

ABSTRACTS OF THE PROCEEDINGS OF THE XLth ANNUAL SCIENTIFIC CONFERENCE OF THE PHYSIOLOGICAL SOCIETY OF NIGERIA

7-11 February 2023, University of Ibadan, Ibadan, Oyo State, Nigeria.

THE EFFECT OF HIGH PLANT AND ANIMAL PROTEIN DIET ON REPRODUCTIVE INDICES AND TESTICULAR EXPRESSION OF COX-2 AND RHOX5 GENE IN MALE WISTAR RATS.

¹O.O. Ekakitie and ²O.I. Ajayi

¹Department of Physiology, Alex Ekwueme Federal University Ndufu-Alike Ikwo, Abakiliki, Nigeria.

²Department of Physiology, University of Benin, Nigeria.

High protein diet (HPD) intakes have been reported to be an essential dietary tool in weight loss practices, obesity, dyslipidemia, glucose intolerance, and hypertension. This study was aimed at investigating the possible reproductive effects of high concentrates of plant and animal protein diets in male Wistar rats. Rats were divided into three groups; Control group (CG; fed with normal rat chow), Animal Protein Diet (APD) Group and Plant Protein Diet (PPD) Group. Protein diet groups were further subdivided into three groups (1= 30%, 2 = 50% and 3 = 65% protein concentrates) that were fed for duration of one, two and three months respectively (n = 5). At the end of the feeding period, blood samples were collected via cardiac puncture. Epididymis was slit and sperm cells were extracted, testes were harvested for histological and gene studies. ELISA method was adopted for hormonal assay (FSH, LH, and testosterone), sperm count was done using microscope and the sperm cells were counted using haemocytometer. Testicular gene expression of COX-2 and Rhox5 was done using RT-PCR. Both PPD and APD significantly increased sperm count and testicular expression of homeobox5 (Rhox5) and cyclooxygenase 2 (COX-2) genes when compared with control groups (P<0.05, respectively). Chronic feeding (3 months duration) with 30% and 50% APD significantly increases testosterone levels and increase in the interstitial cells of Leydig. Furthermore, positive correlation exist between COX-2 gene expression and testosterone levels in rats fed with 30% and 50% Protein diets. Conclusively, HPD improves sperm count and increases testicular levels of genes that are implicated in reproductive function.

Keywords: High protein diet, gene expression, testosterone, homeobox5, cyclooxygenase 2

KOLAVIRON REVERSES EPITHELIAL INJURY CAUSED BY HEXAVALENT CHROMIUM INGESTION IN THE GUT OF *Drosophila melanogaster* Onaara Peter Ashaolu, Amos Olalekan Abolaji, OluGbenga Adeola Odukanmi, Adeola Temitope Salami and Samuel Babafemi Olaleye

¹Departments of Physiology and Biochemistry, University of Ibadan, Ibadan, Nigeria.

The gastrointestinal tract modulates food intake and balance energy distribution throughout the body. In humans, the

Drosophila's gut functions may be altered by foreign substances like bacteria and heavy metals. Kolaviron, a bioflavonoid fraction from *Garcinia kola* seed, has been shown to be gastroprotective and exhibit chelating activities on heavy metals. In this study, we examined some morphological changes in the gut of *Drosophila melanogaster* during and after exposure to diets-containing chromium (VI) and kolaviron. *D. melanogaster* (Oregon strain of 1-3 days old of both sexes) were exposed to chromium (VI) (0, 0.05, 0.25, 0.5, 1, 2, 10, 20, 30, 50 and 100 mg/kg diet) and kolaviron (0, 25, 50 and 200 mg/kg diet) for survival assays in two separate studies. Consequently, 50 and 100 mg/kg Kolaviron were selected to evaluate its protective role in chromium (VI) (1 and 2 mg/kg diet)-induced toxicity in *D. melanogaster* after seven days of oral exposure. Markers of oxidant-antioxidant status (Carbonyl, Nitric oxide, Catalase, Total and Non-protein thiols) were determined by spectrophotometry. Flies' guts were dissected using all-but-gut removal techniques. Histology of the flies' gut using bromophenol blue and H&E stain as well as immunohistochemistry quantification using MitoTracker antibody were evaluated. Data were analyzed using ANOVA and significant at α 0.05. Kolaviron significantly increased flies' survival rate by 87.14%, restored catalase activity and levels of total and non-protein thiols, reduced carbonyl and nitric oxide levels aggravated by chromium exposure. Altered gut epithelial architecture induced by chromium (VI) exposure were ameliorated by kolaviron. Kolaviron protected against acute and chronic exposure to chromium (VI) by attenuating oxidative markers, and restoring the integrity of the gut.

Keywords: *Drosophila melanogaster*, Chromium (VI), kolaviron, *Drosophila melanogaster*, antioxidants.

EFFECT OF HIGH DOSE ASCORBIC ACID ON RATE PRESSURE PRODUCT RESPONSE TO AEROBIC EXERCISE IN YOUNG ADULTS

Elias Simiat O., Adetayo, Ayodeji D., Bamiro Saka A., Umoren Grace A.

Department of Physiology, Faculty of Basic Medical Sciences, Lagos State University College of Medicine (LASUCOM), Ikeja.

Rate pressure product is used to indirectly determine the myocardial oxygen consumption and thus cardiovascular risk of subjects. Ascorbic acid is a powerful aqueous-phase antioxidant which scavenges free radicals and reactive oxygen species (ROS) produced during metabolic pathways. Forty-four participants were recruited after giving informed consent. They were grouped into two equal groups of Lean (BMI =21.26±0.48 kg/m²) and Obese (BMI =33.72±0.76 kg/m²) participants. Blood pressure (BP), heart rate (HR) and plasma electrolytes were measured before and

after participants performed aerobic exercise using a motorised treadmill for 3-5 minutes. All tests were repeated before and after participants ingested 2000mg of ascorbic acid daily for 3 days. Rate pressure product (RPP) was calculated as systolic (SBP) x HR. Data were expressed as mean $\pm$ SEM. Unpaired Student t-test and two-way analysis of variance were used to compare across groups; statistical significance was accepted at $P < 0.05$. Baseline SBP, DBP and MABP in LP were significantly lower than those of OP ($P < 0.0001$, $P = .003$ and $P = 0.03$ respectively). Ascorbic acid led to reduction in SBP (LP to 79 ± 2 mmHg and OP to 116 ± 3 mmHg; $p < 0.0001$); DBP (LP to 71 ± 3 mmHg and OP to 78 ± 2 mmHg; ($P = 0.003$) and MABP (LP to 86 ± 3 mmHg and OP to 92 ± 2 mmHg; $p = 0.08$). The HR of LP (77 ± 3 b/min) was not significantly less ($p = 0.11$) than that of OP (85 ± 2 b/min). Ascorbic acid reduced HR of LP slightly to 76 ± 3 b/min and that of OP to 81 ± 2 b/min ($p = 0.12$). The RPP of LP was 9036 ± 522 mmHg*b/min was similar to that of OP (10056 ± 326 mmHg*b/min) ($p = 0.11$). Ascorbic acid led to a reduction in the RPP of OP by $-7.09 \pm 4.14\%$ and in LP by $-6.40 \pm 5.28\%$ ($p = 0.92$). High dose ascorbic acid had a more pronounced effect on rate pressure product in obese participants than lean participants.

MODULATORY EFFECTS OF CONCURRENT TREATMENT OF CANNABIDIOL (CBD) ON GLUCOSE AND LIPID METABOLISM IN RITONAVIR AND HIGH FAT DIET TREATED ADULT MALE ALBINO WISTAR RATS

Mofolorunso Adekunle M¹., Uwah Chimdindu E¹., Okwute Patrick G¹., Olawuyi H¹., Nabofa EW¹

¹Department of Physiology, School of Basic Medical Sciences, Babcock University, Ilisan Remo, Ogun State, Nigeria.

HIV-related lipodystrophies are the most common form of lipodystrophy affecting up to 50 % of HIV patients, owing to the use of protease inhibitors in HIV treatment. Cannabidiol (CBD) has been reported to positively affect metabolic and nervous functions; it is however not clear whether CBD can ameliorate the lipodystrophic effects induced by protease inhibitor (PI). The present study was thus designed to evaluate the modulatory effects of 2 weeks concurrent treatment of CBD on lipid and glucose metabolism in protease inhibited adult male albino Wistar rats. Adult male wistar rats weighing 180-200 g were divided into five groups ($n = 7$). Group 1 animals served as control and were untreated. Group 2-5 were treated with protease inhibitor and high fat diet (HFD) for 2 weeks. Concurrent treatment of apple cider vinegar (0.8 mg/Kg), CBD (10 and 25 mg/kg) were administered to groups 3-5 animals respectively. Glucose and lipid metabolic parameters (such as OGTT, ITT, lipid profile and fasting serum insulin levels), hepatic oxidative stress markers, liver function test and hepatic leptin/JAK 2 expressions were determined. 2 weeks treatment of rats with ritonavir and HFD caused lipodystrophy like symptoms evidenced by hepatic steatosis, hypercholesteremia, impaired liver function, high glucose intolerance and reduced insulin sensitivity. Concurrent treatment of animals with CBD mitigated the ritonavir and HFD induced alteration in glucose and cholesterol metabolism which was associated with improved insulin response and increase in hepatic

leptin expression. The beneficial effects of CBD treatment on lipodystrophy appears to involve the suppression in the c-Jun N-terminal kinase (JNK) pathway as animals treated with CBD in the present study had lowered lipid peroxidation and decreased JAK-2 hepatic expression.

Keywords:

Lipodystrophy, Metabolism, Cannabidiol, JAK-2 pathway

BETA- 3 ADRENERGIC DRUGS MODULATE GASTRIC PUMP AND MAST CELL ACTIVITIES DURING HEALING OF ACETIC ACID INDUCED ULCER IN RATS

Iyiola T.O¹., Salami A.T¹., Odukanmi O.A¹. and Olaleye S.B¹

¹Gastrointestinal Secretion and Inflammation Research Unit, Department of Physiology, Faculty of Basic Medical Sciences, University of Ibadan

Corresponding email: toluwalopeiyiola@gmail.com

The gastrointestinal system functions optimally during homeostatic balance between aggressive and protective factors; disequilibrium in favor of aggressive factors causes gastric ulcer formation. Gastric ulcer remains a significant public health concern worldwide. Mast cells have been investigated to protect the integrity of the gastric epithelium during the inflammatory phase of gastric ulcer repair. Various studies have established the gastro-protective effect of beta-adrenoreceptors, but their role in gastric ulcer healing processes is poorly understood, hence this study. Chronic gastric ulcers were induced using 0.06mls, 60% vol/vol acetic acid, and thereafter treated with Nebivolol 5mg/kg and Carvedilol 12.5mg/kg. Area of the ulcers was measured using planimetry 3 and 7 days later. Gastric Na⁺K⁺ATPase, H⁺K⁺ATPase, and Ca²⁺ATPase pump activities were assessed spectrophotometrically. Histological evaluation and quantification of gastric mast cells on days 3 and 7 of sacrifice. Data obtained were analyzed using ANOVA, significant at $\alpha 0.05$. There was a significant increase in the level of glutathione concentration and population of the degranulated mast cells in Nebivolol and Carvedilol treated groups when compared with the ulcer untreated group on both days of sacrifice. There was a significant decrease in the gastric H⁺- K⁺ATPase, while there was a significant increase in the activities of Na⁺- K⁺ATPase on day 3 and Ca²⁺ATPase across the treatment groups on both days of sacrifice when compared with the ulcer untreated group. Beta 3 adrenoreceptor agonists improved gastric antioxidant status, augments gastric Na⁺- K⁺ATPase and Ca²⁺ATPase pump activities as against H⁺- K⁺ATPase activity to expedite healing of experimental chronic gastric ulcer.

MODULATORY EFFECTS OF CANNABIDIOL (CBD) ON NF-KappaB p65/RELA SIGNALING PATHWAY IN METABOLIC SYNDROME IN ADULT MALE ALBINO WISTAR RATS

Patrick Godwin Okwute^{1*}, Olawuyi Habeebat¹, Adekunle M. Mofolorunso¹, E.W. Nabofa^{1*}

¹Department of Physiology, Babcock University, Ilisan Remo, Ogun state, Nigeria

nabofaw@babcock.edu.ng; Tel: +2347080295666

Earlier studies suggest that Nuclear factor kappa-light-chain-enhancer of activated B cells (NF-KB) Pathway plays

a crucial role in metabolic syndrome due to widespread inflammation in this condition. Cannabidiol (CBD) supplements are Cannabis sativa-derived products with low tetrahydrocannabinol levels, making it non-psychoactive. It has been reported for its anti-inflammatory, anti-oxidant and hypoglycemic effects. However, it is not known whether CBD is capable of inhibiting NF-KB associated inflammatory conditions. The present study was thus designed to investigate the effect of CBD supplementation on olanzapine induced metabolic syndrome in adult male albino Wistar rats. Thirty five (35) adult male Wistar rats were divided into five (5) groups (n=7). Group 1 animals served as control and were untreated. Group 2-5 were induced with metabolic syndrome features by 2 weeks administration of high fat diet (HFD) and Olanzapine (5mg/kg). Concurrent treatment of metformin (20 mg/Kg), CBD (10 and 25 mg/kg) were administered to groups 3-5 animals respectively. Metabolic parameters (such as OGTT, ITT, lipid profile and fasting serum insulin levels), oxidative stress markers, liver function test and hepatic RelA expressions were determined. Two weeks concurrent treatment of olanzapine and HFD induced metabolic syndrome features which were evidenced by hyperglycemia, insulin intolerance, hyperlipidemia, increased serum insulin levels and hepatic oxidative stress. CBD at both doses ameliorated the olanzapine and HFD induced metabolic syndrome features which were associated with significant reduction in hepatic RelA expressions. CBD possesses remarkable metabolic preserving activities which are associated with down regulation of NF-KB activity in rats treated with OLAN+HFD.

Keywords:

Metabolic Syndrome, Olanzapine, CBD, NF-KB

METHANOLIC EXTRACT OF *Ricinus communis* (CASTOR) LEAF AMELIORATED DICHLORVOS-INDUCED CARDIOTOXICITY IN MALE WISTAR RATS

¹Moronkeji, F.M., ¹Akano, F.M., ¹Saka, W.A, and ²Salman, T.M.

¹Department of Physiology, Ladoke Akintola University of Technology, Ogbomoso.

²Department of Physiology, University of Ilorin, Ilorin.

Correspondence: funmilayokeyi@gmail.com

Accidental poisoning caused by indiscriminate use of organophosphates (OP) has become endemic in recent decades. Evidences from previous studies have revealed that OP poisoning caused cardiovascular abnormalities. However, getting satisfactory antidotes has been a challenge. This study thus evaluated the effect of methanolic extract of *Ricinus communis* on cardiac markers in dichlorvos-exposed Wistar rats. Thirty-two male Wistar rats (200-250g) were randomly assigned into four groups (n=8). Group 1 (control) received 8mL/Kg of Dimethyl sulfoxide dissolved in distilled water. Group 2 were exposed to 1ml of DDVP via inhalation (15mins daily for 4 weeks). Group 3 were exposed to DDVP and then treated with 300mg/kg Castor leaf extract orally for 6weeks. Group 4 received RC only (300mg/kg) orally for 6 weeks. After 42 days, blood pressure and heart rate of the animals were measured in-vitro using tail cuff method. The animals were euthanized;

blood was collected via cardiac puncture and centrifuged to obtain plasma for lipid profile, cardiac injury markers and inflammatory markers. Heart tissue was also excised for histology, immunohistochemistry, oxidative stress markers and DNA fragmentation test. Dichlorvos significantly increased ($P<0.05$) blood pressure, heart rate, inflammatory markers, MDA and DNA fragmentation. However, RC significantly reduced ($P<0.05$) the elevated levels of heart rate, blood pressure, cardiac injury markers, inflammatory markers, MDA and DNA fragmentation. Results from this study suggest that *Ricinus communis* extract exhibits cardio-protective potential.

EFFECTS OF VITAMIN E AND SELENIUM-YEAST ON COGNITIVE PERFORMANCE OF WISTAR RATS SUBJECTED TO PRENATAL NOISE STRESS

Okwute Michael Ochayi^{1,2*}, Dike C. Obalum¹, Nweke Maduka Luke², Eghosa Iyare², Lawal Jabba Hamidu¹, Danazumi Umar Haruna³, Tarimoboere Agbalalah³, Ngabea Murtala^{1,4} and Bond Anyaehie²

¹Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine and Health Sciences, Baze University, Abuja. ²Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine and Health Sciences, University of Nigeria, Enugu State. ³Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine and Health Sciences, Baze University, Abuja. ⁴Department of Medicine, Maitama District Hospital, Abuja.

ochayimikel@gmail.com, +234(0)8024662055

Noise is a common source of environmental stress globally following increased industrialization. It has been shown to induce oxidative stress (OS). Hence there is need for antioxidants supplementation, particularly vitamin E and selenium-yeast to mitigate OS. Twenty-five pregnant Wistar rats were divided into five groups, group 1 (negative control; received 1mL/kg of distilled water without noise stress), group 2: (positive control), received 1mL/kg of distilled water +100 dB/4 h (0900–1300 h) /day of white noise (WN), group 3: vitamin E; 100 mg/kg/day + WN, group 4: Selenium-yeast (0.4 mg/kg/day) + WN and group 5: vitamin E (100 mg/kg/day bw) and selenium-yeast (0.4 mg/kg/day) + WN; all administrations were done 30 minutes before induction of the stress between (0900–1300 h) for 15 days. On gestational day 21. The pups were subjected to cognitive tests using the Y-maze apparatus on days 21 and 22. Tissues were collected for biochemical and immunohistochemical studies. Data were analyzed using one-way ANOVA and Tukey's posthoc test and expressed as mean±SEM with values of $p<0.05$ as statistical significant. Graphpad prism 8.0. Serum corticosterone (CORT) levels statistically increased in group 2 ($p<0.001$) compared with group 1, 3, 4, and 5. Group 2 showed an increased level of Malondialdehyde (MDA), decreased levels of glutathione reductase (Gpx), catalase (CAT), and superoxide dismutase (SOD) of brain tissue homogenate compared to group 1. However, most of these changes were mitigated in the antioxidants treated groups. Group 2 shows a moderate proportion of astrocytes cell activation when compared to group 1; this effect was also partly reverted in the antioxidant-treated groups. Prenatal noise stress increases serum CORT, which is associated with increase OS and may

be linked with astrocytes cells activation. However, groups that received vitamin E, selenium-yeast, and combine administration of selenium-yeast and vitamin E showed improvement in cognitive performance.

Keyword: Prenatal stress, Noise, Vitamin E, Selenium-yeast, Astrocytes

THE INFLUENCE OF SMOKELESS TOBACCO CONSUMPTION ON BODY WEIGHT IN RATS

Essiet, E.U.¹ and Osim E. E.¹

¹Department of Physiology, College of Medical Sciences, University of Calabar, Calabar

Tobacco smoking reduces body weight (Audrain-McGovern and Benowitz, 2011). However, the effects of smokeless tobacco consumption on body weight and the factors that may affect body weight have not been fully ascertained. This study therefore examines the effect of consumption of smokeless tobacco on body weight and the factors that can affect body weight namely: food intake, water intake and basal metabolic rate. Twelve male wistar rats (180 – 220g) were randomly assigned to control and test (smokeless tobacco or TCD) groups (n=6). The control group rats were provided with normal rat diet and water *ad libitum* while rats in the test were fed 15% formulated tobacco diet and allowed water for two weeks. The animals were placed in metabolic cages. The animals' body weight, water intake and food intake were measured daily for two weeks. Their basal metabolic rate was also determined by the indirect calorimetric method which measures the amount of oxygen consumption. The results showed that there was a significant decrease in the mean daily food intake in the TCD group ($4.26 \pm 0.19\text{g}$) compared to control group ($12.19 \pm 0.16\text{g}$) ($P < 0.001$). Mean daily water intake decreased significantly in the TCD group ($6.68 \pm 0.28\text{ml}$) compared to control group ($12.93 \pm 0.28\text{ml}$). Mean body weight decreased significantly in the TCD group ($181.8 \pm 3.29\text{g}$) compared to control ($193.6 \pm 2.91\text{g}$) ($P < 0.001$). There was also a significant reduction in body weight change in the TCD group ($-30.00 \pm 4.47\text{g}$) compared to control group ($23.33 \pm 3.33\text{g}$) ($P < 0.001$). Basal metabolic rate increased in the TCD group ($0.90 \pm 0.01 \text{ ml/hr/g}$) compared to control ($0.81 \pm 0.02 \text{ ml/hr/g}$) ($P < 0.001$). In conclusion, consumption of smokeless tobacco diet reduces body weight in rats. The reduction in body weight may be attributed to a reduction of water intake, food intake and increase in basal metabolic rate.

AMELIORATIVE ACTIVITIES OF COBALT CHLORIDE ON EXPERIMENTAL CROHN'S COLITIS: ROLE OF MAST CELLS, Ca^{2+} ATPASE AND $\text{Na}^{+}\text{K}^{+}$ -ATPASE PUMP ACTIVITY.

Salami A.T.¹, Yakubu, Z.O.¹, Orji J.¹, Iyiola, T.,¹ Olawale P.O.¹, And Olaleye S.B.¹

¹Gastrointestinal secretions and Inflammation Research Unit, Department of Physiology, University of Ibadan, Ibadan, Oyo State,

Corresponding author: adeolathabitha@yahoo.com

Mast cells have been documented to play valuable roles during healing majorly by mediating wound contraction during healing. Crohn's colitis is a diseased condition of the colon characterized by untamed inflammatory activities. Cobalt chloride has been documented to be gastroprotective

and recently enhance gastric motility via increased mechanosensor activities. The activities of Cobalt chloride on colon mast cells during healing of crohn's colitis is vague which this study investigates. 50 male Wistar rats (120 - 130g, n = 10) were divided into 7 groups viz: Groups 1- Control group, 2-Crohn's Colitis Untreated, 3-Crohn's Colitis treated with High Cobalt (62mg/kg), 4-Crohn's Colitis treated with Low Cobalt (25mg/kg), 5-Crohn's Colitis treated with Sulfasalazine (500mg/kg). Crohn's Colitis was induced intra-rectally with NaOH. Daily body weights, colitis score, and colon biochemical analyses were evaluated on days 3 and 7 post-induction of colitis. Histological evaluation of the colon tissue and mast cell counts were quantified. Immunohistochemistry expressions of colon serotonin levels were quantified. Data were expressed as Mean $\pm$ SEM and were analyzed using one way ANOVA, $p \leq 0.05$ was considered statistically significant. Body weights significantly increased in the cobalt treated groups. Cobalt treated groups significantly reduced ulcer area and diarrhea score by day 7 compared with colitis untreated group. Cobalt treatment significantly increased levels of colon mucin and $\text{Na}^{+}/\text{K}^{+}$ ATPase activities but decreased colonic myeloperoxidase level compared with colitis untreated on both days. Colon nitric oxide levels, Ca^{2+} ATPase and mast cells were significantly increased by day 3 but decreased by day 7 on both days during colitis healing in cobalt treated groups compared with colitis untreated. Colon serotonin levels was upregulated in the cobalt chloride treated groups. Cobalt chloride stimulated the healing of crohn's disease in sodium induced experimental rats via increased antioxidant enzymes and modulated mast cell degranulation.

Key words: Colitis, Cobalt chloride, mast cell, serotonin expression.

PRE-TREATMENT OF WISTAR RATS WITH LOW-DOSE CO-ADMINISTRATION OF VITAMIN E AND LITHIUM CHLORIDE REDUCES THE CO-MORBIDITY OF NEUROPATHIC PAIN

Ifeoluwa Omodele Vaughan^{1*}, Ahmed Olalekan Bakare^{2,3}, O.F Olaseinde^{1*}, and B.V Owoyele¹

1. Neuroscience and Inflammation Unit, Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, University of Ilorin, Ilorin, Kwara State, Nigeria

2. Neuroscience and Inflammation Unit, Department of Physiology, Faculty of Basic Medical Sciences, Adeleke University, Ede, Osun State, Nigeria

Corresponding authors: vaughanmodele@gmail.com or deleyle@yahoo.com

Pain is the most prominent symptom experienced in peripheral neuropathy and lithium chloride (LiCl) has been implicated in treatment of allodynia, hyperalgesia and offers neuroprotection to nerve cells. Vitamin E (Vit E), an antioxidant has been used to reduce hyperalgesia in chronic construction injury. The mechanism by which Vit E, LiCl and their co-administration reduces co-morbidity in neuropathic pain in animal models has not been well studied. A total of 36 male Wistar rats 180-200g of body weight were randomly assigned to seven experimental groups (n=7): Group 1 (Control) was given normal saline, Group 2 (Sham Operated) was also given normal saline, Group 3 (Ligated but untreated) was also given normal

saline, Group 4 (NP) was treated with LiCl 15mg/kg+ Vit E 50mg/kg, Group 5 (NP) treated with 7.5mg/kg LiCl + 50mg/kg Vit E, Group 6 (NP) 4mg/kg LiCl+ 25mg/kg Vit E and Group 7 (NP) 7.5mg/kg LiCl+ 100mg/kg Vit E. Neuropathic pain was induced through sciatic nerve ligation in the left leg, while Vit E, LiCl were co-administered for seven days before ligation and administration was continued for 21 days after establishment of Neuropathic pain. All administration was done orally. On the last day of the experiment, the animals were sacrificed. The pre-frontal cortex and spinal cord were collected, homogenized and centrifuged to collect the needed substrates. During the period of treatment, pain behavioral tests (Mechanical allodynia test (MAT), Open field test (OFT), Thermal hyperalgesia test (THT)) were conducted at designated days (Baseline, 3rd day, 7th day, 14th day and 21st day after ligation). To determine the effect of co-administration of Vit E and LiCl on co-morbidity of neuropathic pain, Calcium levels, Dopamine levels and Total protein (TP) levels were assayed. The result of the biochemical analyses showed a significant ($p < 0.05$) increase in dopamine levels in groups treated with 7.5mg/kg LiCl + 50mg/kg Vit E, 4mg/kg LiCl + 25mg/kg Vit E, 7.5mg/kg LiCl + 100mg/kg Vit E compared with the ligated control group. There was significant increase in TP levels across all groups compared with the ligated control group. There was significant increase in calcium levels in group treated with 15mg/kg LiCl + 50mg/kg Vit E compared with the ligated control group. In conclusion, this study demonstrated that in different doses, low dose mixture of LiCl and Vit E reduces pain perception and threshold, thereby reducing the co-morbidities associated with neuropathic pain.

COMPARATIVE ANALYSIS OF THE EFFECT OF AQUEOUS EXTRACT PHYLLANTHUS AMARUS, L-ARGININE AND CHLORAMPHENICOL ON OSMOTIC FRAGILITY ON RED BLOOD CELLS OF DIFFERENT GENOTYPES (HBAA, HBAS AND HBSS)

Aloamaka, O. E.O. And Ighoroje, A.D.A.

Department of Physiology, University of Benin
aloamakaemmanuel@yahoo.com ; 07030413444

Red blood cells of different haemoglobin genotypes (HbAA, HbAS and HbSS) was incubated in *Phyllanthus amarus*, chloramphenicol and L-arginine after which the red cells were subjected to osmotic stress test in phosphate buffered saline. The aim of the experiment was to ascertain/compare the effect of *Phyllanthus amarus* aqueous extract, L-arginine and chloramphenicol on the integrity of red cell membranes of the different genotypes. Doses of 10 mg and 20 mg/ml of aqueous extract of *Phyllanthus amarus*, Chloramphenicol and L-Arginine was used for the study. Washed red cells were incubated in each of the drugs/extract for 3 hours before subjecting to osmotic stress in serial dilutions of PBS, for 30 minutes, spun in a bucket centrifuge at 2500 rpm for 10 minutes. Absorbance of the supernatant was measured using a spectrophotometer at 540nm wavelength. Results of percentage haemolysis was analysed against serial dilutions of PBS. Result showed a shift to the left in haemoglobin AA genotype cells incubated in 10mg and 20mg *Phyllanthus Amarus*, 10mg and 20mg chloramphenicol, 20mg L-Arginine but a shift to the right in

cells incubated in 10mg L-Arginine. Same was recorded for Haemoglobin AS genotype red blood cells except for 10mg and 20mg L-Arginine which showed a shift to the right, in contract, haemoglobin SS genotype red blood cells showed significant shift to the left after incubation in L-Arginine, Chloramphenicol and *Phyllanthus amarus*. In conclusion *Phyllanthus amarus* and Chloramphenicol (10 and 20mg/ml) and high dose L-Arginine (20mg/ml) have protecting ability against osmotic stress in PBS medium in Haemoglobin AA, AS and SS genotype red blood cells meanwhile low dose L-Arginine (10mg/ml) causes red blood cell lysis in haemoglobin AA and AS genotype red blood cells.

EFFECT OF ETHANOLIC LEAF EXTRACT OF TRIDAX PROCUMBENS ON FRUCTOSE-INDUCED HYPERTENSION IN MALE WISTAR RATS: MECHANISM INVOLVED

Aina O.D., Shittu S.T., Alada A. R. A

Department of Physiology, University of Ibadan, Ibadan, Oyo State.

Correspondence: dunsinaina@gmail.com

Fructose induces hypertension by increased cardiac oxidative stress, recent findings have also shown that *Tridax procumbens* (TP) has considerable antioxidant properties. There is however dearth of information on the effect of TP on fructose-induced hypertension. This study therefore investigated the effect of ethanolic leaf extract of TP (ELETP) on fructose-induced hypertension in male Wistar rats. Thirty-five male Wistar rats (200-250g) were used. They were randomly divided into 5 groups (n=7) and treated as follows: Group I (Control) drank tap water while groups II-V drank 10% fructose solution for 3 weeks to establish hypertension. Group I and II received normal saline, group III and IV received 100mg/kg and 400 mg/kg ELETP, respectively while group V received Prazosin (0.5mg/kg) and Propranolol (10mg/kg) orally for 4 weeks. Systolic (SBP), Diastolic (DBP), Mean Arterial Blood Pressure (MABP) and Heart Rate (HR) were determined non-invasively. Lipid profile (cholesterol, trig, HDL and LDL) were determined in plasma. Markers of oxidative stress (MDA, SOD and catalase) were determined in plasma and heart tissue. Increased SBP, DBP, MAP and HR were observed in all fructose exposed rats compared with the control. The increased SBP and DBP were lowered in groups III ($136.58 \pm 1.94\text{mmHg}$; $96.78 \pm 2.21\text{mmHg}$), IV ($132.17 \pm 1.59\text{mmHg}$; $92 \pm 7.14\text{mmHg}$) and V ($122.95 \pm 22.46\text{mmHg}$; $87.56 \pm 5.11\text{mmHg}$) compared with group II ($156.17 \pm 12.09\text{mmHg}$; $112.08 \pm 12.90\text{mmHg}$). Cholesterol, Trig and LDL levels were significantly increased in group II compared with the control. The increased Trig level in group II ($140.62 \pm 21.70\text{mg/dl}$) was significantly reduced in group III ($100.52 \pm 8.78\text{mg/dl}$). Cardiac MDA level was increased while catalase activity decreased in group II when compared with control and all treated groups. In conclusion, TP reversed fructose-induced hypertension through a mechanism that may involve its antioxidant potential.

Keywords: Fructose-induced Hypertension, *Tridax procumbens*, Oxidative Biomarkers

GREEN SYNTHESIZED TITANIUM DIOXIDE NANOPARTICLE OF *HEINSIA CRINITA* LEAVES (HC-TiO₂NPs) PROMOTES GASTRIC ULCERATION FOLLOWING PYLORIC LIGATION IN RATS

Essiet, E.U., Odukanmi, O.A., Salami, A.T., Odeniyi M.A, Olaleye, S.B

Department of Physiology, College of Medicine, University of Ibadan

Department of Pharmaceutics, University of Ibadan Titanium dioxide nanoparticles (TiO₂NPs) are used as food additives. Previous reports showed that TiO₂NPs aggravate gastrointestinal injury. In an attempt to develop a clean, nontoxic and low-cost additive, green synthesis of titanium dioxide nanoparticles was carried out using *Heinsia crinita* leaves and its effect on Gastric ulceration induced by pyloric ligation. Twenty male Wistar rats (180-200g) were used for the study. Rats were grouped (n=5) into 4 groups1- Negative control received 0.5 ml of 1% Tween 80 (Vehicle) in distilled water; 2, 3, and 4 were the pyloric ligation-induced gastric ulcer groups which were untreated, and those pre-treated daily with 5 mg/ kg or 10 mg/kg HC- TiO₂NPs for 30 days, respectively. Gastric adherent mucus secretions were assessed in all the groups while gastric acid secretion was assessed in groups 2, 3, and 4. Gastric ulcer scores, free acidity, total acidity, and mucus secretions were evaluated using standard methods. Data were expressed as mean $\pm$ SEM and were considered significant at $P < 0.05$. Total Acidity (mEq/L/4 h) increased significantly in 5 mg/kg HC- TiO₂NPs (3.11 ± 0.40) and 10 mg/kg HC- TiO₂NPs (3.58 ± 0.24) compared to the ulcer alone group (2.04 ± 0.08). Ulcer scores increased significantly in the 5 mg/kg HC- TiO₂NPs (11.56 ± 0.75) and 10 mg/kg HC- TiO₂NPs (12.94 ± 0.02) group compared to the control (3.02 ± 0.16). Gastric mucus secretion (mg/g tissue) decreased significantly in the positive control (0.11 ± 0.01), 5 mg/kg HC- TiO₂NPs (0.10 ± 0.02), and 10 mg/kg HC- TiO₂NPs (0.08 ± 0.01) groups compared to the negative control (2.67 ± 0.03). HC-TiO₂NPs eroded mucus secretion in the stomach and augmented stomach acidity thereby potentiating pyloric ligation-induced gastric ulcers in rats.

Keywords:

Heinsia crinita, Gastric ulcer, Pyloric ligation, Wistar rats, Acidity

PATERNAL ZINC DEFICIENCY DISTORTS GLUCOSE METABOLISM BY TRANSGENERATIONAL ALTERATIONS OF *DILP2* AND *dPEPCK* IN *DROSOPHILA MELANOGASTER* OFFSPRING

Sanusi KO^{1,2}, Abubakar MB^{1,2}, Ibrahim KG^{1,2,3}, Imam MU^{1,4*}

¹*Centre for Advanced Medical Research and Training, Usmanu Danfodiyo University, P.M.B. 2346, Sokoto, Nigeria*

²*Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria*

³*Department of Basic Medical and Dental Sciences, Faculty of Dentistry, Zarqa University, Zarqa 13110, Jordan.*

⁴*Department of Medical Biochemistry, Faculty of Basic Medical Sciences, College of Health Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria*

Evidence exists for paternal contribution to embryogenesis and reprogramming of offspring metabolic status. Zinc deficiency is a risk factor for several metabolic outcomes that can predispose to glucose dysmetabolism, and maternal contribution to this phenomenon has been partly demonstrated. Accordingly, it is necessary to investigate whether paternal zinc deficiency alone can programme for offspring's adult life glucose dysmetabolism. Hence, the need for this study. Male adult flies that developed on zinc-deficient diet (TPEN-supplemented at 50 μ M and 100 μ M) were crossed with virgin female flies that developed on normal diet to get F1. To generate F2 and F3, F1 and F2 were respectively crossed with flies maintained on normal diet and whose parents were also maintained on normal diet. The offspring (F1-F3) were fed normal diet for seven days and sacrificed afterwards. They were thereafter assessed for changes in biochemical (glucose, trehalose, glycogen, triglycerides) and gene expression (*DILP2* and *dPEPCK* mRNA) markers of glucose metabolism. A significant increase in glucose and trehalose levels were observed in the F0 at 100 μ M TPEN. However, no significant difference in glucose levels was observed in F1 and F2, but a decrease in F3. Also, there was a significant decrease in trehalose levels for F1 (female), F2 (male), and F3 (male and female) but an increase in F2 (female) flies. F0 glycogen levels were also decreased, although there was no change in triglycerides. Moreover, through F1-F3, glycogen levels significantly ($p < .05$) reduced while triglycerides increased. Mechanistically, the fold change in *DILP2* showed a significant increase from male parent (F0) to F2, but decreased in F3. However, *dPEPCK* mRNA increased in F0 and F3 but decreased in F1 and F2. Our findings suggest that paternal dietary zinc deficiency causes transgenerational glucose dysmetabolism partly by altering the *DILP2* and *dPEPCK* mRNA levels in *Drosophila melanogaster* offspring.

A RAT MODEL OF TORSION OF THE TESTIS

Oladele A Afolabi¹, Johnson O Odesanya, Richard A Ajike¹, Olubunmi S Oyekunle¹, Babatunde A Alabi², Ayodeji F Ajayi¹, Roland E Akhigbe¹ Olajumoke D Ogunleye¹

Department of Physiology, Faculty of Basic Medical Sciences, Ladoke Akintola University, Ogbomosh

Animal models of torsion of the testis (TT) have been used extensively to investigate the mechanisms of ischemia reperfusion injury (IRI) which invariably result from attempts to prevent its progression to necrosis. Previous models used have employed the clamping of testicular vessels with microvascular clips to induce ischemia for variable periods of time followed by removal of the clamps for reperfusion. These methods however do not adequately reflect the pathophysiological features of TT which go beyond mere occlusion and eventual restoration of blood flow to the testis. Attempts at mimicking TT by surgical twisting of the spermatic cord and its accompanying vessels to achieve ischemia while being representative of the clinical presentation have been fraught with many technical difficulties. A major technical difficulty is anchoring the

testis to the floor of the scrotum in its twisted state. Articles on the subject have not explicitly addressed these difficulties in the short descriptions encountered in the methods section. Such technical difficulties often encountered by investigators have thus resulted in inability to consistently reproduce the model among different investigators. This article provides a step by step description of the surgical induction of TT in the rat and the subsequent detorsion in order to induce IRI. The method is simple and explicit and can easily be learned and replicated by other investigators in the field.

PHYLLANTHUS AMARUS RESTORES HEPATIC AND INTESTINAL INTEGRITY BY MODULATION OF BAX/CASPASE 3 SIGNALING AND BACTERIAL TRANSLOCATION IN INTESTINAL ISCHEMIA REPERFUSION INJURY

Afolabi O.A., Akhigbe TM, Akhigbe RE, Alabi BA, Gbolagun OT, Taiwo ME, Fakeye OO, Yusuf EO.

Department of Physiology, Ladoke Akintola University, Ogbomosho

Oxidative stress and bacterial translocation invariably accompany intestinal ischemia reperfusion injury (IIRI) triggering systemic inflammatory response syndrome (SIRS) often culminating in multiple organ failure (MOF). *Phyllanthus amarus* leaf extract (PA) has gastroprotective and hepatoprotective properties. This study therefore investigated the protective effect and possible mechanism of action of PA against IIRI and hepatic injury. Fifty male Wistar rats were randomized into five groups (n = 10). The sham-operated group received 0.5 mL distilled water for seven days prior to sham surgery, while IIRI, febuxostat (FEB) + IIRI, low-dose PA (LDPA) + IIRI, and high-dose PA (HDPA) + IIRI groups underwent the experimental IIRI procedure. IIRI, FEB + IIRI, LDPA + IIRI, and HDPA + IIRI received 0.5 mL of distilled water, 10 mg/kg of febuxostat, 200 mg/kg of PA, and 400 mg/kg of PA, respectively, for seven days prior to the IIRI procedure. Malondialdehyde, nitric oxide, TNF- α , IL-6, and myeloperoxidase activity, reduced glutathione, thiol and non-thiol proteins, and superoxide dismutase, catalase, and glutathione peroxidase activities in intestinal and hepatic tissues. Bacterial translocation was assessed by colony counts of cultured hepatic homogenate. Bax/caspase 3 signaling by immunohistochemical staining, intestinal and hepatic histoarchitecture by H&E staining. Administration of PA attenuated IIRI-induced rise in intestinal and hepatic injury markers, malondialdehyde, nitric oxide, TNF- α , IL-6, and myeloperoxidase activities. In addition, PA reversed IIRI-induced suppression of reduced glutathione, thiol and non-thiol proteins, and superoxide dismutase, catalase, and glutathione peroxidase activities in intestinal and hepatic tissues. I/R-induced bacterial translocation was suppressed along with downregulation of I/R-induced activation of Bax/caspase 3 signaling. There was reversal of I/R-induced distortion of intestinal and hepatic histoarchitecture. PA exerted a protective effect against IIRI-induced hepatic injury by suppressing bacterial translocation and oxidative stress-mediated activation of Bax/caspase 3 signalling. These effects may be ascribed to its constituent bioactive tannins, anthocyanin, alkaloids, and phenolics.

POSTISCHEMIC ADMINISTRATION OF FEBUXOSTAT AND VITAMIN E AMELIORATES TESTICULAR ISCHEMIA- REPERFUSION INJURY IN RATS BY SUPPRESSION OF OXIDATIVE STRESS AND INFLAMMATION.

Ajike, RA¹ , Afolabi OA¹, Alabi, BA², Oyekunle, OS¹ Hezekiah, OS¹ Hammed, SO¹

College of Health Science, LAUTECH, Ogbomosho

The pathway of ischemia reperfusion injury (IRI) has been shown to involve generation of reactive oxygen species (ROS) during ischemic phase and in the immediate reperfusion phase. This study investigated the effect of blockage of sources of ROS in the ischemic and reperfusion phases of testicular-IRI. 30 male Wistar rats (180-200g) were grouped (n=6): 1, Sham operated (SO); 2, Torsion+Detorsion (TD); 3, Torsion+FEB+Detorsion (TFD); 4, TD+Vit.E (TDVE); 5, TFD+VE (TFDVE). Group 3, 4 and 5 received 5mg/kg of FEB after 30minute of surgically induced TT for 1 hour, 10mg/kg of VE 30minutes after detorsion and 5mg/kg of FEB after 30minutes of TT+10mg/kg of VE 30minutes after detorsion respectively via i.p. Blood samples and tissues were collected after 3 days of detorsion. Tissue GPx, GSH, total thiol, SOD, MDA, XO, MPO was done. Serum NO, TNF- α , IL-1 β , LH, FSH, inhibin and testosterone were estimated. Semen analysis and sperm DNA damage was assessed from the caudal epididymal fluid. Histology of the testes was also assessed. Data was recorded as mean $\pm$ SEM. Statistical significance was set at p<0.05. The significant (P<0.05) increase in XO and MDA but reduction in SOD, CAT, GSH, protein and non-protein thiols in TD group was reversed significantly in TFD than TDVE and TFDVE. TFD group mostly reduced inflammatory mediators which were raised in TD group. Testosterone level was raised in TFD and TFDVE groups. Increased sperm DNA damage and reduced sperm indices were observed in TD group which were reversed in TFDVE and TFD than TDVE. There was an improvement in testicular cytoarchitecture in TFDVE group. Blockage of Xanthine oxidase in the ischemic phase with febuxostat and ROS burst after reperfusion with Vitamin E after TT onset may offer a viable and practical alternative in the treatment of torsion of testes. Blocking other sources of ROS may help to reduce testicular-IRI

COMPARATIVE ANALYSIS OF THE EFFECT OF AQUEOUS EXTRACT PHYLLANTHUS AMARUS, L-ARGININE AND CHLORAMPHENICOL ON OSMOTIC FRAGILITY ON RED BLOOD CELLS OF DIFFERENT GENOTYPES (HBAA, HBAS AND HBSS)

Aloamaka, O. E.O. And Ighoroje, A.D.A.

Department of Physiology, University of Benin

aloamakaemmanuel@yahoo.com ; 07030413444

Red blood cells of different haemoglobin genotypes (HbAA, HbAS and HbSS) was incubated in *Phyllanthus amarus*, chloramphenicol and L-arginine after which the red cells were subjected to osmotic stress test in phosphate buffered saline. The aim of the experiment was to ascertain/compare the effect of *Phyllanthus amarus* aqueous extract, L-arginine and chloramphenicol on the integrity of red cell membranes of the different genotypes. Doses of 10 mg and 20 mg/ml of aqueous extract of *Phyllanthus amarus*,

Chloramphenicol and L-Arginine was used for the study. Washed red cells were incubated in each of the drugs/extract for 3 hours before subjecting to osmotic stress in serial dilutions of PBS, for 30 minutes, spun in a bucket centrifuge at 2500 rpm for 10 minutes. Absorbance of the supernatant was measured using a spectrophotometer at 540nm wavelength. Results of percentage haemolysis was analysed against serial dilutions of PBS. Result showed a shift to the left in haemoglobin AA genotype cells incubated in 10mg and 20mg Phyllanthus Amarus, 10mg and 20mg chloramphenicol, 20mg L-Arginine but a shift to the right in cells incubated in 10mg L-Arginine. Same was recorded for Haemoglobin AS genotype red blood cells except for 10mg and 20mg L-Arginine which showed a shift to the right, in contract, haemoglobin SS genotype red blood cells showed significant shift to the left after incubation in L-Arginine, Chloramphenicol and Phyllanthus amarus. In conclusion Phyllanthus amarus and Chloramphenicol (10 and 20mg/ml) and high dose L-Arginine (20mg/ml) have protecting ability against osmotic stress in PBS medium in Haemoglobin AA, AS and SS genotype red blood cells meanwhile low dose L-Arginine (10mg/ml) causes red blood cell lysis in haemoglobin AA and AS genotype red blood cells.

SALT SENSITIVITY, SYSTEMIC AND VASCULAR INFLAMMATION IN NORMOTENSIVE YOUNG-ADULT NIGERIANS

A. K. Oloyo¹, **K. B. Ismail-Badmus¹**, A. A. Adejare¹, S. O. Elias², O. Kushimo³, O. Odukoya¹, O. A. Sofola¹

¹ College of Medicine University of Lagos, Physiology, Surulere, Nigeria

² Lagos State University College of Medicine, Physiology, Ikeja, Nigeria

³ Lagos University Teaching Hospital, Cardiology, Surulere, Nigeria

High salt diet is the most important environmental risk factor for hypertension (1), globally, about 50% of essential hypertension tagged essential are salt-sensitive (2). about 56% and 34% adult hypertensive and normotensive Nigerians are salt-sensitive (3). Recently an increase in the prevalence of children and adolescent hypertension has been reported (4). To prevent the development of salt-sensitive hypertension, the search for the predictors of salt sensitivity becomes imperative. This study was designed to demonstrate the association between blood pressure, salt sensitivity and systemic and vascular inflammation in normotensive young-adult Nigerians. Recruited participants are consenting normotensive (Systolic < 90), young adults (18-35 years of age) without any known underlying pathology. 12-hour nocturnal urine and baseline parameters (anthropometric parameters, blood samples) were collected/determined on day 1 of the experiment, participants were given a salt-load at a dose of 200mmol/day Na⁺ for 5 days. Blood pressure parameters were measured before and after salt-loading using a non-invasive electronic Omron M6 BP monitor which has been calibrated against an Accoson mercury sphygmomanometer. Salt Sensitivity was determined as >5mmHg difference in MABP of participants post salt-loading. Plasma concentration of biomarkers of systemic and vascular inflammation (CRP, IL-1b, IL-6, IL-17, MIP-1 TNF- α , VCAM-1 and ICAM-1) were estimated

before and after salt-loading. High salt diet elevated BP in the salt sensitive participants. 27% of the participants are salt sensitive (SS). Plasma concentration of IL-6 is significantly lower in SS participants compared to SR counterparts before and after salt loading; while IL-17, CRP and VCAM-1 concentrations are significantly elevated in SS participants before salt loading. The plasma CRP and IL-6 concentrations of female SS participants are significantly higher. In a young-adult normotensive Nigerian population, it appears that IL-1b, IL-6 and VCAM-1 are predictors of salt sensitivity and future salt sensitive hypertension. However, the mechanism behind this phenomenon needs to be unravelled.

ANTI-OXIDATIVE AND ANTI-INFLAMMATORY EFFECTS OF VIRGIN COCONUT OIL AGAINST TRICHLOROACETIC ACID ASSAULT ON THE LIVER, STOMACH AND COLON OF RATS

¹***Ajeigbe KO**, ²Oladokun OO and ³Omotoso DR

¹Department of Physiology, Faculty of Basic Medical Sciences, Federal University, Oye-Ekiti, Nigeria

²Department of Physiology, Faculty of Basic Medical Sciences, Osun State University, Osogbo, Nigeria

³Department of Anatomy, Faculty of Basic Medical Sciences, Redeemer's University, Ede, Nigeria

*Correspondence: kazeem.ajeigbe@fuoye.edu.ng

Trichloroacetic acid (TCA), a major end-metabolite of trichloroethylene and tetrachloroethylene which humans are exposed to occupationally and environmentally, is a toxicant and chemical carcinogen. It causes organ damage via excessive generation of free radicals, depletion of antioxidant system and activation of pro-inflammatory cytokines. We explore the mechanisms underlying the anti-oxidative and anti-inflammatory mechanisms of Virgin Coconut oil (VCO) alone or combined with 5-fluorouracil (5FU) in the treatment of TCA-induced hepatic, gastric and colonic damage in the rat. Rats were randomly assigned to seven groups (n=5) viz; Group 1: 1mL/day Normal Saline (NS), Group 2-7: TCA (250 mg/Kg b.wt, p.o) for ten days, followed by VCO and 5FU treatment for another ten days except the Group 2 which served as control. Group 3: 5% of VCO per gram of feed+TCA, Group 4: 10% of VCO per gram of feed+TCA, Group 5: 5-FU (50 mg/kg, i.p) + TCA, Group 6: 5% of VCO per gram of feed + 5-FU (50 mg/kg, i.p) + TCA, Group 7: 10% of VCO per gram of feed + 5-FU (50 mg/kg, i.p) +TCA. Serum liver enzymes, tissue oxidative stress parameters, inflammatory markers were evaluated along with histological examination. TCA's elevation of serum transaminases (ALT, AST) and alkaline phosphatase (ALP), as well as Total Bilirubin (T.Bil), level was abrogated by VCO either alone or in combination with 5-FU in a dose-dependent manner. Similarly, decreased activity of SOD, CAT, GPx and Nrf2 in the liver, stomach and colon were enhanced, while MDA, MPO, TNF- α , IL-1 β and NF-kB level hitherto increased by TCA were lessened by VCO. Further, histomorphometry data in the stomach, colon and liver favoured the anti-oxidative and anti-inflammatory potentials of VCO observed in the study. Virgin coconut oil lessens trichloroacetic acid induced oxidative stress and inflammation in the liver, stomach and colon.

NONI FRUIT (*MORINDA CITRIFOLIA*) PRODUCES ANTI-OXIDANT AND ANTILIPEMIC EFFECT AGAINST BISPHENOL-A INDUCED CARDIAC TOXICITY IN FEMALE WISTAR RATS.

¹Adewumi Oluwafemi Oyabambi*, Aindero Blessing Boluwatife

¹ Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Ilorin, Ilorin, Nigeria.

Bisphenol A is an environmental degradation agent and chemical used in manufacturing and food industry with a mainstay of downstream regulation. Noni on the other hand is a widely consumed dairy products of Pantropical origin. This study therefore aimed to examine the ameliorating effect of aqueous extract of Noni fruits on Bisphenol-A induced cardiotoxicity and its associated metabolic risk factors in male Wistar rats. Twenty-four (24) male Wistar Rats weighing 120±50g were divided into four (4) groups of six rats (6); n=6, after a week of acclimatization as: Control (Ctr: normal chow + vehicle: Olive oil), Bisphenol A (7g/kg, orally), Noni aqueous extract (NAE:500 mg/kg; orally), and NAE:500mg/kg+ Bisp A;7g/kg. After six weeks of experimental procedure, each animal was anesthetized with 0.8mg Phenobarbitone and blood sample was collected by cardiac puncture. Plasma and cardiac tissue homogenate were analyzed for biochemical parameters and data were expressed as mean ± SEM and p-values < 0.05 were accepted as significant. Bisphenol A reduced significantly plasma and cardiac histone deacetylase (HDAC), adenosine and Nitric oxide (NO) while causing a significant increase in triglycerides (TG), lipoprotein A, tumor necrotic factor alpha (TNF-α), uric acid (UA), catalase and (malondialdehyde) MDA. The aqueous extract of Noni on the other hand increased significantly HDAC and NO while reducing significantly TNF-α, catalase, MDA, TG, and Lipoprotein A with a marginal decrease in UA. From the study, the NAE reduced worsening cardiovascular risk factors while causing a positive epigenetic expression through improved HDAC and neovascularisation activities.

Keywords: HDAC, cardiovascular risk factors, Noni aqueous extract, Bisphenol A, Wistar rats

AMELIORATIVE EFFECT OF VITAMIN E AND N-ACETYL CYSTEINE ON LEAD ACETATE-INDUCED GLUCOSE METABOLISM IMPAIRMENT IN WISTARS RATS

Efeotor R.O., Shittu S. T.*, Shittu S. A., Kpai T., Oyeyemi W. A., Isehunwa G.O., Lasisi T. J.

Correspondence: drshittu@gmail.com

Lead exposure has been reported to induce disarray in glucose metabolism majorly by tissue oxidative damage. Vitamin E (VitE) and/or N-acetylcysteine (NAC) have been documented to ameliorate lead toxicity. Data on the effect of vitE and/or NAC on lead-induced impairments of glucose metabolism are scanty. This study therefore investigated the effect vitE and/or NAC on glucose metabolism in lead acetate exposed rats. Forty male Wistar rats(100-140g) grouped into 5 (G1-5) were treated as follows; G1 received the vehicle only, G2-5 received lead acetate (20mg/kg, p.o)

while G3-G5 were orally treated with VitE (150mg/kg), NAC (100mg/kg) or a combination of both, respectively for 30 days. Oral glucose tolerance test (OGTT) was carried out and Area under the curve (AUC) was calculated. Fasting blood glucose (FBG), Insulin, lactate, Lactate Dehydrogenase activities (LDH), HOMA-IR, oxidative stress biomarkers (MDA, SOD, Catalase and GPx) and liver function test (ALT, ALP and AST) were determined in the blood. Hepatic glycogen content was determined using the anthrone method. Data are presented as Mean±SEM, analysed by ANOVA at P<0.05 followed by TuKey posthoc test. Lead exposure caused significant increased FBG (101.14 ± 6.10mg/dl), HOMA-IR (0.189±0.17) and plasma lactate level (32.75±8.44mg/dl) in G2 relative to G1 (79.25± 2.60mg/dl, 0.014± 0.003, 29.04±0.12mg/dl). The increase FBG and HOMA-IR were significantly decreased by vitE or/and NAC in G3, G4 and G5 respectively, relative to G2. Hepatic glycogen content was significantly depleted in G2 and reversed in G3-G5 relative to G1. Increased AST and ALT levels were observed in G2 relative to control and the treated groups. Although, MDA level was not different across all groups, GPx and catalase activities were significantly reduced in G2 and reversed in G3-G5 relative to control. Data from this study indicate that vitamin E and N-acetylcysteine prevented lead-induced glucose impairment by potentiating the endogenous antioxidant activities.

Keywords:

Lead toxicity, Glucose metabolism, Vitamin E, N-acetylcysteine

OXIDATIVE STRESS INDUCED BY RESTRAINT, MIRROR AND INTRUDER STRESSORS ALTERS CREATININE, UREA, AND RENAL TUBULOGLOMERULAR MEMBRANE ANTIOXIDANT INTEGRITY IN RATS

Nwogweze B.C¹, Ojieh A.E¹, Ossai N.R¹, Aloamaka C.P¹

¹Department of Physiology, Delta State University, Abraka, Delta State, Nigeria

Corresponding

bartholomew.nwogweze@delsu.edu.ng; 08064062111

Author:

The pervasive nature of the global economic meltdown has made stress a general phenomenon and is believed to contribute to various disease conditions. The study examined effect of oxidative stress on creatinine, urea, and renal tubuloglomerular membrane antioxidant integrity in Female Wistar rats. 24 adults female Wistar rats weighing 160-200g and within the ages of 12-14weeks were used for experiment 1, while 12 offspring were utilized for experiment 2. Kidney tissues were isolated from the animal and homogenized for antioxidant assay. Serum was collected for assays of Urea and creatinine using ELISA. Data collected was analyzed for Mean±SEM and One Way ANOVA. Our results revealed that the different stressors reduced relative kidney weights, but did not significantly alter serum creatinine concentration, however, the concentrations were slightly increased compared to control.

Urea concentration was significantly increased in rats exposed to restraint and intruder stressors. Exposure to mirror stressor did not alter urea concentration. Offspring of stressed female Wistar rat exhibited significant increase in serum urea level, minimal increase in serum creatinine levels. Markers of oxidative stress revealed that GSH, GST, GPx, SOD, MDA and CAT were altered depending on the stressor applied. Exposure to restraint stressor decreased the activities of GPx, SOD and CAT in the kidney of the rats. Exposure of the rats to mirror stressor decreased the activities of GPx and CAT in kidney, while increasing the activity of kidney SOD. When the rats were stressed by exposure to intruder stressor, it decreased the activities of kidney GPx and SOD, but it also increased the activity of kidney SOD. Kidney MDA levels were increase irrespective of the stressor applied. In all, continued exposure of the rats to stressful condition has the tendency of compromising the integrity of liver and kidney function, thus, with potency of compromising female reproductive outcome.

Keywords: Oxidative Stress, Antioxidants, Creatinine, Urea, Kidney

MECHANISTIC EFFECTS OF CAFFEINE CONSUMPTION ON REPRODUCTIVE FUNCTIONS OF FEMALE WISTAR RATS

***Eunice Ogunwale, Victor Emojevwe, Adeniran Oluwadamilare Akinola, Hannah Bolutife Shittu, Praise Oluwaseyi Akinwa, Iyanuoluwa Elizabeth Olagoke and Favour Omolewami Ayodele**

Department of Physiology, University of Medical Sciences, Ondo City, Nigeria

Caffeinated beverages are widely consumed and have been implicated in several bodily dysfunctions. Chronic exposure to caffeine has been linked with decreased female fertility. This study assessed the effects of caffeine consumption and its withdrawal (recovery) on reproductive functions of female Wistar rats. Thirty-five adults female Wistar rats were divided into seven groups (n=5); Group I - control (distilled water), II-IV received 10, 20 and 40 mg/kg/day of caffeine orally for 21 days respectively, V-VII received 10, 20 and 40 mg/kg/day of caffeine respectively for 21 days and allowed to recover for another 21 days. Rats were sacrificed and ovaries, fallopian tubes and uteri were harvested for evaluation of Malondialdehyde (MDA), Nitric oxide (NO), reduced Glutathione (GSH) levels, Superoxide dismutase (SOD) and Catalase activities by spectrophotometry. Serum Luteinizing hormone (LH), follicle stimulating hormone (FSH) and estradiol levels were measured by ELISA, and organ histology was observed microscopically. Data were analyzed using ANOVA and $p < 0.05$ was considered statistically significant. Caffeine increased MDA, NO and catalase activity of ovaries, fallopian tubes and uteri in a dose dependent manner, which were reduced upon withdrawal. Caffeine reduced GSH level of ovary and fallopian tubes which increase after its withdrawal. Serum LH was reduced during caffeine withdrawal from 20 and 40mg/kg/day, FSH reduced in 40 mg/kg/day while estradiol reduced during treatment in a dose-dependent manner when compared with control. Caffeine caused dose dependent alterations in the architecture of the ovaries via congested connective tissues, sloughed plicae of muscularis of fallopian tubes and

degenerated epithelial layer of the uteri with severe infiltration of inflammatory cells in the stroma of its myometrium, conditions which remain during caffeine withdrawal. The study showed that caffeine consumption may adversely alter the reproductive functions of female Wistar rats.

Key words: Caffeine, Infertility, Oxidative Stress, Reproductive hormone

METHANOLIC EXTRACT OF *Ricinus communis* LEAVES AMELIORATES DICHLORVOS-INDUCED NEPHROTOXICITY IN MALE WISTAR RATS

¹Akano, F.M., ¹Saka, W.A, ¹Moronkeji, F.M. and ²Salman, T.M.

¹Department of Physiology, Ladoke Akintola University of Technology, Ogbomoso.

²Department of Physiology, University of Ilorin, Ilorin.

Correspondence: queenphummzy@gmail.com

2-2-dichlorovinyl dimethyl phosphate (DDVP/Dichlorvos) causes nephrotoxicity (Yadav *et al*, 2012); a major health challenge with high mortality rate due to its expensive management. The search for a potent, safe and less expensive medicine to treat nephrotoxicity led to the use of herbal-based medicine. The study investigated the effect of *Ricinus communis* (RC) on DDVP-induced nephrotoxicity. Thirty-two (32) male rats (200-250g) were randomly divided into four (n=8) groups. Group I (Control) received 10ml/kg of dimethyl sulfoxide and distilled water solution (vehicle) for six weeks; Group II were exposed to DDVP (1ml) via inhalation for 4 weeks ; Group III were exposed to DDVP and then administered with 300 mg/kg RC while Group IV received only RC (300mg/kg) orally for six weeks. After treatment, the animals were euthanized; blood was collected via cardiac puncture into EDTA bottles and centrifuged to obtain plasma for electrolytes. The kidneys were excised and used for histology, immunohistochemistry, estimation of oxidative stress and inflammatory markers and DNA fragmentation test using standard methods. DDVP caused significant increases ($P < 0.05$) in Na⁺, creatinine, urea, urinary protein, inflammatory markers, MDA and DNA fragmentation while RC reduced ($P < 0.05$) elevated levels of renal and inflammatory markers, MDA and DNA fragmentation. The results suggest that *Ricinus communis* extract possesses nephro-protective properties.

ETHANOLIC SEED EXTRACT OF *MACUNA PRURIEN* AMELIORATED XEROSTOMIA IN ROTENONE-INDUCED PARKINSONISM IN RATS

Salaudeen, F.M., Odukanmi, O.A., Salami, A.T., Olaleye, S.B

Department of Physiology, College of Medicine, University of Ibadan

Parkinson's disease (PD) is a chronic, progressive, and irreversible neurodegenerative disorder with increasing prevalence worldwide and reported reduced saliva flow and composition in Parkinsonism. *Macuna Pruriens* seed is used in the management of PD locally. This study was designed to investigate the effect of ethanolic seed extract of *Macuna Pruriens* on saliva and its composition in rotenone-induced parkinsonism in male rats.

Thirty-two (32) male Wistar rats weighing between 200-220g were randomly grouped into four groups consisting of eight (8) rats per group. Parkinsonism was induced with a daily oral administration of Rotenone 1mg/kg for 7 days. The control group received 1 mg/kg of olive oil (vehicle), the Rotenone alone group (1mg/kg of rotenone with no treatment), and groups 3 and 4 received 1mg/kg of rotenone and were treated with 50mg/kg and 100mg/kg of the *Macuna Pruriens* seed extract daily for 28 days, respectively. Behavioural studies were conducted to ascertain parkinsonism. Saliva was collected for flow rates, pH, biochemical assays of relevant enzymes, and electrolyte determination, using standard procedures. All data were expressed as mean $\pm$ standard error of the mean (SEM), and statistical analysis was conducted using ANOVA and significant accepted at $P < 0.05$. The 100 mg/kg and 50 mg/kg groups showed a significant increase in the salivary volume and flow rate. There is no significant change in the pH of the saliva and the electrolyte of the saliva. Groups with the test extracts (100 mg/kg and 50 mg/kg rotenone) showed decreases in the salivary amylase content compared to Rotenone alone group. The ethanolic extract of *Macuna pruriens* seed caused an increase in the volume and rate of salivary secretion following the induction of parkinsonism, thus ameliorating the silenced xerostomia in parkinsonism. **Keyword:** Parkinsonism, Rotenone, *Macuna pruriens* extract, Salivary rate

USE OF FACEMASKS IN COVID-19 AND CORONA VIRUS PROTECTION AND STRESS PERCEPTION AMONG A NIGERIAN POPULATION

Anigbogu C.N., Jaja S.I., Ajuluchukwu J.N., Nwanna C.R., Oloyo A. K., Ogungbemi S.I. Agbaraolorunpo F M, And Adejare A. A.

Departments of Physiology, Medicine, and Social Work, University of Lagos, Lagos Nigeria.

COVID-19 pandemic made the use of face masks mandatory globally as a measure for minimizing the transmission risk of the virus. Amidst potential poor masking compliance, it is unclear if masking discomfort is related to type of masking. These masks may also impose physiological and psychological burden on healthy persons. We investigated the perception of stress symptoms in subjects using various face masks. The study was a cross-sectional design using questionnaires among healthy individuals in Mushin and Surulere LGAs. Data are presented as frequency and percentage in numeral, and analysis for association evaluated with chi-square test. A total of 541 volunteers participated in the study, including 302 (55.8%) males and 239 (44.2%) females. They were mostly young adult around 18-29yrs (50.8%), followed by those in 30-39yrs (19.5%), 40-49yrs (15.4%), 50-59yrs (10.7%) and ≥ 60 yrs (3.7%). Nearly all the participants were educated (99.28%), with basic (41.7%) and post-basic (58.3%) education. 67.7% of the participants were working, while 32.3% were not working. The most frequently used mask was disposable surgical mask (85.6%), with other masks such as cotton, Ankara, N95 and polyester/silk at 5.7%, 3.4%, 2.8% and 2.2% respectively. The most common stress symptoms associated with face masking included uneasiness to eat and drink (71%), stuffiness (43.3%), communication barrier (39.6%) and breathlessness

(38.6%). The least experienced stress symptoms were fatigue (22.6%), skin irritation (21.6%) and headache (15.7%). Significant association existed between mask type and stress indices such as headache ($P < 0.01$), tightness ($P < 0.01$) and general discomfort ($P < 0.01$). Disposable Surgical mask was the most used among Lagos residents during the pandemic, more people were generally uncomfortable, with no age/gender-related associated discomfort.

Keywords: face mask, discomfort, covid-19, age, gender

SULFASALAZINE PROTECTS AGAINST THE WORSENING EFFECT OF ROTENONE ON LIVER AND COLONIC DAMAGE IN ACETIC ACID INDUCED COLITIS IN RATS

Sobanke A.O.^{1, 2}, Odukanmi A.O.¹, Salami A.T.¹, Olaleye S.B.^{1*}

1 Department of Physiology, Gastrointestinal Unit, Faculty of Basic Medical Sciences, College of Medicine, University of Ibadan, Ibadan, Nigeria

2 Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Nnamdi Azikiwe University Awka, Nnewi campus, Nigeria

Drugs used to treat colonic inflammation have been mentioned as possibly having an impact on Parkinson's disease (PD) since scientific data show PD associated neuroinflammation is driven by the inflammation of the colon. This study examines the effect of rotenone and sulfasalazine on liver enzymes and colon of rats with colitis. Adult male Wistar rats were randomly divided into five. Group A (control) received a vehicle, Group B received rotenone only. Groups C and D were given 1ml of 4% acetic acid intrarectally to induce colitis, after which Groups D and E were administered 500mg/kg sulfasalazine orally for 14 days, either after colitis induction or alone respectively. Administration of intraperitoneal infusion of 2.5 mg/kg rotenone commenced for groups B to E by day 7 of sulfasalazine treatment for 14 days. Rats were sacrificed on days 7, 14 and 21. Blood samples were collected for liver enzyme determination and the distal colon was taken for biochemical analysis of oxidative stress markers. By day 14 rotenone increased liver enzymes (ALP and ALT), colon myeloperoxidase (ng/mg protein): 213.11 ± 80.9 , 167.33 ± 14.8 in groups B and C compared to control (99.3 ± 26.4). Superoxide dismutase (mmol/mg protein) decreased in groups B to E 21.62 ± 1.23 ; 18.73 ± 0.82 ; 17.37 ± 0.90 ; 20.90 ± 0.10 respectively compared with control (27.81 ± 0.82) ($P < 0.001$). There were decreases in reduced glutathione ($P < 0.05$), sulfhydryl level and Na^+/K^+ ATPase activity in the colonic samples of groups B and C compared to the control. Sulfasalazine lowered MPO, boosted colonic levels of the antioxidant enzymes and the pump activity and also decreased liver enzymes when compared with the control thereby ameliorated rotenone effect. The anti-oxidant and anti-inflammatory properties of sulfasalazine may be responsible for the observed protection which could be helpful in preventing the development of Parkinson's disease.

Keywords

Sulfasalazine, colon inflammation, rotenone, liver enzymes

MODULATORY EFFECTS OF CONCURRENT TREATMENT OF CANNABIDIOL (CBD) ON GLUCOSE AND LIPID METABOLISM IN RITONAVIR AND HIGH FAT DIET TREATED ADULT MALE ALBINO WISTAR RATS

Mofolorunso Adekunle M¹, Uwah Chimdindu E¹, Okwute Patrick G¹, Olawuyi H¹, Nabofa EW¹

¹Department of Physiology, School of Basic Medical Sciences, Babcock University, Ilishan Remo, Ogun State, Nigeria.

HIV-related lipodystrophies are the most common form of lipodystrophy affecting up to 50 % of HIV patients, owing to the use of protease inhibitors in HIV treatment. Cannabidiol (CBD) has been reported to positively affect metabolic and nervous functions; it is however not clear whether CBD can ameliorate the lipodystrophic effects induced by protease inhibitor (PI). The present study was thus designed to evaluate the modulatory effects of 2 weeks concurrent treatment of CBD on lipid and glucose metabolism in protease inhibited adult male albino Wistar rats. Adult male wistar rats weighing 180-200 g were divided into five groups (n=7). Group 1 animals served as control and were untreated. Group 2-5 were treated with protease inhibitor and high fat diet (HFD) for 2 weeks. Concurrent treatment of apple cider vinegar (0.8 mg/Kg), CBD (10 and 25 mg/kg) were administered to groups 3-5 animals respectively. Glucose and lipid metabolic parameters (such as OGTT, ITT, lipid profile and fasting serum insulin levels), hepatic oxidative stress markers, liver function test and hepatic leptin/JAK 2 expressions were determined. 2 weeks treatment of rats with ritonavir and HFD caused lipodystrophy like symptoms evidenced by hepatic steatosis, hypercholesteremia, impaired liver function, high glucose intolerance and reduced insulin sensitivity. Concurrent treatment of animals with CBD mitigated the ritonavir and HFD induced alteration in glucose and cholesterol metabolism which was associated with improved insulin response and increase in hepatic leptin expression. The beneficial effects of CBD treatment on lipodystrophy appears to involve the suppression in the c-Jun N-terminal kinase (JNK) pathway as animals treated with CBD in the present study had lowered lipid peroxidation and decreased JAK-2 hepatic expression.

Keywords: Lipodystrophy, Metabolism, Cannabidiol, JAK-2 pathway

MITIGATING EFFECT OF SULFASALAZINE ON ULCERATIVE COLITIS TRIGGERED OXIDATIVE STRESS IN REGIONS OF RAT BRAIN.

Sobanke A.O.^{1, 2}, Salami A.T.¹, Odukanmi A.O.¹, Olaleye S.B.^{1*}

¹Department of Physiology, Gastrointestinal Unit, Faculty of Basic Medical Sciences, College of Medicine, University of Ibadan, Ibadan, Nigeria ² Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Nnamdi Azikiwe University Awka, Nnewi campus, Nigeria

Ulcerative colitis is a gastrointestinal dysfunction believed to cause inflammation in the brain in a caudo-cranial fashion. This study investigated the effect of acetic acid (AA) induced colitis and sulfasalazine treatment on

biomarkers of oxidative stress in regions of rat brain. Male Wistar rats with the average weight of 140g were randomly divided into four groups. Group A (control) was given normal saline, groups B and C were induced with colitis by single intrarectal administration of 1ml of 4% AA. Group C and D were treated with 500mg/kg sulfasalazine orally for 14 days either after colitis induction or alone respectively. On day 3, 7, 14 and 21 after colitis induction, rats were sacrificed with the brain removed for gross examination while indicators of oxidative stress in the striatum, cortex and cerebellum of rat brains were assayed. Results showed colitis increased NO and H₂O₂ in the brain regions analysed all through the study while MDA significantly increased by day 14 except in the cerebellum. SOD, GSH and Na⁺/K⁺ ATPase activity decreased in the brain regions of the AA group compared with control. Sulfasalazine ameliorated the effects of colitis on the brain by dousing the pro-oxidant and stimulating the anti-oxidant enzymes. Colitis triggered prolonged oxidative stress in the brain which suggests the effect of gastrointestinal inflammation goes beyond peripheral effect. Sulfasalazine protected the brain against the effect of colitis.

Keyword: Acetic acid, Colitis, inflammation, brain, sulfasalazine

METHANOL EXTRACT OF PARQUETINA NIGRESCENS (AFZEL.) BULLOCK LEAF (MEPL) AND SQUALENE AMELIORATE ARSENIC TRIOXIDE-INDUCED REPRODUCTIVE TOXICITY IN MALE WISTAR RATS

Daramola O.O.¹, Oyeyemi W.A.², Akinola A.O.³, Raji Y⁴.

¹Department of Physiology, Redeemer's University, Ede, Osun State, Nigeria, daramolaoore@run.edu.ng

²Department of Physiology, College of Health Sciences, Osun State University, Osogbo, Osun State, Nigeria, oyeyemiwahab@gmail.com

³Department of Physiology, Ondo University of Medical Sciences, Ondo City, Ondo State, Nigeria, aakinola@unimed.edu.ng

⁴Laboratory for Reproduction and Developmental Programming, Department of Physiology University of Ibadan, Ibadan, Oyo State, Nigeria, yoraji@yahoo.com

The concentration of arsenic in Nigeria's groundwater, which is the major source of drinking water is high. Arsenic causes male reproductive dysfunction by inducing oxidative stress. *Parquetina nigrescens* leaf, reported to have antioxidant property, is used in African traditional medicine to improve sexual performance. This study was designed to investigate and compare the effects of methanol extract of *Parquetina nigrescens* leaf (MEPL) and squalene on gonadal functions in arsenic trioxide-treated (As₂O₃) male Wistar rats. The MEPL and analytical grade squalene were used for the study. Forty male Wistar rats (150-180 g), divided into 8 groups (n=5), were treated orally for 54 days as follows: group 1 (10% tween 80), group 2 (3 mg/kg As₂O₃), group 3 (250 mg/kg MEPL), group 4 (500 mg/kg MEPL), group 5 (100 mg/kg squalene), group 6 (As₂O₃+250 mg/kg MEPL), group 7 (As₂O₃+500 mg/kg MEPL), group 8 (As₂O₃+100 mg/kg squalene). Epididymal sperm, testicular malondialdehyde, glutathione peroxidase, 17-beta hydroxysteroid dehydrogenase (17β-HSD), serum testosterone, 8-oxo-2-deoxyguanosine (8-OHdG), testicular Bax, Bcl-2

expression, and testicular tissues were evaluated. Data were analysed using ANOVA at $\alpha_{0.05}$. Sperm motility increased while the percentage of abnormal sperm morphology decreased in the As_2O_3 +250 mg/kg MEPL, As_2O_3 +500 mg/kg MEPL and As_2O_3 +squalene treated groups when compared with As_2O_3 group. Testosterone level, glutathione peroxidase, 17 β -HSD, and Bcl-2 expression decreased in As_2O_3 +250 mg/kg MEPL, As_2O_3 +500 mg/kg MEPL and As_2O_3 +squalene treated groups compared with As_2O_3 group. Atrophy of seminiferous tubules, depletion of germ cell layers, and absence of spermatozoa were observed in the As_2O_3 group, but not in groups co-treated with MEPL or squalene. Methanol extract of *Parquetina nigrescens* leaf and squalene ameliorated arsenic trioxide-induced gonadal toxicity via the prevention of cell death and oxidative stress in male rats.

Keywords: *Parquetina nigrescens*, Squalene, Testicular toxicity, Arsenic trioxide, Apoptosis

BODY WEIGHT PERCEPTION AND ITS RELATIONSHIP WITH ANTHROPOMETRIC INDICES OF UNDERGRADUATE STUDENTS IN PORT HARCOURT, NIGERIA

Onyebuchi Obia¹, Nsanowaji Isaac Meloh², Udodiri Obia² and Edith Reuben¹

1. Department of Human Physiology, faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nkpulu-Oroworukwo, Port Harcourt, Nigeria.

2. Department of Human Physiology, faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Nigeria.

Corresponding author's e-mail;

onyebuchi.obia@uniport.edu.ng

Influence from the media has increased the consciousness of young adults about their body weight and size. The aim of the present study was to evaluate body weight perception and its relationship with anthropometric indices of undergraduate students in Port Harcourt. The study involved a total of 600 undergraduate students aged 18-35 years (including 249 males and 351 females). Body weight perception was assessed using a structured questionnaire. The anthropometric indices (body mass index, waist, hip and shoulder circumferences and foot length) of each subject were measured using standard methods while the ratios were calculated. The average BMI of undergraduates was $23.66 \pm 0.13 \text{ kg/m}^2$. There was no significant gender difference in BMI, hip circumference and foot length. Waist circumference and waist-to-hip ratio were significantly higher in males while waist-to-height ratio was significantly higher in females. There was significant correlation between BMI and hip circumference, shoulder circumference and waist circumference but no significant correlation exists between BMI and foot length. The actual incidence of obesity amongst undergraduates in Port Harcourt was 3.3% using the measured BMI even when only 1.5% perceived admitted being obese. The actual BMI classified overweight was 25.7% as against perceived overweight of 19.8%. Only 56.3% perceived themselves to be within the normal weight whereas up to 67.5% were actually normal weight. The actual incidence of underweight was 3.5% but as many as

VANADIUM MODULATES Na^+ - K^+ ATPase AND SODIUM-GLUCOSE-CO-TRANSPORTER ACTIVITIES IN NORMAL AND DIABETIC RATS. ^{1,2}Anifowose OF, ¹Salami AT, ¹Odukanmi OA, ¹Olaleye SB

¹Gastrointestinal Secretion and Inflammation Research Unit, Department of Physiology, University of Ibadan, Ibadan, Nigeria.

²Department of Physiology, Faculty of Basic Medical Sciences, Ajayi Crowther University, Oyo, Nigeria.

A major function of the gastrointestinal tract is transport of glucose across the membrane of small intestine via sodium-glucose-co-transporters (SGLT) in a process driven by Na^+ - K^+ ATPase. Diabetes is a disease of global concern, with uncontrolled gut glucose absorption, which is a major determinant. The production of α -glucosidase inhibitors targeted at reducing absorption of gut macronutrients has been beneficial though with little setbacks. Vanadium has been reported as a potential oral therapeutic adjunct in diabetic control but its mechanism of action on intestinal glucose uptake is unclear, which this study investigate in normal and diabetic rats. Thirty male wistar rats were divided to 6 groups (n=5): Group I served as negative control, II and III received 20mg/kg/p.o, and 40mg/kg/p.o of Na_2VO_3 respectively while the other groups were induced with diabetes (Streptozotocin, 65mg/kg/i.p) without (Group IV) and with exposure to 20mg/kg/p.o (Group V) and 40mg/kg/p.o (Group VI) of Na_2VO_3 for 8week. Body weight (measured daily), blood glucose level (BGL measured using glucose oxidase method), intestinal glucose absorption (measured using everted sac method), intestinal tissue Na^+ - K^+ ATPase pump activity (measured spectrophotometrically), expression of SGLT1/SLCA51 gene were analyzed using descriptive statistics and ANOVA at $\alpha_{0.05}$. Sodium-metavanadate significantly reduced body weight of Streptozotocin-induced-diabetic groups and BGL of both diabetic and normal rats. Rate of glucose absorption significantly decreased in Na_2VO_3 groups compared with negative-control and in the diabetic Na_2VO_3 groups compared with positive-control. Na^+ - K^+ ATPase activity was significantly decreased in 40mg/kg Na_2VO_3 group compared with negative-control and in diabetic+20 and 40mg/kg Na_2VO_3 groups compared with positive-control. Expression of intestinal SGLT1 was downregulated in Na_2VO_3 rats relative to positive-control. Vanadium treatment in normal and Streptozotocin-induced diabetes decreased blood glucose level and rate of glucose absorption

through inhibition of Na⁺-K⁺ATPase activities resulting in a decreased expression of intestinal SGLT1 gene.

Keywords: Sodium metavanadate (Na₂VO₃), Diabetes and Na⁺-K⁺ATPase activity, sodium-glucose-co-transporter 1 (SGLT1) expression

EFFECT OF GINGER (*ZINGIBER OFFICINALE*) AND MARIJUANA (*CANNABIS SATIVA*) ON FEAR AND ANXIETY IN SWISS MICE.

Bright I. Oworji¹, Chibuike Obiandu¹, Edith Reuben¹ and Adesua .C. Obiandu²

¹Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Rivers State, Nigeria.

²Senior Secondary Schools Board, Port Harcourt, Rivers State, Nigeria.

Corresponding author Email & phone number: obiandu.chibuike@ust.edu.ng; +2348130322139

The effects of consumption of powdered marijuana diet and ginger diet on fear and anxiety were studied using Swiss mice. The mice were randomly assigned into three groups. Group 1 served as control and was fed with normal rodent chow. Group 2 was fed with ginger diet (5g of powdered ginger mixed with 95g of rodent chow, making 5% of ginger diet) while group 3 was fed with marijuana diet (5g of powdered marijuana mixed with 95g of rodent chow, making 5% of marijuana diet). Feeding was allowed for 14 days before the experiment started. The animals had free access to their feeds and water. Food and water intake were measured daily. The Elevated Plus-Maze was used to assess fear and anxiety in the mice.

Results showed that 5g ginger diet had no significant effect on the animal behaviour in terms of time spent in the light and dark fields as well as the time spent in grooming while 5g marijuana diet significantly increased time spent in light and decreased time spent in dark and time spent grooming. These alterations in the marijuana group indicate a reduction in fear and anxiety. Consumption of 5% marijuana diet suppressed fear and anxiety in Swiss mice while consumption of 5g ginger did not affect fear and anxiety in these animals.

Keywords

Zingiber officinale (Ginger), *Cannabis sativa* (Marijuana), Fear and Anxiety.

ANTI-COLITIS POTENCIES OF POTASSIUM BROMATE (KBrO₃) AT THERAPEUTIC DOSE IS ASSOCIATED WITH HEPATOPROTECTION AND OSTEOHOMEOSTASIS

Salami A.T¹, Sivebukola, J.M¹, Owonikoko M¹, Akpamu U¹, And Olaleye S.B.¹

¹Gastrointestinal secretions and Inflammation Research Unit, Department of Physiology, University of Ibadan, Ibadan, Oyo state,

²Department of Physiology, Igbinedion University, Okada, Edo State, Nigeria.

³Department of Physiology, Federal University Oye-Ekiti, Ekiti, Nigeria.

Corresponding author: adeolathabitha@yahoo.com

Potassium bromate (KBrO₃) has been considered as a dose-dependent bifunctional compound but toxic at high doses.

Although, its anti-gastric ulcer healing has been reported, we recently showed that it ameliorated Crohn's colitis healing. In this multi-phased study, we evaluated the effect of KBrO₃ on osteological and hepatic functional changes as extra-intestinal organs associated with wound healing during Crohn's colitis.

60 male Wistar rats (180-200g) were divided into 6 groups (n=10), CON-control, CU-Crohn's colitis untreated, CV-Crohn's colitis treated with vitamin E, CK-Crohn's colitis + potassium bromate, CVK-Crohn's colitis + vitamin E + KBrO₃ and CS-Crohn's colitis + sulfasalazine. Rats were fasted for 24hours; thereafter, Crohn's colitis was induced by intra-rectal administration of NaOH. Colon weight and ulcer scores, Colon, liver and bones biochemical and histological analyses were also evaluated on days 3 and 7 post induction. Data were analysed using descriptive statistics, and significant at $p \leq 0.05$.

Colon weight, weight/length, ulcer score was significantly decreased in KBrO₃ group compared with CU. Liver malondialdehyde content was significantly decreased in KBrO₃ treated group compared with CU group, while the liver protein, glutathione, and nitric oxide level were significantly increased. A significant increase in the myeloid:erythroid ratio of the bone marrow in the (CVK) KBrO₃ and vitamin E treated groups compared to the untreated group. However, the histopathological analysis shows relative preservation of the colon mucosa in the CK and CVK groups both at days 3 and 7 compared with CU group. More so, there was normal sinusoid, hepatocyte morphology in the KBrO₃ treated groups when compared with the control.

Potassium bromate attenuated the adverse effect of increased liver oxidative stress, and reduced myeloid erythroid ratio in the bone marrow thereby enhancing immune response during crohn's colitis healing in male Wistar rats.

Key words:

Colitis, potassium bromate, hepatoprotection, osteohomeostasis, oxidative stress.

AGE-RELATED CHANGES IN PARIETAL CELL TURN-OVER AND APOPTOTIC CELL CLEARANCE DURING HEALING OF ACETIC-ACID-INDUCED GASTRIC ULCER

Akpamu U^{1,2}, Salami A.T¹, Odukanmi O.A¹, Olaleye S.B¹.

¹Gastrointestinal Secretions and Inflammation Research Unit, Department of Physiology, University of Ibadan, Ibadan, Oyo State.

²Department of Physiology, Federal University Oye-Ekiti, Ekiti State.

Corresponding: Akpamu U., E-mail: uwaifoah@yahoo.co.uk; Phone number: 08032770151

Ageing is associated with functional and structural mucosal defense defects and delayed gastric ulcer healing. Gastric parietal cells play an important role in gastric mucosal homeostasis as well as coordination of physiological repair. However, paucity of research exist on how gastric parietal cell turn over may affect gastric ulcer healing in different ages, hence this study.

Forty (40; n=10) male Wistar rats were divided into 4 groups based on their ages as 3-, 6-, 12- and 18-months old. Gastric

ulcer was induced using acetic acid (0.2mL of 30%) and the ulcerated stomachs were harvested after 3 and 7 days for macroscopic ulcer scoring, mucin content, histology and immunohistochemical expression of proliferating cell nuclei antigen (PCNA). Parietal and apoptotic cells were evaluated in the histology and used to compute percentage parietal cell turn-over and apoptotic cell clearance. The data were analysed using ANOVA at $p \leq 0.05$. The results showed decreasing gastric ulcer healing rate with ageing. There was a significant age-related decrease in gastric mucin content, percentage parietal cell turn over and percentage apoptotic cell clearance in the gastric ulcer margin. This correlated with decrease expression of PCNA in the ulcerated gastric mucosa with ageing. The delay in gastric ulcer healing with advancing age may be due to decreasing capacity of parietal cell turnover and apoptotic cell clearance with advancing age considering their significance in ulcer repair processes and cell proliferation.

Key words: Ageing, Ulcer healing, Parietal cell turn over, Apoptotic cell clearance, Proliferating Cell Nuclei Antigen (PCNA).

EFFECT OF MONOSODIUM GLUTAMATE (MSG) ON RENAL OXIDATIVE STRESS, TOXICITY AND HAEMATOLOGICAL PARAMETERS IN BREASTFEEDING WISTAR RATS

¹Emmanuel, N.S*, ¹Tanko, Y., ¹Bako I.G., ²Malgwi, I.S., ¹Muhammad, A. and ¹Umar, H.A

¹Department of Human Physiology, College of Medical Sciences, Faculty of Basic Medical Sciences, Ahmadu Bello University, Zaria, Kaduna, Nigeria.

²Department of Human Physiology, College of Medical Sciences, University of Maiduguri, Borno, Nigeria.

* nesolomon@yahoo.com; Tel: 08038722687

This study assessed kidney toxicity and alterations in haematological indices caused by monosodium glutamate (MSG). Twenty (20) breastfeeding Wistar rats were separated into four (4) groups of five animals each ($n=5$); the MSG groups received varying doses of MSG at 925 mg/kg, 1850 mg/kg, and 3700 mg/kg. The normal control group received 1 ml/kg of distilled water. Administration lasted for fourteen (14) days; all doses were given orally. At the end of the administration, all animals were sacrificed and blood was collected for haematological and some biochemical assessments. Kidney tissues were excised and homogenized for the assessment of renal oxidative stress biomarkers. Malondialdehyde (MDA) concentration increased significantly ($p < 0.05$) in all the MSG groups compared to the control. Antioxidant enzymes; superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) decreased significantly ($p < 0.05$) in MSG groups compared to control. There was also a significant ($p < 0.05$) decrease in the level of reduced glutathione (GSH) in

all the MSG groups compared to the control. Serum creatinine, total and conjugated bilirubin were significantly higher ($p < 0.05$) in all the MSG groups compared to the control. Red blood cells, White blood cells, mean corpuscular haemoglobin, mid-range absolute values, haemoglobin concentration and platelets were significantly reduced ($p < 0.05$) in the MSG groups compared to the control. However, mean corpuscular volume and granulocytes were significantly ($p < 0.05$) higher in the MSG groups compared to the control. In conclusion, oral administration of MSG at higher doses is detrimental to renal function and haematological indices during lactation.

Keywords:

Monosodium Glutamate, Renal, Toxicity, Haematological and Breastfeeding

EVALUATION OF RESPIRATORY SYMPTOMS AND WORK-RELATED FACTORS IN GRAIN MILLERS: CASE STUDY OF SABON-GARI, KADUNA.

Idris I.R.¹, Akor-Dewu M.B.¹, Umar A.A.², Bauchi Z.M.³, Akuyam S.A.⁴

¹Human physiology, ²Community Medicine, ³Human Anatomy, ⁴Chemical Pathology, Ahmadu Bello University Zaria, Nigeria.

rahmadm32@gmail.com, +234 8039504088

Grain millers are at high risk of developing respiratory symptoms due to contact with flour dust in their work environment. The study assessed respiratory symptoms and work-related factors among grain millers in Sabon-Gari Local Government, Kaduna. A descriptive cross-sectional study was conducted among 132 adult Grainmillers that were exposed to dust particles during milling process for at least one year. Grain millers with 1-10years of working experience constituted 40.2% of the participants, 45.6% of the grain millers worked for 7-12 hours per day. Up to 66.1% of the grain millers had cough, 25.2% wheezing, 50.4% shortness of breath, 25.2% chest tightness. Up to 30.7% of the millers had chronic chest problem, while 31.5% had chronic breathing problem. Grain millers that operated for up to 13-18 hours per day had the highest incidence of cough. There was a significant association between the operating hours and incidence of cough, chest tightness, chronic chest problems and chronic breathing problems. Grain millers with 1-10years of working experience had the highest incidence of cough and wheezing. A significant association between years of working experience and incidence of cough was observed. There was significant association between years of working experience and chronic chest problems and chronic breathing problems. The prevalence of respiratory symptoms among grain millers in the study area was high.