8 $\pm$ 4.4 vs 30.5 $\pm$ 5.1 %) when compared with control. Treatment of T2D animals with glibenclimide and MOC (10 mg/kg) reduced FBG to 108 $\pm$ 11.3 and 105 $\pm$ 13.1 mg/dl respectively, increased glucose utilization; increased expressions of hepatic IRS-1 and skeletal muscle Glut 4 ( $P < 0.05$ ) respectively. While MOC treatment did not significantly alter plasma insulin levels in diabetic animals, glibenclimide significantly increased plasma insulin levels (0.68 $\pm$ 0.04 vs 0.25 $\pm$ 0.03 ng/ml). In conclusion MOC is nontoxic. MOC possesses anti-diabetic activity, probably mediated via inhibition of  $\alpha$ -amylase activity and improvement of insulin action.

#### **PINEAL AND HYPOPHYSEAL RESPONSES TO SELENIUM TREATMENTS IN LIGHT DEPRIVED ADULT FEMALE WISTAR RATS**

**<sup>1</sup>M.J. Adeniyi, <sup>2</sup>F.O. Agoreyo, and <sup>2</sup>A.A. Abayomi.**

<sup>1</sup> Department of Physiology, Edo University Iyamho, Edo state.

<sup>2</sup> Department of Physiology, University of Benin, Benin-city, Nigeria

Corresponding author: [Tjimade@gmail.com](mailto:Tjimade@gmail.com); +2348066796517

Dark is a generally known potent stimulus for melatonin secretion. Studies have also reported that pineal and hypophyseal endocrine secretions are influenced by nutritional factors. The study is designed to investigate the combined effect of selenium supplementations and light deprivation on pineal and hypophyseal secretions in female wistar rats. 36 female cyclical wistar rats were divided into vehicle, high selenium (HS), low selenium (LS), light deprived (LD), LD+HS and LD+LS. Rats were orally administered 150 $\mu$ g/kg and 100 $\mu$ g/kg of sodium selenite for two weeks. While light deprived rats were maintained under 6hr light/18hr dark cycle, other rats were under natural 12hr light/12hr dark cycle. The result showed that light deprivation led to significant decrease ( $P < 0.05$ ) in follicle stimulating hormone (FSH) secretion and a significant increase ( $P < 0.05$ ) in plasma melatonin. Selenium supplementations at both doses also improved LH secretion but had no effect on plasma prolactin. At high dose of selenium supplementation, there was an increase in melatonin secretion. In light deprived rats, selenium supplementations caused a significant decrease ( $P < 0.05$ ) in melatonin secretion at both doses but there was no significant change in plasma levels of FSH, LH and prolactin. The findings indicate differential responses of pineal and hypophyseal glands to light deprivation and selenium treatments.

#### **AMELIORATIVE POTENTIAL OF ALLIUM CEPA ON P53 AND BCL2 EXPRESSION, DNA FRAGMENTATION IN LIVER OF CADMIUM SULPHATE TREATED RATS.**

**\*S. F. Ige, O. B. Ademilua, A. O. Fatola, and I. A. Adeyemi.**

Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria.

\*Corresponding author: [sfige@laucech.edu.ng](mailto:sfige@laucech.edu.ng); +2348060743616.

Cadmium (Cd), one of the highly toxic metals to both humans and animals has been known to be cytotoxic and responsible for inducing free radical-dependent DNA damage in cells. *Allium cepa* is a known antioxidant with ameliorative potentials on cadmium-induced organ toxicity. Therefore this study was carried out to evaluate the effects of *Allium cepa* extract on DNA fragmentation, p53 and Bcl2 expression in liver of cadmium sulphate treated rats. Twenty adult male wistar rats weighing 160-180g were used for this study. They were divided into four groups, group one served as control, group two (Cd group) were treated with 15mg/kg CdSO<sub>4</sub>, Group three (Cd + AcE group) were treated simultaneously with 15mg/kg CdSO<sub>4</sub> and *Allium cepa* Extract (1mL/100g BW) while the fourth group (AcE group) received *Allium cepa* extract (1mL/100g BW) alone. All the treatments were given orally for 28 days. Liver Superoxide Dismutase (SOD), Catalase (CAT) activities and % DNA fragmentation were examined spectrophotometrically while immunohistochemical expression of Tumor Suppressor protein (p53) and cytoplasmic Bcl2 were also studied. Exposure to cadmium significantly decreased SOD and CAT activities. It significantly increased % DNA fragmentation and Bcl2 expression and inhibited p53 expression. Decreased SOD and CAT activities, increased DNA fragmentation and Bcl2 expression together with inhibition of p53 expression by cadmium were all ameliorated with *Allium cepa* treatments. In conclusion, *Allium cepa* inhibits liver DNA damage by increasing antioxidant activities and inhibiting Bcl2 expression while promoting p53 expression.

#### **AMELIORATIVE EFFECTS OF MANGANESE GLYCINATE AGAINST INCREASED LIVER ENZYMES IN RATS EXPOSED TO WATER IMMERSION RESTRAINT STRESS**

**\*A. Abdullahi, T. Aluwong, and J.O., Ayo.**

Department, of Veterinary Physiology, Ahmadu Bello University, Zaria, Nigeria

\*Corresponding author: [abdull776@gmail.com](mailto:abdull776@gmail.com); +2348188707939.

Stress response is crucial, as it enhances the organism's chances for survival. It may become overwhelmed by severe stress, resulting in organ injury, manifesting as diseases like gastric ulcers. Water-immersion restraint stress (WIRS) is known to cause increased levels of various serum enzymes in rats. The present study examined the effects of manganese glycinate on serum levels of the liver enzymes; alanine aminotransferase (ALT), aspartate aminotransferase (AST) and alkaline phosphatase (ALP) in rats exposed to WIRS. Fifteen (15) male Wistar rats (150-170 g) were divided into 3 groups of 5 rats each: (I) passive control; (II) active control; and (III) pre-treated with manganese glycinate and subjected to WIRS for 3.5 hours. At the end of the experiment, blood samples were collected through decapitation for haematological and biochemical analyses. The result showed that acute WIRS significantly ( $p < 0.05$ )

increased plasma ALT, AST and ALP activities in the active control group, when compared with the passive control group. Pre-treatment of rats with manganese glycinate showed significant amelioration of these changes induced by WIRS. It was concluded that manganese glycinate pre-treatment has possible anti-oxidant and protective effects against liver damage as may be caused by WIRS in rats.

#### **ANTIDEPRESSANT STUDIES OF METHANOL LEAF EXTRACT OF *Ziziphuss Mauritiana* IN ALBINO SWISS MICE**

\***M.K. Maimunatu**, **2R.A. Magaji**, and **3M.G. Magaji**.

<sup>1</sup>School of Nursing Ahmadu Bello University Teaching Hospital Zaria.

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria.

<sup>3</sup>Department of Pharmacology and Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria.

\*Corresponding author: [maimunatukabir1012@gmail.com](mailto:maimunatukabir1012@gmail.com); +2347065310325

The leaves of *Ziziphus mauritiana* have been reported to be used in the management of depressive illnesses in traditional medicine. The antidepressant activity of the methanol leaf extract of the plant was evaluated using tail suspension test and forced swim test at the doses of 25 mg/kg, 50 mg/kg, 100 mg/kg, and 200 mg/kg, the effect of the extract on recognition memory, motor coordination, and exploration behaviour was evaluated using novel object recognition test, beam walking assay test and open field test respectively. Data was and represented as  $\pm$  SEM and analyzed using one-way analysis of variance (ANOVA), followed by the Bonferroni *post hoc* test where  $P < 0.05$  was considered significant. The result showed a statistical significant decrease in duration of immobility  $p < 0.001$  on TST, when compared with the control. Imipramine (20 mg/kg) was used as standard antidepressant drug. It may be concluded that the methanol leaf extract of *Ziziphus mauritiana* possesses antidepressant property.

#### **INFLUENCE OF AGE, SEX AND EDUCATIONAL STATUS ON SELF-MEDICATION AMONG FARMERS AND ITS ASSOCIATION WITH PEPTIC ULCER DISEASE**

**1T. Danboyi**, **2S. J. Danjuma**, and **3E. Hassan-Danboyi**.

<sup>1</sup>Department of Human Physiology, Kaduna State University

<sup>2</sup>Department of Public Health, Ministry of Health and Human Services, Kaduna State

<sup>3</sup>Department of Human Physiology, Ahmadu Bello University, Zaria

Corresponding author: [timothy.danboyi@kasu.edu.ng](mailto:timothy.danboyi@kasu.edu.ng); +2348036409939.

The trend towards self-medication is at an increasingly alarming rate in our communities and it is becoming easier to procure more drugs over-the-counter (OTC) now than ever before. Peptic ulcer disease (PUD) incidence due to *Helicobacter pylori* infection is decreasing, however most cases now can be attributed to other secondary factors such as ingestion of Non-Steroidal Anti-inflammatory Drugs (NSAIDs). The readily availability of NSAIDs encourages the farmers to self-medicate. This study aims to assess the influence of age, sex and educational status on self-medication of NSAIDs among farmers in Shika District of Sabon Gari Local Government Area of Kaduna State. This

was a descriptive cross-sectional study. A total of 220 questionnaires were administered. Study participants were sampled using a systematic random sampling technique and an interviewer administered structured questionnaire was used to collect data which was entered and analyzed using SPSS v17. About 91.8% of the farmers were found to self-medicate. Farmers  $\leq 40$  years were found to have about five times higher odds to self-medicate than farmers  $> 40$  years of age (cOR=5.04; 95% CI 1.87- 13.58). Sex and educational status were not found to be statistically associated with self-medication. There is an alarmingly high prevalence of self-medication among young farmers. Younger farmers may have high risk of developing NSAID-induced peptic ulcer.

#### **ASSESSMENT OF MILK YIELD AND SOME LACTOGENIC HORMONES IN FEMALE LACTATING WISTAR RATS FOLLOWING FERMENTED SOYA BEAN AND ASCORBIC ACID SUPPLEMENTATION**

**1I.S. Malgwi**, **2E.D. Eze**, **3I. Musah**, **3N.S. Emmanuel**, **3 Y. Tanko**, **4M.U. Kawu**, **5A.I. Iliya**, and **3A. Mohammed**.

<sup>1</sup>Department of Human Physiology, College of Medical Sciences, University of Maiduguri Borno, Nigeria

<sup>2</sup>Department of Physiology, Faculty of Biomedical Sciences, Kampala International University, Kampala, Uganda

<sup>3</sup>Department of Human Physiology, Faculty of Basic medical Sciences, College of Health Science, Ahmadu Bello University Zaria, Nigeria

<sup>4</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University Zaria, Nigeria

<sup>5</sup>Department of Anatomy, Kyiv Medical University, Kyiv-Ukraine

Corresponding author: [ibmalgwi2000@yahoo.com](mailto:ibmalgwi2000@yahoo.com); +2348033582368

Milk is essential for optimal feeding of infants and has a direct impact on growth, development, and health in neonatal period. This study was designed to assess milk yield following Soya bean and Ascorbic acid supplementation. At parturition, the animals were randomly divided into seven groups of five rats each (n=5) and treated as follows: Group I: (Normal control) was given normal feed and normal saline, orally (1 ml/kg bw), Group II: metoclopramide (5 mg/kg bw), Group III: 100 mg/kg bw of Vitamin C, Groups IV, V and VI were given soya bean supplement thus; 10%, 20% and 40%, respectively. Group VII was co-administered with 20% soya bean supplement and Vitamin C (100 mg/kg bw). Treatment was done for the period of ten (10) days at 06:00 hours daily and the animals were euthanized at the end of the experiment. Serum levels of prolactin, oxytocin and milk yield 18 and 23 hours after gavage were evaluated. The result on serum prolactin didn't show any statistical significant increase although there was increase in all the supplements treated groups compared to control except in the group administered 20% of Soya bean supplement. Serum prolactin level was highest in the Soya bean and Vitamin C co-administered group compared to control. Serum oxytocin level was statistically significant ( $P < 0.05$ ) in the metoclopramide treated group ( $404.20 \pm 19.40$  vs  $342.80 \pm 20.30$ ) compared to control. In this Soya bean supplement has been shown to increase serum prolactin and oxytocin level, resulting in a concomitant increase in milk yield

## EVALUATION OF SOME LACTOGENIC HORMONES, MILK YIELD AND OXIDATIVE STRESS BIOMARKERS IN EXCLUSIVELY AND NON-EXCLUSIVELY BREASTFEEDING MOTHERS IN ZARIA

D.D. Obadofin, I.G. Bako, N.S. Emmanuel, and I. Shittabey.

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria, Kaduna state, Nigeria

Corresponding author: [danielbare51@yahoo.com](mailto:danielbare51@yahoo.com)

The aim of the study was to evaluate some lactogenic hormones, milk yield and oxidative stress biomarkers in exclusively and non-exclusively breastfeeding mothers in Zaria. The population for this study consist of breastfeeding mothers attending postnatal care in Hayin Dogo primary health care centre Samaru - Zaria, aged 20 to 50yrs who practice different breastfeeding methods. A sample size of 60 was considered for the study. Five millilitre of venous blood was collected by vein puncture with sterile needle and the sera was used for hormonal and antioxidant assay. The result show a significant increase ( $P < 0.05$ ) in milk index of the non-exclusive group when compared to the exclusive group;  $0.11 \pm 0.012$  (kg/child) vs  $0.081 \pm 0.018$  kg/child respectively. A significant increase ( $P < 0.05$ ) in the serum prolactin level of the exclusive breastfeeding mothers was observed when compared to the non-exclusive breastfeeding mother  $73.10 \pm 13.90$  ng/ml vs  $45.67 \pm 14.33$  ng/ml respectively. Although there was an increase in the serum progesterone level of the non-exclusive breastfeeding mothers when compared to the exclusive breastfeeding mothers;  $8.21 \pm 2.37$  ng/ml vs  $6.36 \pm 2.56$  ng/ml respectively, it was however not statistically significant. There was a non-significant increase ( $P > 0.05$ ) in the serum estrogen level of the non-exclusive breastfeeding mothers ( $73.30 \pm 10.09$  pg/ml) when compared to the exclusive breastfeeding mothers ( $64.80 \pm 13.90$  pg/ml). Also, there were no statistical-significant increase ( $P > 0.05$ ) in the serum MDA, SOD and GPx level of the exclusive breastfeeding mothers when compared to the non-exclusive breastfeeding mothers. It is therefore suggested that exclusively breastfeeding mothers should be well motivated and prepared to manage the stress associated with breastfeeding through up regulation of their antioxidant defence system.

## COMPARATIVE STUDY OF THE ANTI-DIABETIC EFFECTS OF METHANOLIC EXTRACTS OF CURCUMA LONGA RHIZOMES AND SPONDIAS MOMBIN LEAVES IN ALLOXAN INDUCED DIABETES IN MALE WISTAR RATS

\*F. Saronee, M.T. Bekinbo, S.O. Ojeka, and D.V. Dapper.

Department of Human Physiology, Faculty of Basic Medical Sciences, University of Port Harcourt, Choba.

\*Corresponding author: [saroneefriday@yahoo.com](mailto:saroneefriday@yahoo.com); +2347066060696

Approximately eighty percent of deaths associated with diabetes mellitus the world over; occur in low and middle-income countries. Due to poverty, there is the tendency for patients to rely on orthodox medications with attendant adverse effects. Medicinal plants like *Curcuma longa* and *Spondias mombin* have been separately evaluated in ameliorating diabetic conditions. Therefore, this study

attempts a comparative assessment of the anti-diabetic effects of methanolic extracts of *Curcuma longa* rhizomes and *Spondias mombin* leaves in alloxan-induced diabetic male wistar rats. Ninety rats were divided into nine groups of 10 animals each. Diabetes was induced using 200mg/kg/b.w of alloxan administered intraperitoneally. The groups were treated as follows: 1: Non-diabetic control; 2: Untreated diabetic; 3: 200mg/kg/b.w *Spondias mombin*; 4: 400mg/kg/b.w *Spondias mombin*; 5: 500mg/kg/b.w *Curcuma longa*; 6: 1000mg/kg/b.w *Curcuma longa*; 7: 200mg/kg/b.w *Spondias mombin* + 500mg/kg/b.w *Curcuma longa*; 8: 400mg/kg/b.w *Spondias mombin* + 1000mg/kg/b.w *Curcuma longa*; 9: 0.6mg/kg/b.w. Glibenclamide. On day 43, blood was collected by cardiac puncture for determination of blood sugar and glycosylated haemoglobin concentration. A significant ( $p < 0.05$ ) dose dependent decrease in the blood sugar and glycosylated haemoglobin levels were shown in all the treated groups compared to group 2. Furthermore, groups 7 and 8 showed a significant reduction ( $p < 0.05$ ) in blood sugar and glycosylated haemoglobin concentration compared to groups 3 to 6. *Spondias mombin* apparently showed better anti-diabetic effects compared to *Curcuma longa*. However, our result shows that combined treatment with *Spondias mombin* and *Curcuma longa* may potentiate the anti-diabetic effects seen in our experimental studies.

## ACUTE AND SUB-ACUTE TOXICITY STUDIES ON METHANOLIC EXTRACT OF *Combretum dolichopetalum* LEAVES

C. U. Emelike, U.S.B Anyaehie, and E.E. Iyare.

Department of Physiology, Faculty of Basic Medical Sciences, Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State, Nigeria

Corresponding author: [nedumeme@gmail.com](mailto:nedumeme@gmail.com); +2347032660013

*Combretum dolichopetalum* leaves are used in African ethnomedicine as a blood booster, relief of menstrual pain, enhancement of labour, etc. However, to the best of our knowledge, systematic study regarding its toxicity profile has not been reported. The present study sought to carry out acute and sub-acute toxicity studies on *C. dolichopetalum* leaves. The studies were carried out on experimental mice and rats respectively using standard techniques. Results The LD50 of the extract was obtained as more than 5000 mg/kg body weight. Administration of graded doses (100, 200, 400 and 800 mg/kg) of the extract for 21 days resulted in increases in body weights, while blood cells (WBC), Neutrophils, red blood cells (RBC), packed cell volume (PCV), haemoglobin (HGB), mean corpuscular volume (MCV) and mean cell haemoglobin (MCH) of the rats; but did not affect ( $P > 0.05$ ) their monocytes, mean cell haemoglobin concentration (MCHC), platelet (PLT) levels. All doses of the extract did not affect ( $P > 0.05$ ) the sodium, potassium, chloride, bicarbonate, urea, creatinine, total and conjugated bilirubin, alanine and aspartate amino transaminase, aspartate amino transaminase, alkaline phosphatase activities; relative liver and kidney weights of the rats, a finding that was corroborated by histology of the liver and the kidney. The study provided a scientific rationale for the use of *Combretum dolichopetalum* leaves in Nigerian ethnomedicine as a blood booster. The study also revealed the safety in the usage of *C. dolichopetalum* leaves in Nigerian ethnomedicine

**ADMINISTRATION OF FLAVONOIDS FROM *Hibiscus sabdariffa* TO SUCROSE-CONSUMING LACTATING RATS MAY PROGRAM INCREASED WEIGHT GAIN IN OFFSPRING LATER IN LIFE**

**<sup>1,2</sup>D.B. Adeniyi, <sup>1</sup>C.O. Iyare, <sup>1,2</sup>N.A. Katchy, <sup>2</sup>C.C. Nworgu, <sup>1,2</sup>T.K. Chianumba, <sup>1,2</sup>A.P. Okeke, <sup>1,2</sup>E.E. Iyare.**

<sup>1</sup>Reproductive and Developmental Programming Research Group, Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria.

<sup>2</sup>Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria.

Corresponding author: [deborah.adeniyi@unn.edu.ng](mailto:deborah.adeniyi@unn.edu.ng); +2347036830747

Incidence of metabolic dysfunction due to consumption of sugar sweetened beverage is on the increase (Miranda *et al.*,2005) and it is well established that its high intake by lactating dams is associated with development of metabolic dysfunction in offspring (Malik *et al.*,2010). *Hibiscus sabdariffa* (*HS*) with its phytochemicals, has shown prospects in prevention and treatment of obesity and metabolic dysfunction through unclear mechanisms (Aларcon-Aguilar *et al.*,2007). This study investigated the effect of administration of flavonoids from *HS* to sucrose consuming lactating rats on the offspring food intake and postnatal growth. 32 female Wistar rats were used for this study. They were divided into sucrose and non-sucrose groups and 8 sub-groups with 4 rats in each subgroup. Non-Sucrose groups were administered 10mg/kg, 20mg/kg and 50mg/kg of flavonoids from *HS*, the sucrose group were administered 30% sucrose with 10mg/kg, 20mg/kg and 50mg/kg of flavonoids from *HS* orally. Extract administration commenced on day 1 of lactation and ended on postnatal day 21. Blood samples were withdrawn from the offspring on postnatal day 42 for determination of leptin level. Results showed that administration of flavonoids from *HS* to lactating dams decreased preweaning and increased postweaning body weights and BMI, increased postweaning food intake of the offspring and decreased leptin concentration in the non-sucrose group whereas it increased leptin concentration in the sucrose group. It is concluded that maternal consumption of flavonoids from *HS* during lactation, with or without sucrose, may predispose the offspring to increased weight gain later in life through increased food intake.

**EFFECT OF CONSUMPTION OF AQUEOUS LEAF EXTRACT OF *GONGRONEMA LATIFOLIUM* BY LACTATING WISTAR RATS ON SUCROSE-INDUCED PROGRAMMING OF METABOLIC DYSFUNCTION IN THE OFFSPRING**

**<sup>1,2</sup>N.A. Katchy, <sup>1,2</sup>D.B. Adeniyi, <sup>1</sup>C.O. Iyare, <sup>2</sup>C.C. Nworgu, <sup>1,2</sup>T.K. Chianumba, <sup>2</sup>P.O. Okorie, and <sup>1,2</sup>E.E. Iyare.**

<sup>1</sup>Reproductive and Developmental Programming Research Group, Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria.

<sup>2</sup>Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria.

Corresponding author: [nkiru.katchy@unn.edu.ng](mailto:nkiru.katchy@unn.edu.ng); +2348138256395

Consumption of excess sugar has been implicated in the development of a number of metabolic abnormalities and the potential of herbs such as *Gongronema latifolium* (*GL*) has been increasingly recognized in prevention and treatment of human diseases. This research investigated the effect of consumption of aqueous leaf extract of *GL* by lactating Wistar rats on sucrose-induced programming of metabolic dysfunction in young adult offspring. 32 adult female rats were used for this study. They were divided into two groups; Non-sucrose treated group and Sucrose treated groups which were further subdivided into eight subgroups of four rats each representing the different concentrations of the extract as follows: Non-sucrose treated subgroup were administered 100mg/kg, 200mg/kg and 400mg/kg while the Sucrose treated groups were administered 30% sucrose with 100mg/kg, 200mg/kg and 400mg/kg of *GL* extract. The extract was administered orally and daily throughout lactation. At PND 42, blood was withdrawn from both male and female offspring for estimation of serum lipid profile and insulin. Results showed that administration of sucrose with the extracts caused a dose related significant decrease ( $P < 0.05$ ) in offspring body weight, BMI, food intake, blood glucose level, decreased the Total cholesterol, triglyceride, LDL-C, VLDL, increased HDL. It was then concluded that consumption of aqueous leaf extract of *GL* during lactation probably has an abating effect on sucrose induced programming of metabolic dysfunction.

**Na<sup>+</sup>-K<sup>+</sup> PUMP ACTIVITY DIFFERENTIALLY MODULATES REACTIVITY OF ISOLATED RABBIT CAROTID ARTERIES EXPOSED TO ERYTHROCYTE CONSTITUENTS**

**<sup>1</sup>S.O. Azubuike-Osu, <sup>2</sup>O.I. Ajayi, and <sup>2</sup>A.B Ebeigbe.**

Departments of Physiology, <sup>1</sup>Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State <sup>2</sup>School of Basic Medical Sciences, University of Benin, Benin City, Edo State.

Corresponding author: [sharyebbs@gmail.com](mailto:sharyebbs@gmail.com); +2348061239256

The possible involvement of vasospastic mechanisms in vaso-occlusive crisis of sickle cell disease remain unclear. This study aimed to establish if Na<sup>+</sup>-K<sup>+</sup>ATPase enzyme activity modulates vascular reactivity in response to phenylephrine (PE) in isolated rabbit carotid arteries exposed to erythrocyte constituents. Two (2) mm rabbit carotid arterial ring preparations were placed in 20 ml organ baths containing physiological salt solution (PSS) bubbled with 95% O<sub>2</sub>, 5% CO<sub>2</sub>, at 37°C and pH 7.4 and isometric contractions measured, under an initial load of 2g. Arterial rings were equilibrated for 60 minutes and exposed to 50 µl of each erythrocyte constituents at an adjusted haematocrit of 0.6. Rings were exposed to K<sup>+</sup>-free PSS in the absence (control) or presence of RBC constituents (ghosts, erythrocytes and haemoglobin solution) from Hb SS subjects for 30 minutes and contracted with 10<sup>-7</sup> M PE. Re-introduction of K<sup>+</sup> (5 mM) to the bath would cause relaxation due to increased Na-K pump activity and hyperpolarization of the membrane. All results are presented as means ± SEM. The percentage

relaxation response to 5 mM K<sup>+</sup> observed in control and in the presence of SS GHOST, SS HBS and SS RBC were 43.28 ± 5.7, 15.46 ± 6.3, 19.77 ± 9.2 and 25.82 ± 8.9 respectively. 5 mM K<sup>+</sup> relaxation was differentially attenuated ( $p < 0.05$ ) in the order: SS GHOST > SS HBS > SS RBC. The results suggest a possible impairment of Na<sup>+</sup>-K<sup>+</sup> ATPase enzyme activity in SCD, enhanced phenylephrine contractions by exposure to SS GHOST and a possible impairment of endothelial function.

### **COMPARATIVE EVALUATION OF THE EFFECT TWO ANTI-MALARIA DRUGS (CHLOROQUINE AND ARTEQUIN) ON SOME SERUM BIOCHEMICAL PARAMETERS IN RATS**

**1P.I. Ugwu, 1C.C. Nworgu, 1S.P. Madueke, and 2O.E. Ofem**

<sup>1</sup>Department of Physiology, College of Medicine, University of Nigeria, Enugu Campus.

<sup>2</sup>Department of Physiology, College of Medical Sciences, University of Calabar, Nigeria.

Correspondence author: [princewill.ugwu@unn.edu.ng](mailto:princewill.ugwu@unn.edu.ng); +2347063197745

Artemisinin combination therapies (ACT) have replaced the old drugs (like chloroquine) used as first line treatment for malaria. This current study aimed to investigate the comparative effects of chloroquine (an old drug) and artequin (an ACT drug) on serum biochemical indices in rats. Thirty-six (36) Wistar rats were randomly assigned into 2 batches. Each batch had 3 groups of 6 rats each. Group 1 was control, groups 2 and 3 respectively received artequin (1.6mg/100g bwt) and chloroquine (0.875mg/100g bwt) orally and once daily. Administration lasted for 3 and 7 days for batches 1 and 2 respectively. The biochemical analysis of the serum was carried out using standard methods. Results obtained on both days 3 and 7 showed that serum total protein and globulin concentrations in the artequin group was significantly lower ( $p < 0.05$ ) compared to control. The alkaline phosphatase concentration in the artequin group on day 7 was significantly ( $p > 0.05$ ) higher compared to control. In conclusion, administration of artequin and chloroquine at their recommended doses and duration is relatively safe. Prolonged administration of artequin could predispose to low serum proteins and globulin with accompanied elevations in ALP levels while chloroquine could increase AST level signifying hepatocellular damage.

### **EFFECT OF CIMETIDINE ON HEMATOLOGICAL INDICES OF WISTAR RATS: MODULATORY ROLE OF VITAMIN C**

**\*S. Ahmad, and I.U. Yarube.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Bayero University, Kano, PMB 3011, Kano-Nigeria.

\*Corresponding author: [shazymeena01@yahoo.com](mailto:shazymeena01@yahoo.com); +2348035869417

Cimetidine is a drug used in treatment of dyspepsia which is a clinical condition with widespread distribution. The aim of this study was to evaluate the effect of chronic cimetidine treatment at therapeutic dose on hematological indices and the modulatory role of vitamin C on any change induced by cimetidine treatment. Forty adult male

Wistar rats were divided into four groups (n = 10) and treated orally for 60 days with distilled water (control); cimetidine (30 mg kg<sup>-1</sup>); cimetidine (30 mg kg<sup>-1</sup>) + vitamin C (25 mg kg<sup>-1</sup>) and cimetidine (30 mg kg<sup>-1</sup>) + vitamin C (50 mg kg<sup>-1</sup>). At the end of the study blood was collected by heart puncture following adequate anesthesia. Total white blood cell (WBC) count (5.99 ± 0.20 x 10<sup>3</sup>/mm<sup>3</sup>) and total serum protein (6.44 ± 0.21 g/dl) of the cimetidine-treated group were lower than that of the control (7.95 ± 0.29 x 10<sup>3</sup>/mm<sup>3</sup> and 7.26 ± 0.18 g/dl, respectively), while the value for red blood cell (RBC) count, packed cell volume (PCV), hemoglobin (Hb) concentration, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), color index (C.I) and erythrocyte sedimentation rate (ESR) of the two groups were not significantly different. Treatment with vitamin C prevented the cimetidine-induced decrease in total WBC count and total serum protein. It was concluded that chronic cimetidine administration at therapeutic dose caused a significant decrease in WBC count and serum protein; and no significant effect on RBC count, PCV, Hb, MCV, MCH, MCHC, C.I and ESR; and vitamin C at 25 mg kg<sup>-1</sup> was more effective than at 50 mg kg<sup>-1</sup> in reversing the decrease in WBC count and serum protein caused by cimetidine treatment.

### **EVALUATION OF TOXICITY OF ALUMINIUM-TAINTED WATER IMPACT IN MALE WSTAR RATS: OXIDATIVE STRESS IN HEART AND KIDNEY**

**2O.N. Ilochi, and \*1A. N. Chuemere.**

<sup>1</sup>Department of Human Physiology, College of Health Sciences, University of Port Harcourt, P.M.B 5323 Choba Port Harcourt, Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Madonna University, Elele, Rivers State, Nigeria.

\*Corresponding author: [arthur.nwafor@uniport.edu.ng](mailto:arthur.nwafor@uniport.edu.ng);

Aluminium is a ubiquitous element; comprising about 8% of the earth's surface; and it has no known beneficial effect in humans, but can enhance adverse health effects. The adverse effect of aluminium on body organs is incompletely understood, necessitating the need to better understand the mechanistic-link in its induced adverse health outcomes. This study evaluated the oxidative stress and established the predictor ratio of the negative impact of aluminium chloride - tainted water (AlCl<sub>3</sub>) assessed by alterations in pro-oxidant/antioxidant in the heart and kidney of male Wistar rats. Fifty male Wistar rats were randomly assigned to five groups of 10 rats each. Control group was given normal drinking water, while the AlCl<sub>3</sub> treated animals were administered 200, 400, 600 and 800mg/kg of AlCl<sub>3</sub> orally, once daily for 28 days. Heart and kidney specimens were collected for assessment of oxidative stress markers-malondialdehyde (MDA) and protein carbonyl (PCO) and glutathione peroxidase (GPx), superoxide dismutase (SOD) and catalase (CAT) activities. The results showed that AlCl<sub>3</sub> in a dose-response-organ specificity induced significantly ( $P \leq 0.05$ ) higher oxidant/antioxidant enzymes' alterations in rats as reflected by marked increased MDA level with a concomitant decreased GPx, SOD and CAT activity.

Correlation coefficient indicated that all the oxidative stress markers were significantly different upon comparing in both  $AlCl_3$  and control groups. In conclusion, our data indicated that dose-response-organ dependent raised oxidative stresses are the possible mechanistic-link in  $AlCl_3$  induced male rat cardio-renal toxicity. Additionally, the established predictor ratio of the interplay in the interrelationship of the damaged tissue biomarkers can contribute to evaluation of pathophysiology risk of  $AlCl_3$  in heart and kidney.

### **IN-VITRO NEGATIVE CHRONOTOPIC AND INOTROPIC EFFECTS OF AQUEOUS LEAF EXTRACT OF OCIMUM BASILICUM (SWEET BASIL) ON ISOLATED PERFUSED RABBIT HEART**

**W. I Kayode, E. A. Alex, A.B. Dubo, K. V. Jerome, A. Shehu, F. A. Dawud, and J.A. Tende.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University Zaria, Kaduna Nigeria

Corresponding author: alexenoch23@gmail.com;

Numerous cardiovascular health benefits have been attributed to *Ocimum basilicum*. The aim of this study is to explore the effect of aqueous leaf extract of *Ocimum basilicum* on force and rate of contraction of the heart using an isolated perfused heart system. In this study different concentration (10mg/ml, 25mg/ml, 50mg/ml) of the aqueous leaf extract of *Ocimum basilicum* were used and the experiment was carried out using the isolated perfused rabbit heart model. Standard drugs such as Adrenaline, Propranolol, Acetylcholine and Atropine were also administered and their results were compared with those of the extract. The standard drugs were administered before the extract and at each administration the heart was allowed to recover or reach a basal contraction before the next administration. The extract exerts a negative chronotropic and negative inotropic effect on the isolated heart tissue in a concentration dependent fashion ( $p < 0.005$ ). In conclusion aqueous leave extract of *Ocimum basilicum* possess negative inotropic and chronotropic properties.

### **MODULATORY ROLE OF CLOVE SUPPLEMENT ON CHRONIC RESTRAIN STRESS INDUCED ALTERATION IN PAIN PERCEPTION AND INFLAMMATION IN WISTAR RATS.**

**M.A. Abdulwahab, A.H. Umar, A. Abdulaziz, H. Abba, A. Sabiu, D. Manari, and H. Sulaiman.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria

Corresponding author: [havsmujad@gmail.com](mailto:havsmujad@gmail.com);  
+2348068439013, +2348038436308, +2348074315732

The use of herbal medicine is wide spreading and growing, clove is being used for different medicinal purposes such as pain reliever for tooth aches, antiseptic, antispasmodic, antiviral and antibacterial. This study aims to determine the modulatory role of clove supplement on pain perception, inflammation and biomarkers of oxidative stress in Wistar rats exposed to chronic restrain stress. Forty male Wistar rats weighing 100-120g were used for the study. The

animals were divided into four groups; positive control group (no stress), negative control group (exposed to restrain stress for four weeks without supplement), third group were given 3% clove supplement with 97% standard feed, fourth group were given 6% clove supplement with 94% standard feed. The third and the fourth groups were both exposed to restrain stress for four weeks (chronic stress). In the tail flick test, clove exhibited more pronounced anti nociceptive effect in the 6% clove supplement group, while a mild reduction in pain response latency at 3% clove supplement group was observed. The result of the anti-inflammatory study revealed that 3% and 6% clove supplement groups possessed anti-inflammatory activity with a maximum inhibitory effect at the end of four hours (4hrs). This study also showed an increase in the serum level of \*SOD in the supplement groups, while a decrease in MDA level across the treatment groups was observed. The results obtained from this study confirmed the potentiality of clove as an anti-inflammatory and analgesic agent, as well as a potential anti-oxidant.

### **ACUTE EFFECTS OF 90-MINUTE FOOTBALL MATCH ON RED BLOOD INDICES IN SEDENTARY YOUNG MALES.**

**1.I. Musa, \*1H.O. Suleiman, 2M.A. Mabrouk, and 3T.Yusuf.**

1Department of Human Physiology, Kogi state university, Anyigba Nigeria

2Department of Human Physiology, Bayero University, Kano Nigeria

3Department of Human Physiology, Ahmadu Bello University, Zaria Nigeria

\*Corresponding author: [abusafiyya2013@gmail.com](mailto:abusafiyya2013@gmail.com);  
+2348065638515

Previous study, had demonstrated that standard ninety-minute football match did not have adverse effects on blood rheology in regularly trained male footballers. In this study, we aimed to investigate the acute effects of a single 90-minute football match on red blood cell indices in sedentary young males. This quasi- experimental study was carried out on 20 healthy males (20.00±0.48years old). The university institutional review board gave approval for all procedures in accordance with the Declaration of Helsinki. Fasting blood (3ml) was collected from antecubital vein before and after the 90 minutes football match. From the samples, pre- and post-match red blood cell indices were determined using standard methods. Data were analyzed by SPSS version 20 using t student and paired t-tests in order to compare group before and after exercise training. The 90 minutes football match decreased Red Blood Cell count and Packed Cell Volume significantly ( $P \leq 0.05$ ). But it increased the Plasma Volume significantly ( $P \leq 0.05$ ). Results of this study showed that an acute effect of a single 90-minute football match maintains red blood cells and pack cell volume are within physiological range in sedentary young men, thereby optimizing microcirculation to enhanced oxygen delivery to the working muscle.

### **EFFECTS OF ZINC AND FOLIC ACID ON SPERM MOTILITY AND TUMOUR NECROSIS FACTOR-ALPHA (TNF-A) LEVELS IN TESTICULAR ISCHAEMIC-REPERFUSION INJURY IN WISTAR RATS**

\***1R.J. Bebekah, 2J.O. Ayo, 1Y. Tanko, and 3K.V. Olorunshola.**

<sup>1</sup>Department of Human Physiology, College of Medical Sciences, Faculty of Basic Medical Sciences, Ahmadu Bello University, Zaria

<sup>2</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria

<sup>3</sup>Department of Human Physiology, Faculty of Medicine, University of Abuja, Abuja

\*Corresponding author: [drbebekah@gmail.com](mailto:drbebekah@gmail.com); +234 7036992647

Ischaemic-Reperfusion Injury is a complex phenomenon that induces cell damage through a biphasic process-Ischaemia and reperfusion. The reperfusion phase of this process results in generation of reactive oxygen species and pro-inflammatory cytokines which affect sperm motility. This study attempts to investigate the ameliorative effect of zinc and folic acid on sperm motility and TNF- $\alpha$  levels following IRI. Thirty male Wistar rats were divided into six groups comprising of five animals (n=5). Group 1(control) were given 1 ml/kg normal saline for 21 days. Group 2 (sham) were given normal saline for 21 days followed by sham treatment. Group 3 (torsion/detorsion) were given normal saline for 21 days followed by torsion-detorsion. Rats in Group 4 (folic acid) were treated with (2 mg/kg) folic acid for 21 days followed by torsion-detorsion of the testis. Group 5 (zinc) were treated with (50mg/kg) zinc for 21 days followed by torsion-detorsion. Group 6 (Aspirin) were treated with (200mg/kg) aspirin for 21 days and induced with torsion-detorsion. At the end of 21 days, the epididymises were harvested and sperm motility investigated. Blood samples were collected, the sera harvested and used for TNF- $\alpha$  assay. The number of the non-motile cells decreased significantly ( $p < 0.05$ ) in the folic acid and zinc treated groups compared with the control. There was no significant difference in the TNF- $\alpha$  levels in the treated groups but a slight decrease was recorded in the zinc treated group. Results from this study suggest that oral treatment with folic and zinc could significantly reduce the adverse effect of IRI

#### **ALLOXAN-INDUCED DIABETES CAUSES LIVER FUNCTIONS AND LIPID PROFILE CHANGES IN ALBINO WISTAR RATS: ROLE OF ETHNOLIC LEAF EXTRACT OF *GUIERA SENEGALENSIS***

\***1Y. Sadau, 2F.U. Maigari, 2A.A. Siddan, and 3M.N. Nuhu.**

<sup>1</sup>Department Human Physiology, Gombe State University, Gombe, Nigeria

<sup>2</sup>Department of Biochemistry, Gombe State University, Gombe, Nigeria

<sup>3</sup>Sa'adatuRimi College of Education, Kano

\*Corresponding author: [ysadau@gmail.com](mailto:ysadau@gmail.com); +2348065077877

In most of African countries, a large number of diseases are treated administering plant infusions. *Guierasenegalensis* (Gs) has been used treats many diseases in Northern Nigeria, but its effects on liver function test, blood glucose level and lipid profile in diabetic rats has not been documented. Thirty five male albino rats with average weight of 200 g-250 g were used for study. They were divided into five groups of seven rats each: Group A (normal control). Group B (diabetic

control) Groups C and D and E were induced with diabetes and treated daily with 100mg/kg, 150 mg/kg and 200 mg/Kg body weight of Gs leaf extract respectively for three weeks. At the end of this experimental procedure, rats were anaesthetized with diethyl-ether vapour. Blood samples were collected through cardiac puncture for measurement of serum metabolites. The result demonstrated that administration of ethnolic leaf extract of Gs in the induced diabetes rats has not shown any significant changes in the activities of ALP, AST and ALT when compared with diabetic control. However a significant increase was recorded in the serum total protein (TP) and albumin (ALB) when all the doses of Gs were compared with diabetic control. Administration of ethnolic leaf extract of Gs to alloxanized diabetic rats at the doses considered possesses hypoglycemic activities.

#### **EFFECTS OF CALCITRIOL SUPPLEMENTATION ON RENAL, LIVER AND LIPID PEROXIDATION BIOMAKERS, IN FRUCTOSE-DRINKING ALBINO WISTAR RATS**

**1I. Lai, \*1Y. Sadau, and 2F.U. Maigari.**

<sup>1</sup>Department of Human Physiology, College of Medical Sciences, Gombe State University Gombe, Nigeria,

<sup>2</sup>Department of Biochemistry, Gombe State University, Gombe, Nigeria

\*Corresponding author: [ysadau@gmail.com](mailto:ysadau@gmail.com); +2348065077877

Type 2 diabetes mellitus is an important public health problem. The study was designed to examine the effects of oral calcitriol treatment on indices of renal and liver failure, antioxidant status and lipid peroxidation in fructose-drinking rats. Animals (130- 200 Kg) were randomised into four groups of five rats each and subjected to 125  $\mu$ g/Kg body weight calcitriol treatment for three weeks after five weeks of fructose drinking. *Group I:* Control; normal rat feed + distilled water, *Group II:* normal rat feed + 125  $\mu$ g/Kg body weight of Calcitriol, *Group III:* normal rat feed + 10% fructose solution, *Group IV:* normal rat feed + 10% fructose solution + 125  $\mu$ g/Kg body weight of Calcitriol. All the parameters were determined using available commercial kits. Results showed that fructose-drinking rats exhibited significant increased in urea, creatinine, liver enzymes activities and lipid peroxidation index while the activities of Superoxide dismutase (SOD) and Catalase (CAT) were significantly reduced compared with the control. Calcitriol treatment significantly reduced renal failure indicators and activities of liver enzymes. However the activities of antioxidant enzymes were significantly increased. it was contrived that calcitriol treatment exhibited a reno-hepatic protection, enhanced the activities of the antioxidant enzymes and prevented lipid peroxidation in fructose-drinking rats.

#### **THE EFFECT OF ADMINISTRATION OF CURCUMIN DURING SUCKLING ON THE DEVELOPMENTAL PROGRAMMING OF METABOLIC FUNCTION IN MALE AND FEMALE ADOLESCENT SPRAGUE DAWLEY RATS**

\***1,2K. G. Ibrahim, 1E. Chivandi, and 1K. H. Erlwanger.**

<sup>1</sup> School of Physiology, Faculty of Health Sciences, University of the Witwatersrand, 7 York Road, Parktown 2193, Johannesburg, South Africa.

<sup>2</sup> Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Usmanu Danfodiyo University, P.M.B. 2254, Sokoto, Nigeria.

\*Corresponding author: [gandi.kasimu@udusok.edu.ng](mailto:gandi.kasimu@udusok.edu.ng)

The current global epidemic of metabolic syndrome is linked to the increased consumption of fructose rich diets. Nutritional perturbations with natural polyphenols during the suckling period have demonstrated beneficial metabolic programming effects. Curcumin is a dietary spice that has anti-diabetic, antioxidant and anti-inflammatory properties. We aimed to determine whether administration of curcumin to rats during suckling would protect or predispose them to the adverse effects of a post weaning high fructose diet. Male and female Sprague Dawley pups (n=128) were allocated to four treatment groups and administered either a 0.5% dimethyl sulfoxide solution, curcumin (500mg.kg<sup>-1</sup>), fructose (20%, w/v) or a combination of curcumin and fructose daily via oral gavage from postnatal days 6 to 21. All the rats were weaned onto normal rat chow and each of the initial groups was further subdivided into two subgroups; one group had plain tap water while the other had fructose (20%, w/v) as their drinking solution for six weeks. The rats were then fasted overnight and euthanised on postnatal day 63. Blood was collected via cardiac puncture and used for metabolic substrates and hormonal assays. There were no differences (p>0.05, ANOVA) in the fasting blood glucose, triglycerides, cholesterol, plasma concentrations of insulin, adiponectin and the homeostatic model of insulin resistance across the treatment groups. Administration of curcumin during suckling, a critical window of developmental plasticity in the rat, did not affect the metabolic response of adolescent rats to a post weaning high fructose diet.

#### **EVALUATION OF THE ROLE OF ELLAGIC ACID ON MOTOR AND OXIDATIVE RESPONSES IN PENTYLENETETRAZOLE-KINDLED RATS**

**<sup>1</sup>P. P. Mshelia, <sup>2</sup>N. M. Danjuma, <sup>3</sup>R. A. Magaji, and <sup>4</sup>T. Dzenda.**

<sup>1</sup>Department of Human Physiology, Abubakar Tafawa Balewa University, Bauchi, Nigeria

<sup>2</sup>Department of Pharmacology and Therapeutics, Ahmadu Bello University, Zaria, Nigeria

<sup>3</sup>Department of Human Physiology, Ahmadu Bello University, Zaria, Nigeria

<sup>4</sup>Department of Veterinary Physiology, Ahmadu Bello University, Zaria, Nigeria

Corresponding author: [philmshell@gmail.com](mailto:philmshell@gmail.com); +2348063306765

Epilepsy is a neurologic disorder affecting more than 50 million people worldwide. Motor function impairment is among the disorders caused by epilepsy. Oxidative stress plays part in epileptic kindling. This study assessed the motor strength role of ellagic acid in pentylenetetrazole (PTZ)-kindled rats. Thirty male Wistar rats (200 – 300g) with 6 groups of 5 rats each were used. Groups 1 – 5 received 35mg/kg PTZ, while group 6 received distilled water (*s.c*) on alternate days. One hour before PTZ administration, group 2, 3 and 4 received 15, 30 and 60 mg/kg (*p.o*) ellagic acid dissolved in 10% Dimethylsulphoxide (DMSO) respectively while group 5

received 30mg/kg phenobarbital (*i.p*) and were observed for seizure activity after PTZ injections. When kindling was achieved, motor strength test was conducted after which the rats were anaesthetized and their brain tissues used for assaying malondialdehyde (MDA), superoxide dismutase (SOD) and glutathione peroxidase (GPx). Results showed no significant (P < 0.05) improvement in motor strength in all the treated groups. A significant decrease (P < 0.05) was observed in MDA concentration in the treated groups when compared to control group 1. Also SOD increased significantly (P < 0.05) in all the groups when compared to control group 1. GPx was significantly increased (P < 0.05) in group 4 when compared to group 1 control. Findings from the study showed that epileptic seizure did not affect motor strength while oxidative stress was involved in kindling. Ellagic acid may be a potent antiepileptic drug with no associated side effects.

#### **EVALUATION OF THE EFFECTS OF CANNABIS SATIVA L. EXTRACT ON MOTOR FUNCTION OF MALE WISTAR RATS**

**\*Z. Richard, A. S. Sunday, U. E. Umana, and P. P. Adamu**

<sup>1</sup>Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria, Nigeria.

\*Corresponding author: [richardzachariah@gmail.com](mailto:richardzachariah@gmail.com); +2348031521783

The present study was aimed at investigating the effect of *Cannabis sativa L.* administration on motor coordination activity of adults Wistar rats. The work was limited to motor activity test of the cerebral cortex of adult male Wistar rats. Fifteen male adults Wistar rats of average weight 220g were divided into 3 groups with 5 animals per group. Animals in group 1(control) were given distilled water, while group 2 and 3 were administered with 250mg/kg and 500mg/kg b.wt respectively via oral route, daily for 21 days. Motor exploratory activity was assessed using Ladder rung walking test method. Motor assessment showed a significant increase (P<0.05) in the meantime taken to reach the home cage in groups 2, and 3 when compared to the control. It can therefore be concluded that *Cannabis sativa L.* administration result in motor exploratory impairment which could be due to degenerative changes in the cerebral cortex of adults Wistar rats.

#### **THE HYPOTENSIVE EFFECT OF HIBISCUS SABDARIFFA TEA MAY OCCUR THROUGH THE INHIBITION OF THE DISCHARGE OF THE SYMPATHETIC NERVOUS SYSTEM**

**<sup>1,5</sup>O.I. Oyeniran, <sup>2</sup>I.A. Abubakar, <sup>1</sup>G.O. Igbokwe, <sup>1</sup>E. E. Igbokwe, <sup>3</sup>Y.J. Oyeniyi, <sup>1</sup>F.B.O. Mojiminiyi, <sup>4</sup>S.A. Isezuo.**

Departments of <sup>1</sup>Physiology, <sup>2</sup>Veterinary Parasitology & Entomology, <sup>3</sup>Pharmaceutics & <sup>4</sup>Medicine, Usmanu Danfodiyo University, Sokoto, Nigeria, <sup>5</sup>Physiology, Nile University of Nigeria, Abuja

Corresponding author: [frank.mojiminiyi@udusok.edu.ng](mailto:frank.mojiminiyi@udusok.edu.ng); +234-7065748556

This study tested the hypothesis that the hypotensive effect of *Hibiscus sabdariffa* tea (HST) may be due to its

attenuation of discharge of the sympathetic nervous system (SNS). Using a double-blinded placebo-controlled design, the hand grip exercise (HGE) was used to activate the SNS.<sup>1</sup> Following ethical approval, HGE was performed in healthy human subjects before and after the oral administration of 200mg/kg HST (n=20) or food colourant (n=20) which served as placebo. The basal blood pressure (BP) and pulse rate (PR) were obtained, then each subject held the hand-grip dynamometer forcefully at 30% maximal voluntary contraction (MVC) for 1-2 minutes until the onset of fatigue, and the BP and PR responses were measured. The mean arterial pressure (MAP) was taken as representative BP. Results were expressed as Mean±SEM and P<0.05 was considered significant. In the presence of HST, the HGE-induced changes ( $\Delta$ MAP=8.7±1.3mmHg;  $\Delta$ PR=8.4±1.0 beats/min) were significantly reduced compared to its absence ( $\Delta$ MAP=15.0±1.8mmHg,  $\Delta$ PR=14.5±1.5 beats/min; P<0.0001 respectively). However, in the presence of the food colourant, these changes ( $\Delta$ MAP=11.2±0.6mmHg,  $\Delta$ PR=11.9±0.8 beats/min) were significantly higher compared to its absence ( $\Delta$ MAP=8.7±0.7mmHg,  $\Delta$ PR=9.7±0.7 beats/min; P<0.0001 respectively). These results suggest that HGE-induced activation of the SNS was attenuated by HST but aggravated by the food colourant. It is concluded that the hypotensive effect of HST may occur through the inhibition of SNS activation while the food colourant may further activate it.

#### **EFFECT OF CIGARETTE SMOKING ON COGNITIVE FUNCTION AMONG YOUNG MALE UNDERGRADUATES IN AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA**

**1E. Hassan-Danboyi, 1R. A. Magaji, and 2T. Danboyi.**

<sup>1</sup>Department of Human Physiology, Ahmadu Bello University, Zaria.

<sup>2</sup>Department of Human Physiology, Kaduna State University, Kaduna;

Corresponding author: [timothy.danboyi@kasu.edu.ng](mailto:timothy.danboyi@kasu.edu.ng);  
+2348036409939

About 2 billion people worldwide smoke tobacco product mostly in form of cigarette. Evidences on the effects of cigarette smoking on cognition have been very conflicting. While some studies have shown cigarette smoking to be protective against cognitive impairments other studies have shown otherwise. The aim of this study is to assess the relationship between cigarette smoking and cognitive impairment in young male undergraduate students of Ahmadu Bello University, Zaria, Nigeria. This is a cross-sectional study, comprising 62 smokers and 41 never-smokers as volunteers. Each volunteer was randomly selected and subjected to four cognitive battery tests which include the mini-mental state examination (MMSE), clock-drawing test (CDT), trail-making test (TMT) and verbal fluency test (VFT), with an inter-test period of about 15 minutes. Analysis was done using the SSPS v17. Most of the volunteers were within 18-27 years of age (50 [80.6%] of smokers and 35 [85.4%] of never-smokers). On individual cognitive battery test, varying degrees of cognitive impairments were found among both groups: MMSE (3.2% of smokers, none of never-smokers); VFT 1 (9.7% of smokers, 9.8% of never-smokers); VFT 2 (32.3% of smokers, 17.1% of never-smokers); CDT (38.7% of smokers, 14.6% of never-smokers); TMT A (71.0% of

smokers, 75.6% of never-smokers) and TMT B (46.8% of smokers, 51.2% of never-smokers). Overall, the never-smokers appear to performed better than the smokers except in the cognitively-tasking TMT but only 16.1% of the smokers had cognitive impairment, as against 26.8% (11) of the never-smokers. Chi-square analysis revealed no association between smoking and cognitive impairment. Pearson's correlation also revealed weak correlations between smoking and cognitive impairment in all the tests. Therefore, light to moderate cigarette smoking confers some protective effect against cognitive impairment probably due to the cognitive-enhancing effect of nicotine contained in the cigarette smoke.

#### **THE AWARENESS OF PHYSIOLOGY AS A SCIENTIFIC DISCIPLINE AND A PROFESSION AMONG SENIOR SECONDARY SCHOOL STUDENTS IN ABUJA, NIGERIA**

**\*1O. M. Ochayi, 1R. Ojo, 1M. T. Olea, and 2O. I. Oyeniran.**

<sup>1</sup>Department of Physiology, Faculty of Basic Medical Sciences, Baze University, Abuja, Nigeria

<sup>2</sup>Department of Physiology, College of Medicine, Nile University of Nigeria, Abuja, Nigeria

Corresponding author: [mykelochayi@yahoo.com](mailto:mykelochayi@yahoo.com);  
+234(0)7035639237

The recognition of Physiology as a profession and major discipline in medicine and scientific research in Nigeria is gaining momentum. This attention is however low especially among prospective university applicants. This study was conducted to determine the level of awareness of Physiology among secondary school students in the six local government areas of Abuja. The research was carried out in twelve randomly chosen secondary schools (private and public) in Abuja, Nigeria. One hundred and twenty (n=120) senior secondary school students (SSI-SSIII) were asked to fill in questionnaire, of which ninety-eight (98) responded. The first part of the survey included personal data and brief history. The second part contained 9 close-ended questions assessing students' knowledge about physiology as a discipline. The results were treated statistically using student's t-test. Apparently, data from the respondents shows that private and public schools are not familiar with the varied facets of Physiology as a discipline. Among the students in the private school, a mean of 2.18 for male and 2.29 female were obtained; while in public schools, a mean of 2.43 for male and 2.52 for female were obtained respectively. However, all the respondents were aware that there are professionals called Physiologist (private school: Mean<sub>male</sub> = 3.5; Mean<sub>female</sub> = 4.31 and public schools: Mean<sub>male</sub> = 3.0; Mean<sub>female</sub> = 4.31). The results of this study shows that most senior secondary school students are not very familiar with Physiology as a scientific discipline. However, their knowledge of Physiology as a profession was remarkable.

#### **MODULATORY EFFECTS OF ACETONE EXTRACT OF Combretum micranthum BARK ON CYCLOOXYGENASE ENZYME**

**U. Aliyu, I.A. Imam, E.A. Alex, A. Shehu, J. V. Kayode, F. Ja'afar, A. S. Musa.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences College of Health Sciences, Ahmadu Bello University, Zaria, Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Medicine, Kaduna State University, Kaduna, Nigeria.

Inflammation is an essential response provided by the immune system that ensures the survival during infection and tissue injury. Inflammatory responses are essential for the maintenance of normal tissue homeostasis. Combretum micrathum is used traditionally in Senegal and Mali for fatigue, liver ailments, headache, convalescence, diabetes, blood disease, weight loss, cancer, sleep disorders, most of these diseases are associated with inflammation. The aim of this study was to validate the numerous uses of Combretum micranthum plant. The acetone extract of Combretum micranthum was screened for cyclooxygenase (COX) activity in a 96 well microtitre plate using COX screening assay kit. The result obtained demonstrated a weak inhibitory activity by the extract on both COX-1 and COX-2 with median inhibitory concentration values of  $52.45 \pm 3.4 \mu\text{g/ml}$  and  $66.01 \pm 4.7 \mu\text{g/ml}$  respectively. This shows that the extract had a weak anti-inflammatory property which may be attributed to the presence of some phytochemicals such as resins and glycosides in the extract. The median lethal concentration (LC<sub>50</sub>) was  $41.32 \pm 0.92 \mu\text{g/ml}$  which signifies low toxicity compared to the control drug doxorubicin with an LC<sub>50</sub> value of  $3.8 \pm 0.08 \mu\text{g/ml}$ . In conclusion, the acetone extract of Combretum micranthum bark was found possess weak anti-inflammatory activity and low toxicity to vero cells.

#### LIVER ENZYMES AND SERUM ELECTROLYTES EVALUATION IN FEMALE LACTATING WISTAR RATS FOLLOWING FERMENTED SOYA BEAN AND ASCORBIC ACID SUPPLEMENTATION

<sup>1</sup>I.S. Malgwi, <sup>2</sup>E.D. Eze, <sup>3</sup>N.S. Emmanuel, <sup>3</sup>Y. Tanko, <sup>3</sup>I. Musah, <sup>4</sup>M.U. Kawu, <sup>5</sup>A.I. Iliya, and <sup>3</sup>A. Mohammed.

<sup>1</sup>Department of Human Physiology, College of Medical Sciences, University of Maiduguri Borno, Nigeria

<sup>2</sup>Department of Physiology, Faculty of Biomedical Sciences, Kampala International University, Kampala, Uganda

<sup>3</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Science, Ahmadu Bello University Zaria, Nigeria

<sup>4</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University Zaria, Nigeria

<sup>5</sup>Department of Anatomy, Kyiv Medical University, Kyiv-Ukraine

Corresponding author: [ibmalgwi2000@yahoo.com](mailto:ibmalgwi2000@yahoo.com)

In mammals, lactation is the most energetically demanding period of a female's reproductive life. However, some of the substances used to enhance lactation have side effects. This study was designed to investigate the effect of fermented Soya bean and ascorbic acid supplements on some liver enzymes and histology. At parturition, the animals were randomly divided into seven (7) groups of five (5) rats each (n=5) and treated as follows: Group I: (Normal control) was given normal feed and distilled water, orally (1 ml/kg bw), Group II: metoclopramide (5 mg/kg bw), Group III: 100 mg/kg bw of Vitamin C, Groups IV, V and VI were given soya bean supplement thus; 10%, 20% and 40%, respectively. Group VII was co-

administered with 20% soya bean supplement and Vitamin C (100 mg/kg bw). Treatment was done for the period of ten (10) days at 06:00 hours daily. The result on serum ALP level showed a significant increase in all the supplements treated groups; SB 10% ( $110.80 \pm 1.63$ ), SB 20% ( $127.60 \pm 9.60$ ), SB 40% ( $122.80 \pm 2.60$ ) and SB 20% + VIT C ( $129.40 \pm 4.90$ ) compared to the controls ( $86.60 \pm 3.73$ ) ( $P < 0.05$ ). Although there was increase in the level of serum calcium, sodium, magnesium, potassium, chloride and bicarbonate in all the treated groups, it was however not significant compared to the control and metoclopramide treated group. The co-administration of the soya bean supplement and Vitamin C showed a significant increase in serum ALP, ALT and AST levels which could infer a detrimental potential of such combination to the hepatocytes.

#### EFFECTS OF HYDROMETHANOL EXTRACTS OF *Garcinia kola* ON SOME BIOCHEMICAL PARAMETERS OF MALE WISTAR RATS.

<sup>1</sup>C. Obiandu, <sup>1</sup>F. Saronee, <sup>2</sup>K. Okari, and <sup>3</sup>A. Obiandu.

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Choba, Rivers State, Nigeria.

<sup>2</sup>Department of Medical Biochemistry, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Choba, Rivers State, Nigeria

<sup>3</sup>Post Primary schools board, Port Harcourt, Rivers State, Nigeria

Corresponding author: [saroneefridayt@yahoo.com](mailto:saroneefridayt@yahoo.com); +2348130322139  
*Garcinia kola* is commonly used in traditional medicine for the treatment of diverse ailments including coronary artery diseases. Thus, this study aims to determine the effect of hydromethanol (1:4) extracts of the pulp and seed coat of *Garcinia kola* on serum lipid profile and its antioxidant properties. The two forms were separately dried and blended to powder. Forty male wistar rats (8 per group) were assigned into Five (5) groups. Groups were treated thus: Group one; control. Group two; 100mg/kg pulp extract. Group three; 200mg/kg pulp extract. Group four; 100mg/kg seed coat extract. Group five; 200mg/kg seed coat extract; for 30 and 60 days duration. On treatment conclusion, blood was collected for the determination of lipid profile and antioxidant properties. The higher dose of the pulp and seed coat extracts significantly ( $P < 0.05$ ) increased the catalase level and superoxide dismutase enzyme activity, whereas, both the higher and lower doses of the seed coat extract caused a reduction in malondialdehyde level. The serum total cholesterol was significantly elevated by the higher dose of the pulp extract while the seed coat extract caused significantly increased high density lipoprotein cholesterol level and a reduction in the low density lipoprotein level. The two extracts demonstrated marked antioxidant effects. The seed coat of *Garcinia kola* may possess the potential to prevent cell death due to lipid peroxidation by inhibiting the lipid peroxidation process. The seed coat extract may also be useful in preventing coronary artery disease and other atherosclerotic problems.

#### BLOOD GLUCOSE AND OXIDATIVE STRESS BIOMARKERS ASSESSMENT IN ALLOXAN INDUCED DIABETIC WISTAR RATS TREATED WITH QUERCETIN

**I. Shittabey, A.W. Alhassan, Y. Tanko, S. Yusuf, and D.D. Obadofin.**

Department of Human Physiology, Faculty of Basic Medical Sciences, college of Health Sciences Ahmadu Bello University Zaria

Corresponding author: [heyking92@gmail.com](mailto:heyking92@gmail.com)

The study was designed to evaluate the effect of Quercetin on blood glucose level and oxidative stress biomarkers in Alloxan-induced diabetic wistar rats. The animals were divided into six groups of five each (n=5). Group I served as control and received distilled water, group II received dimethylsulphoxide 1% (DMSO), group III and IV received Quercetin at 50mg/kg and 100mg/kg respectively. Group V received vitamin C (100mg/kg) while group VI was given glibenclamide (1 mg/kg). Diabetes was induced by injection of alloxan 150 mg/kg intraperitoneally. All administrations were done via oral gavage for 21 days. Quercetin at a dose of 50mg/kg and 100mg/kg significantly ( $P<0.05$ ) reduced fasting blood glucose level when compared to control ( $101.00 \pm 7.27$  vs  $122.56 \pm 8.02$  mg/dL) vs ( $332.80$ mg/dL  $\pm 36.53$ mg/dL). Serum catalase was significantly higher in the quercetin treated groups compared to the diabetic control. Serum level of SOD was significantly higher in the 100 mg/kg quercetin treated group relative to the diabetic control  $2.44 \pm 0.07$  and  $2.10 \pm 0.05$  vs  $0.92 \pm 0.05$ . Serum malondialdehyde concentration was significantly lower ( $P<0.05$ ) in the groups treated with quercetin compared to the diabetic control  $0.98 \pm 0.01$  vs  $1.32 \pm 0.06$ . In conclusion oral administration of quercetin has been found to reduce blood glucose level, increase serum antioxidant level and significantly decrease serum malondialdehyde level in Alloxan-induced diabetic wistar rats.

**THE EFFECT OF AQUEOUS AND N-HEXANE EXTRACTS OF NIGELLA SATIVA IN ALUMINIUM CHLORIDE –INDUCED HEMATOLOGICAL ALTERATION AND OXIDATIVE STRESS.**

**F. A. Dawud, Z.A. Miko, L.Y. Andrew, and K. G. Usman.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences. Ahmadu Bello University

Corresponding author: [Zainabamiko@gmail.com](mailto:Zainabamiko@gmail.com); +2347030168510

Aluminium Chloride ( $AlCl_3$ ) is a neurotoxic substance that has been known to induce hematological alteration and oxidative stress. The present study was designed to investigate the protective effect of *Nigella sativa* against  $AlCl_3$  induce hematological alterations and oxidative stress in adult Wistar rats. Thirty adult Wistar rats divided into six groups of five animals each. Group 1 (control group) was given Tween 80%; Group 2 was given Aqueous *Nigella sativa* (ANS) extract at dose of 200mg/kg; Group 3 was given Hexane *Nigella sativa* (HNS) extract at dose of 50mg/kg ; Group 4 was given 900mg/kg of  $AlCl_3$ ; Group 5 was given 200mg/kg ANS + 900mg/kg  $AlCl_3$  and Group 6 was given 50mg/kg HNS extract + 900mg/kg  $AlCl_3$ .  $AlCl_3$  significantly ( $p<0.05$ ) decreased RBC count but showed a significant ( $p<0.05$ ) increased in PCV, HB, MCH, and MCHC. Treatment with HNS and ANS reversed the effects of  $AlCl_3$ . But, group treated with HNS

alone significantly ( $p<0.05$ ) increased RBC count. Lymphocytes and WBC counts were significantly ( $p<0.05$ ) decreased by  $AlCl_3$ , which was reversed with HNS. Treatment with either of the extract alone significantly ( $p<0.05$ ) increased lymphocytes count.  $AlCl_3$  significantly ( $p<0.05$ ) decreased the level of MDA, and GSH as well as SOD and CAT activities. Treatment with ANS showed no significant ( $p<0.05$ ) effect on MDA and GSH but significantly increased ( $p<0.05$ ) catalase activity, whereas treatment with HNS significantly ( $p<0.05$ ) decreased MDA level only. It can be concluded that extracts of *Nigella sativa* increased hematological parameters and alleviate oxidative stress in Wistar rats treated with  $AlCl_3$

**EFFECTS OF HYDROMETHANOL EXTRACTS OF *Garcinia kola* ON SOME BIOCHEMICAL PARAMETERS OF MALE WISTAR RATS.**

**1C. Obiandu, 1F. Saronee, 2K. Okari, and 3A. Obiandu.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Choba, Rivers State, Nigeria.

<sup>2</sup>Department of Medical Biochemistry, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Choba, Rivers State, Nigeria

<sup>3</sup>Post Primary schools board, Port Harcourt, Rivers State, Nigeria

Corresponding author: [saroneefridayt@yahoo.com](mailto:saroneefridayt@yahoo.com); +2348130322139

*Garcinia Kola* is commonly used in traditional medicine for the treatment of diverse ailments including coronary artery diseases. Thus, this study aims to determine the effect of hydromethanol (1:4) extracts of the pulp and seed coat of *Garcinia kola* on serum lipid profile and its antioxidant properties. The two forms were separately dried and blended to powder. Forty male wistar rats (8 per group) were assigned into Five (5) groups. Groups were treated thus: Group one; control. Group two; 100mg/kg pulp extract. Group three; 200mg/kg pulp extract. Group four; 100mg/kg seed coat extract. Group five; 200mg/kg seed coat extract; for 30 and 60 days duration. On treatment conclusion, blood was collected for the determination of lipid profile and antioxidant properties. The higher dose of the pulp and seed coat extracts significantly ( $P<0.05$ ) increased the catalase level and superoxide dismutase enzyme activity, whereas, both the higher and lower doses of the seed coat extract caused a reduction in malondialdehyde level. The serum total cholesterol was significantly elevated by the higher dose of the pulp extract while the seed coat extract caused significantly increased high density lipoprotein cholesterol level and a reduction in the low density lipoprotein level. The two extracts demonstrated marked antioxidant effects. The seed coat of *Garcinia kola* may possess the potential to prevent cell death due to lipid peroxidation by inhibiting the lipid peroxidation process. The seed coat extract may also be useful in preventing coronary artery disease and other atherosclerotic problems.

**SERUM LACTOGENIC HORMONES AND TOTAL MILK YIELD IN FEMALE LACTATING WISTAR RATS TREATED WITH EXTRACT OF *CITRULLUS LANATUS SEEDS***

**M. Yahuza, M.B. Akor-Dewu, I.G. Bako, and N.S. Emmanuel.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University Zaria, Kaduna Nigeria  
Corresponding author: [yahuzam01@gmail.com](mailto:yahuzam01@gmail.com);  
+2348066351085

Around the world few herbs used for lactation purposes have not been scientifically evaluated but their traditional use, suggests and some beneficial effects. This study was designed to evaluate the lactogenic effect of *Citrullus lanatus* seeds (extract) in female lactating Wistar rats. Twenty apparently healthy female Wistar rats weighing between 160-200 g were randomly grouped into four (4) of five animals each (n=5) and treated orally for a period of ten (10) days, starting from day 3 after parturition. Group 1: Control (2 ml/kg) of distilled water; Group 2: Metoclopramide (5 mg/kg); Group 3: Extract (200 mg/kg); Group 4: Extract (400 mg/kg). Total milk yield was obtained from the difference between pre and post suckling pups weight. At the end of the treatment, rats (dams) were anaesthetized using diazepam and ketamine injection (75 and 25 mg/kg) respectively, and the blood samples obtained via cardiac puncture for biochemical analysis. There was a non-significant increase in serum prolactin level in all the treated groups when compared to control. Serum oxytocin level increased significant ( $P < 0.05$ ) in groups 2, 3 and 4 compared to control. There was also a significant increase ( $P < 0.05$ ) in serum oxytocin level in group 3 compared to group 2. Total milk yield increased significantly ( $P < 0.05$ ) in the group 2 and 3 compared to control. In conclusion, *Citrullus lanatus* was found to increase oxytocin and milk yield in lactating Wistar rats.

#### **ASSESSMENT OF LIPID PEROXIDATION AND SOME ANTIOXIDANT ENZYMES IN FEMALE LACTATING WISTAR RATS FOLLOWING ASCORBIC ACID AND $\alpha$ -TOCOPHEROL SUPPLEMENTATION**

**A.E. Ogweje, I.G. Bako, M.B. Akor-Dewu, and N.S. Emmanuel.**

Department of Human Physiology, Faculty of Basic medical Sciences, College of Health Sciences, Ahmadu Bello University Zaria, Nigeria  
Corresponding author: [abigailogweje@gmail.com](mailto:abigailogweje@gmail.com);  
+2347034434941

Oxidative stress, an imbalance between the generation of reactive oxygen species/ reactive nitrogen species and antioxidant defence capacity of the body, is actively involved in the pathogenesis of diabetes and its complications. This study was designed to evaluate lipid peroxidation and antioxidant enzymes in female lactating rats. At parturition, the animals were randomly divided into five groups thus; Group I: (Normal control) was given normal animal feed and distilled water, (1 ml/kg), Group II: metoclopramide (5 mg/kg bw), Group III: 100 mg/kg bw of Vitamin E. Group IV: 100 mg/kg of Vitamin C, whereas Group V was treated with the co-administration of vitamin E and C. Administration was carried out orally for a period of ten (10) days at 06:00 hours daily and the animals were euthanized at the end of the experiment. Serum levels of MDA in group treated with ascorbic acid

was significantly decreased ( $P < 0.05$ ) compared to control, metoclopramide treated and  $\alpha$ -Tocopherol treated groups. There was also a significant decrease in the groups treated singly with vitamin C and  $\alpha$ -Tocopherol when compared to the group co-administered with ascorbic acid and  $\alpha$ -Tocopherol. However there was no statistically significant difference observed in the serum level of Superoxide dismutase (SOD) and Catalase (CAT). Serum level of Glutathione peroxidase (GPx) was statistically significant ( $P < 0.05$ ) in the group administered  $\alpha$ -Tocopherol compared to the control. In conclusion, ascorbic acid and  $\alpha$ -Tocopherol administered singly was more efficient in alleviating lipid peroxidation than their co-administration.

#### **DETERMINATION OF CORRECTED QT INTERVAL (QTc) AMONG PSYCHIATRIC PATIENTS AT DAWANAU PSYCHIATRIC HOSPITAL, KANO**

**B. W. Yakasai, and S. A. Ibrahim.**

Corresponding author: [bashykasai@gmail.com](mailto:bashykasai@gmail.com); +234  
8025257786

Psychiatric patients are often associated with electrocardiographic (ECG) abnormalities notable among which is prolonged QTc which in some cases are life threatening due to the effect of anti psychotic drugs they are placed on. This study aims to determine the QTc of patients on anti psychotic drugs and find out if there are abnormalities in the ECG tracings as documented in the literature. Anthropometric and clinical data were obtained from 323 participants attending Dawanau Psychiatric hospital between April to May 2017. Apparently normal individuals who were not taking anti psychotic drugs were used as controls. ECG was recorded using DEC G-03A 12 Lead ECG machine on all the patients lying supine on a couch. The mean age of the participants was  $34.5 \pm 9.57$  years with 182 (56%) being males and 141 (44%) females. Independent sample t-test among the subjects and controls for BMI, SBP and Heart rate were  $21.4 \pm 4.4 \text{ kg/m}^2$  and  $21.57 \pm 3.57 \text{ kg/m}^2$  ( $p=0.89$ ),  $111.42 \pm 16.67 \text{ mmHg}$  and  $124.5 \pm 12.47 \text{ mmHg}$  ( $p=0.001$ ), and  $81.53 \pm 17.95 \text{ b/min}$  and  $73.37 \pm 12.03 \text{ b/min}$  ( $p=0.015$ ) respectively. The mean corrected QT interval (QTc) was  $413.51 \pm 30.09 \text{ ms}$  for the subjects and  $391.47 \pm 18.38 \text{ ms}$  for the controls which is statistical significant ( $p=0.001$ ). Nineteen (6%) of the subjects have prolonged QTc as against none of the controls, Correlation analysis within the subjects indicated no significant association between QTc and duration of anti-psychotic drugs treatment ( $r=1$ ). It can be concluded that antipsychotic drugs do not affect QTc duration. It is therefore recommended that baseline ECG screening be carried out on all patients on anti-psychotic drugs to help identify those with salient features of myocardial diseases so as to institute concurrent treatment in order to minimize the risk of fatal complications.

#### **LIPID PEROXIDATION AND ANTIOXIDANT ENZYMES ASSESSMENT IN ALLOXAN MONOHYDRATE INDUCED HYPERGLYCAEMIC MALE WISTAR RATS FOLLOWING ORAL ADMINISTRATION OF THEOPHYLLINE AND GLIBENCLAMIDE**

**D.C Ejiogu, Y. Tanko, N.S. Emmanuel, E.A Alex, F.M Yahuza, A.B Dubo, A.E Ogweje, and A. Mohammed.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University Zaria, Kaduna Nigeria  
Corresponding author: alexenoch23@gmail.com

The currently available anti-diabetic drugs are far from being satisfactory. Hence it is therefore imperative that the effects of other drugs like theophylline on blood glucose be studied. This study was designed to evaluate the effect of theophylline and glibenclamide treatment on lipid peroxidation (serum malondialdehyde concentration) and some antioxidant enzymes (superoxide dismutase, glutathione peroxidase and Catalase) in alloxan induced hyperglycaemic male Wistar rats. Thirty healthy male wistar rats weighing between 160-180g were grouped into five of six animals each (n=6) and treated for a period of fourteen days (14) after induction of hyperglycaemia using alloxan monohydrate. Group 1: (Normoglycaemic) Group 2: Diabetic control (DC), Group 3: Glibenclamide, 5mg/kg, Groups 4 and 5; theophylline 5mg/kg and 10mg/kg respectively. At the end of the fourteen (14) days, rats were anesthetized using ketamine and diazepam at 75 and 25 (mg/kg) respectively. Blood samples were taken from all treated groups for evaluation of serum MDA, SOD, GPx and CAT level. The result on serum MDA concentration was significantly decreased ( $P < 0.05$ ) in glibenclamide treated group compared to diabetic control;  $1.14 \pm 0.03$  vs  $1.32 \pm 0.06$ . Although a decrease was observed in the theophylline treated groups, the difference was however not statistically significant compared to diabetic control. There was also significant increase ( $P < 0.05$ ) in serum SOD and CAT level in the glibenclamide and theophylline treated group (5 mg/kg) compared to DC;  $2.02 \pm 0.04$  and  $1.92 \pm 0.24$  vs  $0.92 \pm 0.05$  respectively for serum SOD and  $53.20 \pm 0.58$  and  $52.80 \pm 1.07$  vs  $46.00 \pm 0.84$  respectively for CAT. However, serum GPx increased significantly ( $P < 0.05$ ) only in the theophylline treated groups compared to DC. In conclusion, Theophylline and Glibenclamide decreases lipid peroxidation while increasing serum antioxidant levels in alloxan induced hyperglycaemic male Wistar rats after 14 days oral administration

**PREVALENCE OF MALARIA PARASITE (PLASMODIUM PARASITE) IN PATIENTS WITH SICKLE CELL ANAEMIA IN CRISIS STATE ATTENDING HAEMATOLOGY CLINICAL OF AHMADU BELLO UNIVERSITY TEACHING HOSPITAL ZARIA, NIGERIA.**

**<sup>1</sup>A.B. Abubakar, <sup>1</sup>A. Mohammed, <sup>1</sup>Y. Tanko, <sup>2</sup>A. Hassan, and <sup>3</sup>A.S. Buba.**

<sup>1</sup>Department of Human Physiology, Ahmadu Bello University Zaria.

<sup>2</sup>Department of Haematology, Ahmadu Bello University Teaching Hospital Zaria.

<sup>3</sup>Department of Human Physiology, Gombe State University Gombe.

Corresponding author: [abullauk@gmail.com](mailto:abullauk@gmail.com); +2347033855283

The sickle cell gene has a geographical distribution that is identical to plasmodium species hence its prevalence in the sub-Saharan Africa including Nigeria where malaria is endemic (Edington and Laing, 1957). The high incidence of the sickle cell gene in malaria holoendemic areas attributable to the protection it affords the bearer as

explained by the concept of balance polymorphism (Serjeant and Serjeant, 2001). Approximately, 300 million people world-wide are affected by malaria. It remains the major cause of premature death, Abortion and still birth in the tropic and sub tropic, average of 1 – 1.5 million people die from it every year (WHO, 2003). Malaria is the most common cause of outpatient hospital visit in Nigeria and it consistently ranked among five most common cause of death for all ages (FMOH). This is a cross sectional study involving 30 consenting patients with SCA in crisis which was conducted in the haematology clinic of Ahmadu Bello University Teaching Hospital Zaria. All participants were interviewed using a structured questionnaire and examined clinically, consisting of 17 females (56.7%) and 13 males (43.3%). The ages ranges from 18 to 35. Malaria parasites were found in four (13.7%) patients with SCA in crisis. Females are less protected from malaria than males with incidence of 3 (13.7%) and 1 (7.7%) respectively. Males had more frequency of crisis while female had lower haematocrit level meaning that anaemia is worse in females. Blood transfusion and malaria are positively related. The prevalence of malaria in crisis is 13.7% females are less protected from malaria than males. The have frequent crisis while the female have lower haematocrit level meaning that anaemia is worse in female. Blood transfusion and malaria are positively related.

**COMPARATIVE STUDY OF OSMOTIC FRAGILITY TEST AND MALONDIALDEHYDE CONCENTRATION IN DEXAMETHASONE AND STREPTOZOTOCIN AS A MODEL OF TYPE 2 DIABETES IN HIGH FAT DIET FED RAT**

**O. N. Yusuf, A.A. Zakari, A. Jimoh, and F.A. Dawud.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria, Nigeria

Different models have been experimented for easy generation of type 2 diabetes interval time. In order to further clarify the pathophysiology of this metabolic disease, this research was done to compare the effect of erythrocyte osmotic fragility (OFT) and malondialdehyde (MDA) concentrations in streptozotocin with high fat diet (STZ/HFD) and dexamethasone with high fat diet (DEXA/HFD) in Wister rats. For the study, 25 male rats of uniform weight and age were selected and divided into five groups, viz, Control group, dexamethasone (DEXA) 2ml/kg, high fat fed rats (HFD), (STZ 30mg/kg/HFD), and (DEXA 0.5ml/kg/HFD). At the end of the study, 5ml of blood of each animal was collected through cardiac puncture; 3ml was put in EDTA bottle and the remaining 2ml in plain tube for serum extraction which were subjected to OFT and MDA concentration analysis. Data obtained were analysed using ANOVA followed by Tukey's post-hoc test for descriptive analysis. The results showed significant increase in OFT for DEXA/HFD ( $38.20 \pm 0.86$ ,  $49.40 \pm 0.51$ ,  $68.60 \pm 2.71$ ,  $87.20 \pm 2.44$  and  $98.00 \pm 2.00$  at 0.7%, 0.6%, 0.5%, 0.4% and 0.3% concentration of NaCl respectively) and STZ/HFD ( $37.40 \pm 2.38$ ,  $57.00 \pm 5.21$ ,  $73.20 \pm 5.28$ ,  $82.40 \pm 2.98$ ,  $91.40 \pm 2.73$  at 0.7%, 0.6%, 0.5%, 0.4% and 0.3% concentration of NaCl respectively) when compared with control group. Also for MDA serum concentration, both STZ ( $30.14 \pm 1.63^*$  nmol/ml) and DEXA ( $29.56 \pm 0.30^*$  nmol/ml)

showed statistical significant increase compared to control group. Conclusively, our findings indicate that rats treated with streptozotocin in combination with high fat diet and dexamethasone in combination with high fat diet are effective way to induce diabetes in Wistar rat

### **PROTECTIVE EFFECT OF CAMEL MILK ON LIVER ENZYMES OF HIGH FAT DIET FED WISTAR RATS**

**<sup>1</sup>T.S. Abdulkadir, <sup>2</sup>A.M. Danborn, <sup>1</sup>A.S. Isa, <sup>1</sup>A. Jimoh.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria, Nigeria.

<sup>2</sup>Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Bingham University, Karu, Nasarawa State, Nigeria.

Corresponding author: [abdulkadirsimisola@gmail.com](mailto:abdulkadirsimisola@gmail.com); +2348037615815

Camel milk exhibits antioxidant and insulin-like activities beneficial in diabetic mellitus. The study was aimed at investigating the protective effect of camel milk on activities of liver enzymes in diabetic Wistar rats. A total of 20 Wistar rats of both sexes used in the study were divided into four groups: Group I served as control; Group II, positive control; and Groups III and IV administered with camel milk orally at the dose rate of 2 and 4 ml/kg respectively for six weeks. Diabetes mellitus was induced in the rats by high fat diet, containing 10% of oil, 20% mill and 1% cholesterol. Aspartate aminotransferase activity was lower in diabetic rats administered with camel milk at both 2 ml/kg ( $9.67 \pm 1.93$  IU) and at 4 ml/kg ( $7.97 \pm 1.83$  IU) than in diabetic group ( $90.2 \pm 2.90$  IU). Alanine aminotransferase activity was lower ( $p < 0.05$ ) in diabetic rats, administered with camel milk at 4 ml/kg ( $6.48 \pm 0.42$  IU), compared to that of diabetic group ( $7.73 \pm 0.98$  IU). The concentration of Alkaline phosphate was lower ( $p < 0.05$ ) in diabetic rats, administered with camel milk at the dose rate of 2 ml/kg ( $33.90 \pm 3.00$  IU) and 4 ml/kg ( $39.30 \pm 8.00$  IU) than that of the diabetic control ( $117.83 \pm 15.70$ ). Concentrations of total protein and albumin did not differ among the groups treated with camel milk. The result showed that camel milk reduced activities of the liver enzymes and may be beneficial in offering protection against diabetes mellitus. It was concluded that camel milk exerted protective effect against type 2 diabetes mellitus, and may be beneficial in its management.

### **CALABASH CHALK CHRONIC DIET CONSUMPTION ELEVATES ANXIETY AND PAIN PERCEPTION IN MICE**

**<sup>1</sup>B.I. Owzorji, <sup>2</sup>U.E. Okon, and <sup>2</sup>E.E. Osim.**

<sup>1</sup>Department of Physiology, Faculty of Medical Sciences, Abia State University, Uturu, Nigeria.

<sup>2</sup>Department of Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, University of Calabar, Nigeria.

\*Corresponding author: [emeosim@yahoo.com](mailto:emeosim@yahoo.com); +2348035524412

Consumption of calabash chalk is a common practice in Nigeria as well as other parts of Africa, especially among pregnant women. Nevertheless, calabash chalk contains lead (Pb) and arsenic which are thought to be harmful to

the brain and responsible for cognitive dysfunction. It is therefore conceivable that calabash chalk consumption may affect other neuronal activities in the body such as anxiety and pain. Therefore, this present research study investigated the effects of consumption of this form of pica on anxiety and pain perception in mice. Forty-five (45) Swiss white mice of mixed sex were randomly assigned into 3 groups of 15 mice each. Group 1 served as control, while groups 2 and 3 received low and high doses of calabash chalk diets respectively. Feeding lasted for 30 days. Anxiety levels of the mice were assessed with the aid of elevated plus maze and light-dark transition box as well as elevated plus maze, while response to pain stimuli were studied using hot plate and formalin tests. The results showed that the calabash chalk diet-fed mice had significantly increased ( $p < 0.05$ ) close arm duration and stretch attend posture compared to control. Pain perception was significantly increased in the calabash chalk diet-fed mice compared to control. Consumption of calabash chalk elevates anxiety and pain perception in mice. These actions may be as a result of its lead and arsenic content.

### **ASSESSING THE IMPACT OF RESTRAINT STRESS DURATION ON SOME SPERM INDICES AND OXIDATIVE STRESS BIOMARKERS OF MALE WISTAR RATS**

**<sup>1</sup>O. M. Ochayi, and <sup>2</sup>S. J. Ishaku.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Baze University, Abuja, Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Bingham University, Nasarawa, Nigeria

Corresponding author: [shebaishaku2017@yahoo.com](mailto:shebaishaku2017@yahoo.com); +2348036094374

This experiment was aimed at determining the possible timing, which restraint stress induces oxidative damage and alters some sperm indices among Wistar rats. Animals were randomly divided into three groups of three animals each ( $n=3$ ). Group I -normal control (undisturbed), Group II-(3 h stress) group, Group III- (6 h stress group). Restraint stress was induced by placing rats in specially constructed restraint meshes for both 3 and 6 hours (between 9.00-15.00 h) for 21 days. Testes homogenate were evaluated for Malondialdehyde (MDA), catalase (CAT), superoxide dismutase (SOD) and reduced glutathione (GSH). 3 h stress group showed statistical ( $P < 0.05$ ) decrease in sperm concentration and motility when compared to normal control group and 6 h stress group. However there was statistical ( $P < 0.05$ ) increase in SOD and CAT in normal control groups when compared to stress groups. Restraint stress for both 3 and 6 h induced oxidative stress which might have led to decrease in sperm motility and concentration; however 3 h of stress induced more oxidative damage among male Wistar rats.

### **ABORTIFACIENT EFFECT OF AQUEOUS LEAF EXTRACT OF AZADIRACHTA INDICA (MELLACEAE) IN PREGNANT FEMALE RATS**

**I.G. Bako, A. Yahuza, A. Shehu, and E.S. Adanna.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Science, Ahmadu Bello University Zaria, Nigeria.

Corresponding author: [yahuzaattahiru1018@gmail.com](mailto:yahuzaattahiru1018@gmail.com); +2348035828044

Rapid rise in population has caused serious problems in the economic and social growth of human development in countries like Nigeria, leads to poverty. About 80% of the world's population rely on herbal medicinal products as a primary source of medicine. The Abortifacient effect of *Azadirachta indica* was investigated by evaluating the serum estrogen and progesterone level in female pregnant Wistar rats. Female Wistar rats in their pro-estrous phase were cage with male in ratio 2:1. Rat exhibiting thick clump of spermatozoa in their vaginal smear were separated and that is day one of pregnancy. Total of twenty (20) female pregnant Wistar rats were randomly divided into four group of five rats each (n=5). Group I received (control) 1 ml/kg normal saline, Group II received 200 mg/kg Misoprostol, Groups III and IV received 250 mg/kg and 500 mg/kg of the aqueous extract of *Azadirachta indica* respectively. Misoprostol and aqueous extract of *Azadirachta indica* were administered orally on day 4th and day 5th of conception. The results showed that all rats in group I carry their pregnancy to term (delivered). The rats in groups II, III, and IV had their pregnancy aborted. Serum estrogen and progesterone level in aqueous extract treated groups when compared with control group showed a significant decrease. Also, the results for serum estrogen and progesterone in the aqueous extract treated groups when compared with Misoprostol group also showed no significant decrease. *Azadirachta indica* exhibit abortifacient effect as it caused abortion and decreases progesterone level which is the hormone that maintain pregnancy.

#### POSSIBLE ANTIOXIDANT EFFECTS OF *THEOBROMA CACAO L.* STEM BARK ON PHENYLHYDRAZINE-INDUCED ANEMIA IN WISTAR RATS

<sup>1,2</sup>**B.O. Oluwatayo, <sup>2</sup>T.O. Kolawole, and C.C. Wali.**

<sup>1</sup>Federal College of Veterinary and Medical Laboratory Technology, Vom. Plateau State

<sup>2</sup>Department of Physiology, Madonna University, Elele. Rivers State

\*Corresponding author: [tunduntayo91@yahoo.com](mailto:tunduntayo91@yahoo.com); +2348035504667

Cocoa (*Theobroma cacao L.*) is a rich source of polyphenols and is been reported as having high antioxidant activity than teas and red wines. In hemolytic anemia, erythrocytes have a shortened life-span which is a part of the clinical syndrome associated with intoxication, where chemicals interact with sulfhydryl groups, inhibit enzymes, immune mechanisms, and the fragmentation of erythrocytes through the spleen or by unknown or poorly defined mechanisms. This study investigated the potential antioxidant effects of aqueous extract of *Theobroma cacao L.* stem bark on normal and phenylhydrazine (PHZ)-induced anaemic wistar rats. PHZ was used to induce anaemia intraperitoneally at a dosage of 60mg/kg (body weight) for two days. Forty five albino wistar rats weighing 126-224g were grouped randomly into 8 groups of 5 rats each. Group 1 served as normal control, received only water and feed, Group 2 (Anaemic control) was induced with anaemia without treatment, Group 3, 4, and 5 were induced with anaemia, received, 200mg/kg, 500mg/kg and 800mg/kg b.wt of the aqueous extract of *Theobroma cacao* stem bark respectively., while, groups 6, 7 and 8 were normal rats given 1000mg/kg, 3000mg/kg and 5000mg/kg b.wt of the extract

for 28days. Some haematological parameters, enzymatic and non- enzymatic antioxidant activities were determined. Results obtained showed that high doses of the extract showed significant increase ( $p < 0.001$ ) in SOD activities in the normal rats, Catalase & MDA increased both groups. However, SOD levels reduced significantly in the treated anaemic rats. The increase in some of the antioxidant enzyme activities and concomitant reduction in severity of anaemia in the treated rats points to ameneorative effect of the antioxidant properties of *Theobroma cacao L.* on drug induce anaemia in wistar rats.

#### EVALUATION OF *OGOGORO* -INDUCED TESTICULAR TOXICITY IN ADULT MALE WISTAR RATS.

<sup>1</sup>**C. N. Chima, <sup>1</sup>M. A. Dewu, and <sup>2</sup>A. A. Abubakar.**

<sup>1</sup>Department of Human Physiology, Faculty of Medicine, Ahmadu Bello University, Zaria, kaduna Nigeria

<sup>2</sup>Department of Community Medicine, Faculty of Medicine, Ahmadu Bello University, Zaria, kaduna Nigeria

Corresponding author: [nichodemus2020@gmail.com](mailto:nichodemus2020@gmail.com); +2347035638389

Excessive alcohol consumption in beverages implicates several disease entities globally. The aim of this study is to evaluate the *Ogogoro* induced testicular toxicity in adult male wistar rats. Twenty (20) rats were divided into four groups of 5 rats (n=5) each. Group I: normal saline 2ml/kg, Groups II-IV: *Ogogoro* 3.5ml/kg, 7ml/kg, 14ml/kg respectively for sixty days. The result showed a significant decrease in serum testosterone and luteinizing hormone (LH) in groups III and IV respectively, when compared to the control. There was a significant decrease in sperm motility, increased number of dead spermatozoa in group IV when compared to the control ( $P < 0.05$ ). Testicular weight and gonadosomatic index were significantly reduced in group IV treated rats. A significant increase ( $P < 0.05$ ), in testicular MDA level in groups III and IV was found when compared to the control indicating increased lipid peroxidation. The testicular homogenate SOD, GPX and CAT activities in groups III and IV were significantly decreased when compared to the control. *Ogogoro* administered group IV showed irregular seminiferous tubules with epithelial sloughing. *Ogogoro* cause testicular toxicity via lipid peroxidation which could adversely affect male reproduction.

#### ASSESSMENT OF LIVER ENZYMES LEVELS IN TYPE 2 DIABETIC RABBITS TREATED WITH COMBINED SUPPLEMENTATION OF *SYZYGIIUM AROMATICUM* (CLOVE) AND FERMENTED *ZINGIBER OFFICINALE* (GINGER) SUPPLEMENTS

<sup>1</sup>**A. Abdulrazak, <sup>2</sup>Y. Tanko, <sup>2</sup>A. Mohammed, <sup>1</sup>N.M. Sada, <sup>1</sup>K.A. Mohammed, and <sup>3</sup>A.A.U. Dikko.**

<sup>1</sup>Department of Human Physiology, College of Medicine, Kaduna State University, Kaduna Nigeria.

<sup>2</sup>Department of Human Physiology, Faculty of Medicine Ahmadu Bello University Zaria, Kaduna Nigeria.

<sup>3</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medicine, Bayero University Kano Nigeria.

Corresponding author: [aabdulrazak@kasu.edu.ng](mailto:aabdulrazak@kasu.edu.ng)

Monitoring vital organs functional status such as liver may leads to early detection of complications or adverse effects

of therapeutics. The aim was to evaluate the effects of clove and fermented ginger rhizome supplements on liver enzymes concentration in high fat diet induced type 2 diabetes in rabbits. High fat diet (SAF = 69% + Cholesterol = 1% + Ground nut meal = 20% + ground nut oil = 10%) was fed to rabbits for eleven weeks to ascertain diabetic animal model (DAM), thereafter, DAM were treated with supplements for six weeks. Twenty (20) male rabbits (5 weeks of age) divided into four groups (n=5) were used; Group I (Normal control) was treated with standard animal feed (SAF). Group II-IV (DAM groups) were treated as follows: Group II; treated with SAF only, Group III; treated with SAF + cholestran (0.26 g/kg) and Group IV; treated with SAF + clove + fermented ginger supplements. At the completion of treatments, animals were sacrificed and serum from blood samples was used for laboratory assessments of liver enzymes, data obtained were statistically analyzed using SPSS version 20.0. A significant ( $P < 0.05$ ) increase in aspartate aminotransferase (AST) and alkaline phosphatase (ALP) activities in group II (diabetic animals fed on normal feed) were noticed, when compared to normal control group. While in group IV a significant ( $P < 0.05$ ) decrease in serum AST when compared to diabetic rabbits group on normal feed was observed. In conclusion, combined clove and fermented ginger supplements reverses (down-regulates) elevated liver enzymes seen in high fat diet induced type 2 diabetic rabbits. Further work to validate these effects could facilitate the use of the supplement as a composite in formulating diet for type 2 diabetic patients.

#### **EFFECT OF NICOTINAMIDE ON DEPRESSED MICE USING OPEN SPACE FORCED SWIM TEST MODEL OF DEPRESSION.**

**\*A.B. Umar, U.A. Muhammad, H.A. Saleh, O.A. Umodoh, A.U. Muhammad, A.S. Hamza, I.U. Babayo, E.O. Udo, H.I. Getso, N.U. Kawu, A. Jibrin, I.U. Shehu, and Y. Yusha'u.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health, Ahmadu Bello University, Zaria, Nigeria.

\*Corresponding author: [maresha.au@gmail.com](mailto:maresha.au@gmail.com); +2348068906968

Depression is a significant contributor to global burden of diseases and affects people of all communities across the world. The world health organization has ranked depression as the 4<sup>th</sup> leading cause of disability in the world and is projected to be the 2<sup>nd</sup> by the year 2020. In Nigeria, about 3.9% of the populations suffer from depression. Nicotinamide (NAM), has an anti-inflammatory property and can inhibit cytokines release, thus, having antidepressant potential. The aim of this study was to investigate the antidepressant effect of nicotinamide in depressed mice using open space forced swim test model of depression. Twenty-five mice of both sexes were randomly divided into five groups of five animals each; group 1 received normal saline 10 ml/kg, group II, III and IV received 25 mg/kg, 50mg/kg and 100mg/kg of NAM respectively and group V received 20 mg/kg of fluoxetine. Tail suspension test (TST) was carried out on the animals before treatment which served as a baseline for depression. The animals were habituated to swimming for 4 days and on the fifth day, drug administration commenced which lasted for two weeks. The animals were only allowed to swim on the 1<sup>st</sup>, 4<sup>th</sup>, 7<sup>th</sup>, 10<sup>th</sup> and 14<sup>th</sup> day. Behavioural

despair (immobility time) and locomotor activity (line crossing) of animals were assessed using tail suspension test, open space force swim test (OSFST) and open field test (OFT) respectively. The result obtained showed no significance. However, a statistically significant difference ( $p < 0.05$ ) in 4<sup>th</sup> day between group two and five and also on the 7<sup>th</sup> day between group five when compared with group one and group two. There was no statistically significant difference in immobility of the Tail Suspension Test ( $p > 0.05$ ) and line crossing in Open Field Test ( $p > 0.05$ ) between the control and NAM treated groups. In conclusion, the result showed that NAM has no effect on the immobility time in depressed mice using OSFST.

#### **MODULATORY ROLE OF VITAMINS A AND E ON MEMORY AND MOTOR FUNCTIONS OF CYANIDE INDUCED NEUROTOXICITY IN ADULT SWISS MICE**

**\*1A.A. Ishaku, 2M. Mabrouk, 3A. Mohammed, 3Y. Tanko, and 3A.H. Umar.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, University of Maiduguri, Nigeria.

<sup>2</sup>Department of Human Physiology, Bayero University, Kano, Nigeria.

<sup>3</sup>Department of Human Physiology, Ahmadu Bello University, Zaria, Nigeria

\*Corresponding author: [ayeeshasmiley85@yahoo.com](mailto:ayeeshasmiley85@yahoo.com); +2348027889342

Cyanide is a potent neurotoxic substance that can initiate series of intracellular reactions leading to oxidative stress. Vitamins A and E are antioxidants that have scavenging properties against free radicals and reactive oxygen species. This study was designed to evaluate effect of sublethal administration of potassium cyanide (KCN) and possible ameliorative role of vitamins A and E on sensorimotor functions and long term visuo-spatial learning and memory in adult Swiss mice. Thirty-five mice weighing between 18-22 g were used for the study. The animals were randomly divided into five groups (n = 7) and exposed to sublethal concentration of potassium cyanide (10% LD50; 1.5 mg/kg). KCN was administered orally while vitamin A (25 mg/kg) and vitamin E (50 mg/kg) were administered intra-peritoneally (IP) once daily for 28 days. KCN was administered first, followed after 10 minutes by vitamin A, and then vitamin E after 5 minutes. At the end of 28 days, mice were examined for signs of neuro-toxicity using wire grid, coat hanger and stationary beam test models. In the wire grid test, the latency to fall in weeks 2 and 4 were statistically significant ( $p < 0.05$ ). In acquisition and retention, using elevated plus maze (EPM), KCN treated group recorded high transfer latencies in seconds (50.40±1.72 secs) and (57.60±0.93 secs) as compared to group IV (29.40±0.68 secs; 5.60±0.60 secs). It was concluded that KCN affects motor coordination and memory in mice, while treatment with antioxidant vitamins A and E ameliorated these deficits.

#### **AMELIORATIVE EFFECT OF EUGENOL ON ALUMINIUM CHLORIDE-INDUCED NEPHROTOXICITY IN WISTAR RATS**

**\*1M. Abdullahi, 1A.N. Agbon, 4F.A. Yaradua, 1M.D. Umar, 2F.O. Ayegbusi, and 3P.S. Akpulu.**

<sup>1</sup>Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University, Zaria.

<sup>2</sup>Department of Chemical Pathology, Faculty of Clinical Sciences, College of Health Sciences, Ahmadu Bello University Teaching Hospital, Shika.

<sup>3</sup>Histology Laboratory Unit, Department of Human Anatomy, Faculty of Basic Medical Sciences, Ahmadu Bello University, Zaria.

<sup>4</sup>Department of Human Anatomy, Federal University Birnin Kebbi, Kebbi State.

\*Corresponding author:

[muhammadabdullahi455@gmail.com](mailto:muhammadabdullahi455@gmail.com); +2349063224257

Kidneys are essential to the urinary system and play critical role in homeostasis. Eugenol is known for its medicinal value and is an established antioxidant present in plants like, clove, basil and nutmeg. This study histologically and biochemically assessed the ameliorative effect of Eugenol on aluminium chloride (AlCl<sub>3</sub>)-induced nephrototoxicity in Wistar rats. Thirty Wistar rats of both sexes (95 - 110 g) were divided into six groups (A – F) of five rats each. Group A served as the control and was administered distilled water (2 ml/kg), Group B was administered AlCl<sub>3</sub> (100 mg/kg) only. Groups C - F were administered Eugenol (150 mg/kg, 225 mg/kg and 300 mg/kg, respectively), and Silymarin (100mg/kg), before AlCl<sub>3</sub> (100 mg/kg). All the Administrations were via oral Gavage for the duration of three weeks. The Ameliorative effect of Eugenol was assessed using light microscopic examination of routinely (H and E) stained kidney sections and biochemical analysis of kidney electrolytes (Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup> and HCO<sub>3</sub><sup>-</sup>) and Urea. Results revealed the distortion of the histoarchitecture of the renal parenchyma and elevated levels of kidney electrolytes in AlCl<sub>3</sub>-treated group when compared to the control (p>0.05) and Eugenol-treated (p<0.05) groups. However, administration of Eugenol ameliorated AlCl<sub>3</sub>-induced kidney damage by preservation of the kidney histoarchitecture and, decreased (p<0.05) serum kidney electrolytes levels. Eugenol ameliorative activity was comparable with that of Silymarin, especially at dose 225 mg/kg. Eugenol possesses nephroprotective potentials against heavy metal-induced acute nephrototoxicity in Wistar rats.

#### **WAIST TO HEIGHT RATIO CORRELATES NEGATIVELY WITH DURATION OF MENSTRUAL BLEEDING AMONG FEMALE STUDENTS OF BAYERO UNIVERSITY, KANO.**

\*<sup>1</sup>N.W. Yusuf, <sup>1</sup>K. Aminu, <sup>2</sup>F. A. Dawud, and <sup>1</sup>A.I. Salisu.

<sup>1</sup>Bayero University, Kano. Kano State <sup>2</sup> Ahmadu Bello University, Zaria. Kaduna State

-Corresponding author: [nafisaywali@yahoo.com](mailto:nafisaywali@yahoo.com); +2348037005079

Obesity is associated with menstrual irregularity, sub fertility and infertility presumably due to obesity-associated increases in peripheral estrogen production by the adipose tissue. It has been suggested that accumulation of fat centrally may be more associated with menstrual irregularities than overall adiposity such as BMI. This study therefore aimed at assessing the relationship between indices of obesity and menstrual cycle characteristics among female students of Bayero University, Kano. Using self-administered questionnaire the menstrual

characteristic of 283 students between the ages 16 to 26 years, were studied. Body mass index (BMI) was calculated as the subject's weight (kg) divided by the square of the subject's height (m<sup>2</sup>) and waist-height ratio (WHtR) was calculated as waist circumference divided by height. The data was analyzed using IBM SPSS Statistics for Windows, version 22.0. Quantitative data was presented as mean  $\pm$  SD, and qualitative data was presented using percentages and frequency. p $\leq$ 0.05 was considered statistically significant. Most of the respondents 184 (65%) had their weight within normal, the mean age at menarche was 13.55 $\pm$ 1.50; mean length of menstrual cycle was 26.68 $\pm$ 3.51; and the mean duration of menstrual bleeding was 5.18 $\pm$ 1.24. A statistically significant difference between the body mass index and duration of menstrual bleeding was found. The study also found a significant negative correlation between waist to height ratio (WHtR) and duration of menstrual bleeding.

#### **PROTECTIVE EFFECT OF L-ARGININE CO-ADMINISTRATION WITH HIGH-FAT DIET ON ERYTHROCYTE OSMOTIC FRAGILITY AND MALONDIALDEHYDE CONCENTRATION IN MALE WISTAR RATS**

\*<sup>1</sup>A.N. Dadi, <sup>1</sup>E. A. Alex, <sup>1</sup>Y. Tanko, and <sup>2</sup>J. O. Ayo.

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University Zaria, Nigeria.

<sup>2</sup>Department of Veterinary Physiology, Ahmadu Bello University, Zaria, Nigeria.

\*Corresponding author: [nantimaisha@gmail.com](mailto:nantimaisha@gmail.com)

The excessive consumption of high-fat diet is associated with an increased incidence of obesity, resulting in oxidative stress and lipid peroxidation. This study was designed to evaluate the protective effect of L-arginine co-administration with high-fat diet on erythrocyte osmotic fragility (EOF) and malondialdehyde (MDA) concentration in male Wistar rats. Thirty (30) adult Wistar rats used for the study were divided into six groups of five rats each: Group I: (Normal Control) Received distilled water (1 ml/kg) with normal feed. Group II: (Diabetic control) Received high-fat diet (HFD) only. Group III: Received NFD + 200 mg/kg of L-arginine. Group IV: Received NFD + 400 mg/kg of L-arginine. Group V: Received HFD + 200 mg/kg L-arginine. Group VI: Received HFD + 400 mg/kg of L-arginine. The result shows significant decrease (P < 0.05) EOF only in the 400 mg/kg Arg+HFD group (84.0 $\pm$ 2.28%) (55.4 $\pm$ 2.0%) as compared to normal control (90.6 $\pm$ 1.72%) (60.4 $\pm$ 2.02%) and HFD-only group (92.4 $\pm$ 1.60%) (62.8 $\pm$ 0.92%) at 0.3% and 0.4% respectively. The result on MDA concentration showed a non-significant increase (P > 0.05) in all the treated groups when compared to normal group. The highest MDA concentration was observed in the group treated with high-fat diet only (0.96  $\pm$  0.10  $\mu$ Mol/L), when compared to normal (0.72  $\pm$  0.10  $\mu$ Mol/L). It was concluded that HFD increased haemolysis and MDA concentration in Wistar rat, and this effect was ameliorated by L-Arginine administration.

#### **EVALUATION OF THE AQUEOUS EXTRACT OF *Datura stramonium* ON OXIDATIVE STRESS BIOMARKERS OF *Plasmodium berghei*-INFECTED MICE**

\*L. Jimoh, R. A. Magaji, and I.A. Sheriff

Department of Physiology, College of Health Sciences,  
Ahmadu Bello University, Zaria, Nigeria

\*Corresponding author: [lukmannla@yahoo.com](mailto:lukmannla@yahoo.com); +2348060299159

Malaria is one of the major infectious diseases in Africa, especially in Nigeria. The aim of this study was to evaluate the effect of an aqueous extract of *Datura stramonium* on some oxidative stress biomarkers of *Plasmodium berghei*-infected mice. The aqueous extract of the leaves at 250, 500 and 1000 mg/kg body weight/day dose levels were used to treat the test groups after infection for four days (Adia *et al.*, 2014), while a standard antimalarial drug, Chloroquine, at a dose of 25 mg/kg body weight was administered on the positive control group. The negative control group was left untreated. The variation in the activity of catalase (CAT), superoxide dismutase (SOD), and glutathione (GSH) in the different groups were observed throughout the study. The crude extract was screened for its phytochemical composition. Results showed a marked decrease in GSH level and activity of SOD and GSH after infection signifying oxidative stress. However, there was a significant rise ( $P < 0.05$ ) in SOD and GSH levels in the group treated with 500 mg/kg body weight of *D. stramonium* as compared to other treatment groups. More so, the activity of catalase across groups treated with *D. stramonium* also showed considerable increase. The screening for the phytochemical composition of the crude extract showed the presence of alkaloids, flavonoids, and saponins, while tannins and anthraquinones were absent. The findings of this study showed that *Datura stramonium* may be used as an antimalarial regimen, as its' application does alleviate oxidative stress as seen in the biomarkers determined.

#### ANTIDIARRHOEAL ACTIVITY OF METHANOL LEAF EXTRACT OF *HYPTIS SUAVEOLENS* (L.) POIT (BUSH MINT).

O. S. Salami, H.O. Kwanashie, and I. M. Maje.

Department of Pharmacology and Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Nigeria.

Corresponding author: [sahcedat53@gmail.com](mailto:sahcedat53@gmail.com); +2348036206290.

Diarrhoeal disease is prevalent in tropical countries with poor hygiene and low standard of living. Diarrhoea is a leading cause of malnutrition and death due to its dehydrating effect and loss of electrolytes. *Hyptis suaveolens* has been used traditionally around the world for various ailments and diseases. The plant is also consumed as foods in some communities. The phytochemical analysis and acute toxicity test of the methanol leaf extract were evaluated. Antidiarrhoeal activity of the leaf extract was evaluated using castor oil and magnesium sulphate induced diarrhoea in rats and chicks at doses of 250 mg/kg, 350 mg/kg and 500 mg/kg body weight orally. The phytochemical screening revealed the presence of alkaloids, flavonoids, glycosides, tannins, saponins and triterpenes. The oral LD<sub>50</sub> of the extract was above 5000 mg/kg in both rats and chicks. The methanol leaf extract of *Hyptis suaveolens* at tested doses significantly ( $p < 0.05$ ) reduced the frequency and weight of stool in castor oil and magnesium sulphate - induced diarrhoea in rats and chicks in a dose and time dependent manner compared to loperamide (2 mg/ml). It can be

concluded that *Hyptis suaveolens* has antidiarrhoeal activity in rats and chicks which may be attributed to some of the phytochemical constituents.

#### POLYUNSATURATED FATTY ACID METABOLISM AND ANTIOXIDANT RESPONSES IN ADULT LACTATING WISTAR RATS FOLLOWING ORAL ADMINISTRATION OF MONOSODIUM L-GLUTAMATE (MSG)

\*N.S Emmanuel, Y. Tanko, I.G Bako, and A. Mohammed.

Department of Human Physiology, Faculty of Basic medical Sciences, College of Medical Sciences, Ahmadu Bello University Zaria, Nigeria

\*Corresponding author: [nesolomon@yahoo.com](mailto:nesolomon@yahoo.com)

Several studies have reported toxic effects of MSG on the reproductive system however; the concept of oxidative shielding suggests that during reproductive exercises the likes of lactation, mothers preemptively decrease their levels of oxidative stress for the sole of purpose of shielding or protecting their offspring from detrimental effects of damaged molecules like oxidized fatty acids. Hence this study was designed to investigate the effect of MSG on oxidative status of Wistar rats during lactation. Following birth, the dams were divided into four groups of six (n=6) rats each having six pups. Oral administration of MSG lasted for 2 weeks as follows: Group 1: Distilled water (2 ml/kg), Group 2: Metoclopramide (5 mg/kg), Group 3: MSG 1850 mg/kg and Group 4: MSG 3700 mg/kg. The result of serum malondialdehyde (MDA) concentration (Umol/L) was lower significantly ( $P < 0.05$ ) in all the MSG administered groups compared to control and metoclopramide (5 mg/kg) treated. Serum superoxide dismutase (SOD) (Umol/mg) was significantly higher ( $P < 0.05$ ) in MSG administered groups compared to metoclopramide (5 mg/kg). Serum level of glutathione (GSH) (Umol/mg protein) was significantly higher ( $P < 0.05$ ) in MSG 3700 mg/kg administered group compared to control, MSG 1850 mg/kg and metoclopramide (5 mg/kg). Although serum catalase (CAT) level was decreased in both MSG and metoclopramide groups compared to control, the difference was however only statistically significant ( $P < 0.05$ ) in 3700 mg/kg group. Oral administration of MSG increased serum SOD and GSH level with a significant decrease in MDA concentration in lactating Wistar rats.

#### INFLUENCE OF VARYING DEGREE OF WOOD DUST EXPOSURE ON PULMONARY FUNCTION AND RESPIRATORY SYMPTOMS AMONG WOOD WORKERS IN KANO, NORTH WESTERN NIGERIA.

<sup>1</sup>N. Y. Wali, <sup>1</sup>I. Sulaiman, <sup>1</sup>A. I. Salisu, <sup>2</sup>F. A. Dawud, and <sup>2</sup>Y. Tanko.

<sup>1</sup>Department of Human Physiology, Bayero University Kano, Nigeria

<sup>2</sup>Department of Human Physiology, Ahmadu Bello University, Zaria, Nigeria

Corresponding author: [nafisaywali@yahoo.com](mailto:nafisaywali@yahoo.com); +2348037005079

One of the major occupation-related health challenges encountered by wood workers is respiratory disorder, which usually results from breathing in noxious or toxic chemicals such as wood dust. The aim of this study is to

evaluate the respiratory functions and symptoms among wood workers exposed to varying degrees of wood dust in Kano, Nigeria. This descriptive cross-sectional study was carried out among 370 randomly selected wood workers in Kano wood market. Lung function test was performed, while semi-structured interviewer administered questionnaire was used to rate respiratory symptoms. The study demonstrated that there is low percentage predicted force expiratory volume at one minute (PPFEV<sub>1</sub>) and percentage predicted ratio of FEV<sub>1</sub> and FVC, whereas, the percentage predicted forced vital capacity (PPFVC) of the respondents across all age groups remained unchanged. A statistically significant association existed between exposure to wood dust and respiratory symptoms ( $\chi^2 = 16.2$ ,  $df = 1$ ,  $p = 0.001$ ), thereby contributing to the observed manifestation of respiratory symptoms such as chronic cough, corrhiza, breathlessness and wheezing among 61% of wood dust exposed workers. Similarly, a negative correlation was observed between degree of exposure to the hazards and lung function of the workers ( $r = -0.655$ ,  $P\text{-Value} = 0.0001$ ).

### COMPARATIVE EFFECT OF *Nigella sativa* SEED OIL AND ZINC GLUCONATE ON ETHANOL-INDUCED GASTRIC MUCOSAL DAMAGE AND GASTRIC SECRETION IN WISTAR RATS

\*<sup>1</sup>G.M. Abubakar, <sup>2</sup>R.A. Magaji, and <sup>2</sup>Y. Tanko.

<sup>1</sup>School of Health Technology, Minna, Niger State, Nigeria

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, Ahmadu Bello University, Zaria, Nigeria.

\*Corresponding author: [abubakarkd98@gmail.com](mailto:abubakarkd98@gmail.com); +2348038194866

A wide spread search has been launched to identify new anti-ulcer therapies from natural Sources, with minimal side effects. The aim of the study was to compare the effects of *Nigella sativa* seed oil and zinc gluconate on ethanol-induced gastric mucosal damage and Secretion in Wistar rats. A total of 50 male rats, weighing between 150-200g were used for the study. The animals were then subdivided into two sub-groups of 25 rats each for gastric mucosal damage and gastric secretion studies respectively. Each of the sub-groups were divided into 5 groups of 5 rats each and treated with distilled water (10ml/kg), absolute ethanol (1ml/kg), *Nigella sativa* oil (5ml/kg), zinc gluconate (50mg/kg) and zinc gluconate (50mg/kg) plus *Nigella sativa* oil (5ml/kg) respectively. The results of the study revealed the normal architecture of gastric mucosa for the control group with ulcer index of  $0.0 \pm 0.0$  mm. The ethanol-treated group showed severe necrosis-of gastric epithelium, with ulcer index of  $10.25 \pm 0.85$  mm as compared to the control. The *Nigella sativa* oil, zinc gluconate and *Nigella sativa* plus zinc gluconate treated groups have demonstrated significant decrease in the ulcer indices of  $5.50 \pm 1.04$  mm,  $4.75 \pm 0.25$ mm and  $3.75 \pm 1.44$ mm respectively as compared to the control with  $0.0 \pm 0.0$  mm. On the other hand the groups also showed preventive indices of 48.8%, 53.6% and 63.4% respectively when compared to those of the control 100% and ethanol treated group with no protection. In conclusion, *Nigella sativa* and zinc gluconate conferred protection to gastric mucosa but the combination of the two produced an additive effect.

### LAURIC ACID ALLEVIATES INFLAMMATION AND STRUCTURAL CHANGES IN THE LUNGS OF TYPE II DIABETIC MALE WISTAR RATS

<sup>1</sup>A. B. Dubo, <sup>1</sup>F. A. Dawud, <sup>2</sup>I. A. Umar, <sup>1</sup>E. A. Alex, <sup>1</sup>S. Baiyekusi, and <sup>1</sup>U. Farra'u.

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria

<sup>2</sup>Department of Biochemistry, Faculty of Life Sciences, Ahmadu Bello University, Zaria

Corresponding author: [hdaugustine@abu.edu.ng](mailto:hdaugustine@abu.edu.ng); +2348163387211

Diabetic complication in the lungs is characterized by infiltration of inflammatory mediators in the lungs and structural alteration of the lung parenchyma. This study was designed to evaluate the effect of lauric acid on leucocytes infiltration in **bronchoalveolar lavage fluid** (BALF), concentration of TNF- $\alpha$  and lung histology of type II diabetic male Wistar rats. Type II diabetes was induced using high fat diet/40 mg/Kg streptozotocin along with 20% fructose solution. A total of thirty-five male Wistar rats were randomly divided into seven groups of five rats each as follows: Group I was normoglycemic Wistar rats administered 1ml/Kg distilled water, and served as normal control. Group II was normoglycemic Wistar rats administered 125 mg/Kg lauric acid. Group III was diabetic Wistar rats administered 1ml/Kg tween 80, and served as diabetic control. Groups IV, V, VI and VII were diabetic Wistar rats treated with 125 mg/Kg, 250 mg/Kg, 500 mg/Kg lauric acid and 100 mg/Kg metformin orally respectively. The results obtained, showed a significant ( $P \leq 0.05$ ) increase in total and differential white blood cell count in blood and BALF of the diabetic rats, however, it was significantly decreased after treatment with lauric acid. The concentration of TNF- $\alpha$  was significantly higher in the lungs of diabetic rats, but treatment with lauric acid has reduced it significantly. Lauric acid also reversed the reduced alveolar spaces in diabetic lungs. It can be concluded that lauric acid reduced inflammation and reversed the histoarchitectural alterations in the lungs of type II diabetic male Wistar rats.

### TAURINE TREATMENT MODULATES HEMATOLOGICAL INFLAMMATORY MARKERS IN PAPAIN INDUCED ARTHRITIS IN ADULT FEMALE WISTAR RAT.

<sup>1</sup>W. I. Kayode, <sup>1</sup>M. B. Akor-Dewu, <sup>1</sup>J. A. Tende, <sup>1</sup>E. A. Alex, <sup>1</sup>A. B. Dubo, <sup>1</sup>K. V. Jerome, and <sup>2</sup>J. O. Ayo.

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Ahmadu Bello University Zaria, Kaduna Nigeria.

<sup>2</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University Zaria, Kaduna Nigeria.

Corresponding author: [kayodeiyiomo@gmail.com](mailto:kayodeiyiomo@gmail.com)

Osteoarthritis (OA) is one of the most prevalent and debilitating joint disease associated with reduced quality of life and increased healthcare costs. Available medical therapies, including traditional analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) for OA are ineffective at slowing down the disease progression, but rather alleviate the symptoms by reducing pain. Additionally, their chronic use has been linked to number of deleterious side effects. This study aimed to evaluate the effect of taurine on some inflammatory hematological parameters in papain induced osteoarthritis in adult female

Wistar rats. Thirty female rats were acclimatized and randomly divided into six (6) groups: control group (G1), disease control group (G2), standard control group (G3), taurine treated groups (G4, G5 and G6). G1 received distilled water 1ml/Kg, G2 received 1ml/Kg of distilled water, G3 received Diclofenac sodium 5mg/Kg, while taurine treated groups G4, G5, and G6 received 100mg/Kg, 200mg/Kg and 400mg/Kg of taurine respectively. OA was induced by intra-articular injection of papain into the right knee joint of the rats on days 1, 4 and 7 before the commencement of the treatment. The parameters checked include; Erythrocyte sedimentation rate (ESR), Neutrophil lymphocyte ratio (NLR), Platelet lymphocyte ratio (PLR) and diameter of inflammation on the knee joint. There was a significant ( $P<0.05$ ) reduction in ESR, NLR, PLR and diameter of inflammation induced in the knee joint in the taurine treated groups as compared to the disease control group. In conclusion taurine was able to decrease inflammatory hematological parameters in papain induced arthritis in female Wistar rats.

### PROTECTIVE EFFECT OF CO-ADMINISTRATION OF VITAMINS C AND E ON RESERPINE-INDUCED MOTOR IMPAIRMENT IN MICE

<sup>1</sup>T. Danboyi, <sup>2</sup>A. Jimoh, <sup>2</sup>A.W. Alhassan, and <sup>1</sup>E. Hassan-Danboyi.

<sup>1</sup>Department of Human Physiology, Kaduna State University, Kaduna, Nigeria

<sup>2</sup>Department of Human Physiology, Ahmadu Bello University, Zaria, Nigeria

Corresponding author: [timothy.danboyi@kasu.edu.ng](mailto:timothy.danboyi@kasu.edu.ng); +2348036409939

The conventional treatments for Parkinson's disease, the most common movement disorder worldwide, have not been able to halt its progression, hence, newer approaches targeting its pathogenesis are being explored. We investigated the effect of combining vitamins C and E on reserpine-induced motor impairment in mice. Twenty-five mice were assigned into 5 groups. Group I (control) received distilled water only while the other groups received reserpine 0.1mg/kg intraperitoneally on alternate days. In addition, Group III (vitamin E group) received vitamin E 200 mg/kg/day, group IV (vitamin C group) received vitamin C 250 mg/kg/day and group V (co-administered group) received both vitamins orally. Group II (reserpine group) received nothing in addition to reserpine. All drugs were given concurrently for 28 days. Neurobehavioral assessment was performed using beam walking and open field tests. Results were expressed as mean  $\pm$  SEM and values at  $p < 0.05$  were considered significant. The increase in number of foot slips ( $3.60 \pm 0.68$ ) as well as the time taken to reach the safe platform ( $36.60 \pm 5.78$  s) observed in the reserpine group were significantly decreased in the co-administered group ( $0.25 \pm 0.25$  and  $3.00 \pm 0.41$ s respectively). The transfer latency was significantly decreased ( $10.33 \pm 1.45$  s) with a marked increase in the number of lines crossed ( $56.00 \pm 13.53$ ) in the co-administered group compared to reserpine group ( $214.00 \pm 64.16$  s and  $4.3 \pm 1.67$  respectively). The co-administration of vitamins C and E confers a significant neuroprotection against reserpine-induced motor impairment in mice.

### INVESTIGATION OF THE EFFECTS OF AQUEOUS EXTRACT OF *Piper guineense* (ASHANTI PEPPER) SEED ON INDICES OF HEPATIC FUNCTIONS

P. S Anyaeji, D.C. Nwachukwu, C.J. Ossai, and S. Ugwu.

Department of Physiology, Faculty of Basic Medical Sciences, University of Nigeria, Enugu Campus.

Corresponding author: [Pammary12@gmail.com](mailto:Pammary12@gmail.com); +2348063842445

*Piper guineense* seed is widely consumed in some part of West Africa for its nutritional and medicinal properties. This study investigated the effect of its aqueous extract on indices of hepatic functions. Twenty Wistar rats were purchased and divided into four groups of five per group. They were allowed access to feed and water for two weeks. Different concentrations of the extract were administered to the three experimental groups: 100 mg/Kg, 200mg/Kg, 400 mg/Kg, while control group were given feed and water. The feeding lasted for 21 days. The result showed that liver enzymes Alanine transaminase, aspartate aminotransferase, Alkaline phosphatase showed no significant difference ( $p>0.05$ ) between the experimental groups and control groups. Total protein and Globulin of the experimental groups were significantly ( $p<0.05$ ) lower when compared to the control group but albumin did not. The group that received the highest dose of the extract had significantly lower total bilirubin when compared with the control group ( $p<0.05$ ) while conjugated bilirubin did not. Histology showed that only high dose of *Piper guineense* distorted the normal histo-architecture of the liver. Thus, moderate consumption of *Piper guineense* seeds is recommended; high dose may be harmful to the liver.

### EFFECT OF ETHANOL EXTRACT OF *ALLIUM SATIVUM* ON HEMATOLOGICAL PARAMETERS IN *E. COLI* INDUCED SEPSIS IN WISTAR RAT

O. K. Collins

Department of Physiology, University of Nigeria

Corresponding author: [Onwukakelechi@gmail.com](mailto:Onwukakelechi@gmail.com); +2348108859241

One of the agents of sepsis include the gram negative *E. coli*. Over the years of study, spices, such as *Allium sativum*, seems to combat infection. The aim of this work is to determine the effect of ethanolic extract of *allium sativum* on hematological parameters and osmotic fragility of red blood cells of Wistar during *E. coli* induced sepsis. Thirty-five (35) rats were used in this study and were grouped into 7 groups ( $n=5$ ). Except for group 1 (normal control), all groups were induced with sepsis by *E. coli* interperitoneal injection. Successful induction was confirmed after 5 days. All groups, except group 1 and group 2, the negative control group, were treated for 14 days. The remaining groups were treated with 400mg/kg/day of hydrochloride ciprofloxacin; HC (group 3; positive control), 200mg of extract/kg/day (group 4), 400mg of extract/kg/day (group 5), 200mg of extract /kg/day with HC (group 6) and 400mg of extract/kg/day with HC (group 7). After 14 days, the hematological parameters and RBC osmotic fragility test were obtained and analyzed ( $P<0.05$  and  $P<0.01$ ). Though the extract seems to boost the hematocrit and hemoglobin concentration, it also made them more fragile especially in

the presence of Cirpofloxacin. These could lead to hemolytic anemia. Garlic should be used with hematinics to treat infection. Combined therapy of Garlic and standard drug should not also be encouraged as it worsens the anemia caused by standard drug.

#### **ELECTROCARDIOGRAM PATTERN AND BLOOD PRESSURE IN ADULT SICKLE CELL ANAEMIA PATIENTS IN SOKOTO, NIGERIA**

**1M.I. Ikedue, 1G.O. Igbokwe, 1E.E.Igbokwe, 2M.A. Ndakotsu, 3S.A. Isezuo, and 1F.B.O. Mojiminiyi.**

Departments of 1Physiology, 2Haematology & 3Medicine, Usmanu Danfodiyo University, Sokoto, Nigeria.

Corresponding author: frank.[mojiminiyi@udusok.edu.ng](mailto:mojiminiyi@udusok.edu.ng); +234-7065748556

The present study was aimed at determining the electrocardiographic (ECG) pattern of sickle cell anaemia (SCA) in adults attending the sickle cell clinic at the Haematology Outpatient Unit of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. A total of 148 subjects comprising 55 SCA patients (in crisis), 53 SCA patients (in the steady state) and 40 normal control groups were studied. Following ethical approval, ECG and blood pressure (BP) were measured using standard methods<sup>1</sup>. Electrodes were positioned as recommended by the American Heart Association<sup>2</sup> and BP with the aid of a mercury sphygmomanometer. Patients had significantly ( $P < 0.001$ ) lower systolic BP in the steady state ( $108 \pm 1.6$  mmHg) and in crisis ( $105 \pm 1.7$  mmHg) compared to controls ( $122.9 \pm 1.7$  mmHg). The diastolic BP of patients in the steady state ( $63.0 \pm 1.9$  mmHg) was significantly ( $P < 0.001$ ) lower than in the control group ( $73.1 \pm 1.7$  mmHg) but did not differ from the value recorded in patients in crisis ( $65.5 \pm 1.6$  mmHg). There was no significant difference in the heart rate, P wave duration, QTc and PR interval of patients and control. However, QRS duration was significantly ( $P < 0.0001$ ) lower in SCA patients in the steady state ( $54.2 \pm 2.2$  ms) and in crisis ( $53.3 \pm 2.8$  ms) than in controls ( $72.1 \pm 3.0$  ms). In conclusion, this study shows that the SCA patients had lower BP and QRS duration than healthy controls.

#### **DIURNAL FLUCTUATIONS IN MECHANICAL, THERMAL AND CHEMICAL PAIN THRESHOLDS IN MALE AND FEMALE WISTAR RATS DURING HARMATTAN SEASON IN NORTH WESTERN NIGERIA**

**K. V. Jerome, A. S. Isa, A. Abduwahab, E. A. Alex, and W. I. Kayode.**

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University Zaria.

Corresponding author: [victorkayode63@gmail.com](mailto:victorkayode63@gmail.com); +2348133840457

This study investigated the diurnal fluctuation of mechanical, thermal, chemical pain in the light phase and dark phase and also considering their sex based differences during the harmattan season conducted in the North-West Nigeria. The work was carried out in two phases (light and dark phase). Light phase done at 07:00h-10:00h, while Dark phase at 19:00h- 22:00h. The rats were made to undergo the experimental pain assessment (Mechanical, thermal and chemical), also, the temperature and the relative humidity of the day were checked and recorded hourly. Animals were randomly grouped in to two phases,

the light phase group and the dark phase group. Animals in the light phase group were grouped in to male and female groups. Animals in the male group were further sub grouped in to three groups of 5 animals each for the three different pain threshold assessment test. Mechanical and thermal pain threshold showed no statistically significant difference between the light phase and the dark phase ( $p > 0.05$ ). Chemical pain threshold was significantly higher in the dark phase when compared to the light phase ( $p < 0.05$ ).

#### **IMPAIRED SPERM PARAMETERS IN STREPTOZOCIN INDUCED DIABETIC MALE WISTAR RATS AND THE EFFECTS OF LAURIC ACID**

**1,2M.V. Olubiyi, 2R.A. Magaji, 3M.G. Magaji, and 4M.U. Kawu.**

<sup>1</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Kogi State University, Anyigba, Kogi State, Nigeria

<sup>2</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria, Nigeria

<sup>3</sup>Department of Pharmacology and Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Nigeria

<sup>4</sup>Department of Veterinary Physiology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria

Corresponding author: [olubiyi.vm@ksu.edu.ng](mailto:olubiyi.vm@ksu.edu.ng)

Diabetes mellitus is associated with a decline in reproductive function. Studies have shown that coconut oil (CO) possesses anti-diabetic properties and ameliorative effects on impaired sperm parameters. Lauric acid (LA) is the most abundant constituent of CO. Thus, this study sought to investigate the effects of LA on sperm parameters in diabetic male Wistar rats. The animals, divided into 6 groups of five ( $n=5$ ), received treatments orally for 4 weeks as follows: Group I: distilled water (1ml/Kg), Group II: Diabetic untreated, Group III: Diabetic + LA (90 mg/Kg), Group IV: Diabetic + LA (180 mg/Kg), Group V: Diabetic + LA (360 mg/Kg) and Group VI: Diabetic + CO (1.42 ml/Kg). The results show a significant decline ( $P < 0.05$ ) in the concentration, motility, normal morphology and viability of sperm cells in diabetic untreated rats compared to the normal control rats. In diabetic rats treated with CO; sperm concentration, percentages of motile, normal and viable sperm cells were significantly higher ( $P < 0.05$ ) compared to the diabetic untreated rats. Compared to the diabetic untreated rats; only the percentage of progressive motile sperm cells in diabetic rats treated with 90 mg/Kg LA and the percentage of normal sperm cells in diabetic rats treated with 360 mg/Kg LA respectively, were significantly higher ( $P < 0.05$ ). Furthermore, the impacts of the above doses of LA were significantly lower ( $P < 0.05$ ) compared to the treatment with CO. Thus, impaired sperm parameters in diabetic rats were not completely alleviated by lauric acid.

#### **EFFECT OF STEP AEROBICS ON BLOOD GLUCOSE LEVEL AND CARDIORESPIRATORY PARAMETERS OF OVERWEIGHT ADULTS IN VOM, PLATEAU STATE, NIGERIA.**

**1E.C. Umeh, 2F.O. Umeh, 1H. Bawa, 1M. Qossim, and 1O.K. Oluwatosin.**

<sup>1</sup>Department of Human Physiology, College of Medical Sciences, Abubakar Tafawa Balewa University Bauchi.

<sup>2</sup>Department of Mathematics, Ahmadu Bello University Zaria  
This study was aimed at determining the effect of step aerobics training on blood glucose and cardiorespiratory parameters of overweight adults in Vom, Plateau State, Nigeria. Twenty (20) overweight adults participants were selected using the purposive sampling technique from Vom, Plateau State, Nigeria. Participants were trained for 8 weeks with a frequency of 3 days per week and a duration of 48 minutes with a moderate intensity of HR max of between 50-65%. Blood Glucose Level (BGL), Resting Heart Rate (RHR), Peak Expiratory Flow Rate (PEFR) and forced expiratory volume in one second (FEV<sub>1</sub>) were taken at pre training and post training (after 8 weeks of step aerobics training) respectively. Results showed that Step aerobics training significantly reduced the BGL of overweight adults ( $P < 0.05$ ), caused no reduction on the RHR of overweight adults ( $p > 0.05$ ) and increased the PEFR and FEV<sub>1</sub> of overweight adults ( $P < 0.05$ ). The effect of step aerobics on the overweight adults has proven to be generally positive on the basis of these findings, therefore Step aerobics should be publicized in fitness and wellness centers as a mode of training as it has shown evidence of metabolic and cardiorespiratory adaptations in overweight adults by causing a reduction in blood glucose level, increasing peak expiratory flow rate and forced expiratory volume in one second.

**EFFECT OF LACTATIONAL EXPOSURE TO FLAVONOID-RICH EXTRACT OF *HIBISCUS SABDARIFFA* ON THE ONSET OF PUBERTY AND REPRODUCTIVE HORMONE PROFILE IN THE OFFSPRING OF ALBINO RATS**

<sup>1,2</sup>T.K. Chianumba, <sup>2</sup>C.C. Nworgu, <sup>1,2</sup>D.B. Adeniyi, <sup>1,2</sup>N.A. Katchy, and <sup>1,2</sup>E.E. Iyare.

<sup>1</sup>Reproductive and Developmental Programming Research Group, Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria.

<sup>2</sup>Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria.

Corresponding author: [Chianumbatochi@gmail.com](mailto:Chianumbatochi@gmail.com); +2347030063754

The effect of lactational exposure to flavonoid-rich extract of *Hibiscus sabdariffa* from birth to postnatal (PND) 42 was investigated in Albino rats. Sixteen in-bred pregnant rats were randomly assigned to four groups (A, B, C, D) of four rats each and were given rat chow and water ad libitum. From birth to PND 21 (weaning), all groups had normal rat chow and water ad libitum. The dams of the test groups were administered with rich extract of flavonoid via oral gavage daily, 10mg/kg body weight (B), 20mg/kg body weight (C) and 50mg/kg body weight (D), throughout the entire period of lactation (PND 0— PND 21). At PND 21, the pups were designated into four groups according to their dams. Water and fluid intake was measured daily. From PND 21 pups were monitored daily for Balano-preputial separation and Vaginal opening. At PND 42, blood sample was collected by ocular-puncture for the assay of reproductive hormones of both male and female pups. Results from this study showed a significant ( $P > 0.05$ ) delay on the onset of puberty, increase in weight and Body Mass Index (BMI) of the test rats as compared with the control. Also, there was a significant ( $P > 0.05$ ) decrease in circulating plasma levels of LH, FSH and Testosterone (male), while there was a significant increase ( $P < 0.05$ ) in the circulating plasma level of Estradiol (female) of these pups. Flavonoid was seen to delay the onset of puberty and decreased circulating levels of reproductive hormones.