

ABSTRACTS OF THE PROCEEDINGS OF THE FORTY-SECOND ANNUAL SCIENTIFIC CONFERENCE OF THE PHYSIOLOGICAL SOCIETY OF NIGERIA

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ALTERED COGNITIVE FUNCTION IN PREGNANCY AND ALUMINUM CHLORIDE-INDUCED ALZHEIMER'S DISEASED FEMALE WISTAR RATS.

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Cognition has been observed to decline during pregnancy, a condition colloquially described as "baby/pregnancy brain." Like in pregnancy, a decline in cognition is also a common feature amongst people with Alzheimer's disease. This research studied the cognitive functions in pregnancy, comparing them with aluminium chloride-induced Alzheimer's models to explore links between pregnancy and early-onset dementia. Estrus cycles of the animals were monitored and they were mated to achieve pregnancy. Also, calculated doses of aluminium chloride were injected intraperitoneal to a different group to induce Alzheimer's disease. Neurobehavioral studies were conducted for all the groups, and blood samples were collected for assay of reproductive hormones and cognition-related neurotransmitters. Results are presented as Mean±SEM. Student t-test and ANOVA were used to compare the means obtained and p-values of less than 0.05 were considered as statistically significant. Results obtained indicate a similar decline in cognition in both pregnant and Alzheimer's disease groups compared with controls. In conclusion, this study projects the need to be thoroughly decisive concerning childbearing in females with a family history of Alzheimer's disease, as pregnancy may be an early trigger for the cascade of reactions that culminate in early or late onset dementia.

Keywords: Cognition, Pregnancy, Aluminium chloride, Alzheimer's disease.

MODULATION OF KEY INFLAMMATORY GENE EXPRESSION IN THE UTERUS OF PREGNANT RATS FOLLOWING EDIBLE CLAY (CALABASH CHALK) INGESTION.

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Calabash chalk consumption is a common practice among individuals of African descent, particularly pregnant women and children, as it is culturally believed to satisfy cravings, support detoxification, and relieve morning sickness. This study investigated the gene expression of interleukin-6 (IL-6), tumour necrosis factor-alpha (TNF- α), and cyclooxygenase-2 (COX-2) in uterine tissue following oral

ingestion of edible clay during pregnancy. Seventy-five pregnant Wistar rats, separated into five groups and three subgroups (n = 5), representing gestational day (GD) 7, 14, and 20, were orally administered 2000 mg/kg (high dose), 1000 mg/kg (medium dose), and 500 mg/kg (low dose) of edible clay, distilled water (control) and lead acetate (15 mg/kg). Uterine tissues were harvested on GD7, 14 and 20, and gene expression of IL-6, TNF- α , and COX-2 was analyzed using real-time quantitative polymerase chain reaction (RT-PCR). Results revealed a significant decrease in the expression of IL-6, TNF- α and COX-2 genes across all doses of edible clay and lead acetate group for the IL-6 gene (p<0.05) at GD7. GD14 showed a significant increase in the expression of IL-6, TNF- α , and COX-2 genes of pregnant rats exposed to a medium dose of edible clay and lead acetate, but a significant decrease in the expression of the COX-2 gene of pregnant rats treated with high and low doses of edible clay (p<0.05). At GD20, there was a significant decrease in the expression of IL-6, COX-2, and TNF- α genes in the uterus of pregnant rats across all treatment groups compared with control (p<0.05). The observed downregulation indicates a weakened uterine immune signaling for implantation, pregnancy maintenance and parturition.

Keywords: Pregnancy, Edible clay, Uterus, Inflammatory genes, immune signalling.

ANTIPROLIFERATIVE EFFECT OF MARGARITARIA DISCOIDEA STEM BARK EXTRACT ON BENIGN PROSTATIC HYPERPLASIA IN RATS

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Age-associated benign prostatic hyperplasia (BPH) is a prevalent condition affecting a large percentage of men above the age of 50 years. Although BPH is a benign process, the fact that it often develops into malignant tumour (e.g., prostate carcinoma) makes it a condition that requires urgent attention. Presently, surgical, minimally invasive, and pharmacological interventions are the common available treatment options. Unfortunately, these available interventions have been associated with erectile dysfunction, male infertility and depression. Therefore, this study sought to explore the antiproliferative effect of aqueous extract of *M. discoidea* stem bark (AESBM) in a rat model of BPH. Twenty male rats were randomized into four groups (n=5) as follows: control, untreated BPH, finasteride-treated (5 mg/kg), and AESBM-treated (300 mg/kg) groups. BPH was

induced by subcutaneous injection of testosterone propionate (6 mg/kg) for 28 days, and AESBM was administered orally after BPH induction for 28 days. BPH induction was evident by the increased prostate weight, PSA, and testosterone levels. This was accompanied by a significant increase in IL-6, TNF- α , IL-1 β , NO, and caspase 3 and a decrease in enzymatic antioxidant activities. These events were associated with increased glandular and stromal hyperplasia within the prostate gland. Interestingly, these observed oxido-inflammatory-mediated apoptotic responses were abrogated in animals treated with AESBM. In fact, AESBM's ameliorative effects were comparable to those observed in animals treated with a standard drug (finasteride). Therefore, findings from this study established the efficacy of AESBM as a potential phytotherapeutic agent for BPH management.

Keywords: Antiproliferative, Benign Prostatic Hyperplasia, Inflammation, Oxidative stress, Phytotherapy

ASSESSMENT OF THE EFFECTS OF OMEGA-3 FATTY ACIDS ON TESTICULAR INTEGRITY IN METHAMPHETAMINE-EXPOSED WISTAR RATS

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Methamphetamine (MA) abuse poses a growing global health concern, with detrimental effects on male reproductive health often underemphasized. Notably, MA impairs testicular function, disrupting spermatogenesis and hormonal balance. Omega-3 fatty acids (Ω -3FAs), known for their anti-inflammatory and antioxidative properties, may offer protective benefits against such reproductive toxicity. Therefore, this study explored the modulatory effects of Ω -3FAs on testicular integrity in MA-exposed Wistar rats by assessing sperm quality, hormonal and steroidogenic profiles, oxidative stress markers, inflammatory cytokines, apoptotic indices, and histological architecture. Twenty adult male Wistar rats were randomized into four groups (n = 5): control (vehicle), MA (10 mg/kg), Ω -3FAs (300 mg/kg), and combined MA + Ω -3FAs. Treatments were administered orally for 60 days. On day 61, rats were euthanized, and biological samples were collected for comprehensive biochemical and histological analyses. MA exposure significantly reduced testicular and body weights, sperm count, motility, and viability while increasing sperm deformities. It also disrupted hormone levels, elevated oxidative stress (MDA, H₂O₂), inflammation (TNF- α , IL-1 β), and apoptosis (caspase-3, DNA fragmentation index), and led to adverse histological changes. Conversely, co-administration of Ω -3FAs significantly ameliorated these MA-induced alterations. Rats in the MA + Ω -3FAs group showed improved testicular and body weights, sperm parameters, hormone balance, and antioxidant enzyme levels. Furthermore, Ω -3FAs attenuated inflammatory and apoptotic markers and restored normal testicular histoarchitecture. In conclusion, Ω -3FAs exhibit significant protective effects against MA-induced testicular toxicity via antioxidant, anti-inflammatory, and anti-apoptotic pathways. Therefore, these findings underscore the therapeutic potential of Ω -3FAs in mitigating reproductive dysfunction associated with methamphetamine abuse.

Keywords: Infertility, Testicular toxicity, Oxidative stress, Apoptosis, Inflammation, Spermatogenesis, Antioxidants, Drug abuse, Methamphetamine, Omega-3 fatty acids.

CHLORPROMAZINE-INDUCED SEDATION: A STUDY OF THE DOPAMINERGIC MECHANISM UNDERLYING SLEEP AND LOCOMOTOR ACTIVITY IN WISTAR RAT.

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The dopaminergic system plays a vital role in regulating motor control, mood, cognition, and sleep. Dopamine antagonists such as chlorpromazine hydrochloride influence these functions by modulating dopaminergic neurotransmission. Acute administration of chlorpromazine has been shown to affect locomotor activity and sleep in rodents; limited research exists on its chronic effects. This study aims to investigate the effects of prolonged administration of chlorpromazine hydrochloride on locomotor activity and thiopental-induced sleep in Wistar rats. The objectives of the study are; to determine the effect on the onset time of sleep in rats following chronic doses of chlorpromazine hydrochloride, examine the effect on the duration of sleep in rats following chronic doses of chlorpromazine hydrochloride and evaluate the locomotor activity following the administration of chronic doses of chlorpromazine hydrochloride. Sixty healthy adult male albino Wistar rats were randomly divided into control and treatment groups. Animals were acclimatized for two weeks with free access to food and water. A stock solution of chlorpromazine hydrochloride was prepared by dissolving a known quantity of the drug into a known volume of physiological saline. Chlorpromazine hydrochloride was administered intraperitoneally at doses of 1, 3, and 10 mg/kg, either with thiopental sodium (40 mg/kg) for sleep studies or alone for locomotor assessments. The control groups received thiopental alone or normal saline. Sleep parameters (sleep latency and sleep duration) were recorded every three days for 21 days. Locomotor activity was assessed in an open-field apparatus, with observations repeated across the 21-day study period. Data were expressed as mean \pm SEM and analyzed using one-way ANOVA with Dunnett's multiple comparison test, with $p \leq 0.05$ considered statistically significant. The result showed that chronic administration of chlorpromazine hydrochloride significantly decreased sleep latency at 3 mg/kg (days 6 and 9) and 10 mg/kg (days 1, 3, 18, and 21). It also showed that sleep duration was significantly prolonged at 3 mg/kg (days 15, 18, 21) and 10 mg/kg (days 1, 3, 6, 21). These results demonstrate the potentiation of thiopental-induced sleep by chlorpromazine, consistent with its central nervous system-depressant effect. In locomotor studies, 1 mg/kg and 3 mg/kg doses showed no significant effects across the study period. However, 10 mg/kg caused a significant reduction in locomotor activity on days 2 and 3, followed by a significant increase on day 21. This late increase may suggest behavioral sensitization (reverse tolerance), likely due to receptor-level adaptations in dopaminergic signaling or may also have been an artifact. The findings of this study confirms that chlorpromazine hydrochloride enhances barbiturate-induced sleep in Wistar rats under chronic administration, supporting its sedative profile. The observed

reversal in locomotor suppression to increased activity after prolonged dosing indicates neuroadaptive changes, consistent with dopaminergic receptor sensitization. This aligns with previous evidence that dopamine D2 receptor antagonism initially reduces locomotor activity but may trigger compensatory excitatory responses with chronic exposure. In conclusion, chronic administration of chlorpromazine hydrochloride promotes thiopental-induced sleep and alters locomotor activity in Wistar rats. While low to moderate doses maintained sedative properties, prolonged high-dose administration induced behavioral sensitization, suggesting a potential dual central nervous system effect.

Keywords: *Chlorpromazine hydrochloride, dopaminergic system, thiopental-induced sleep, locomotor activity, Wistar rats, behavioral sensitization*

CURCUMIN MITIGATES THE DELAY IN PUBERTAL DEVELOPMENT AND ONSET OF PUBERTY OF THE OFFSPRING OF FOOD-RESTRICTED LACTATING WISTAR RATS

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Maternal food restriction (FR) affects puberty onset and contributes to the developmental programming of reproductive dysfunction in adulthood. Polyphenols such as Curcumin has been increasingly recognized in prevention and treatment of diseases. This study investigated the effects of Curcumin on pubertal development and puberty onset of the offspring of food-restricted lactating Wistar rats. Twenty five female Wistar rats were used for the study. At birth, the dams were then randomly assigned to five (5) groups of five (5) rats each. Group 1 (Normal control (100% Control diet), Group 2 (FR control (50% Control diet), Group 3 (25 mg/kg Curcumin +50% Control diet) Group 4 (50 mg/kg Curcumin +50% Control diet) and Group 5 (100 mg/kg Curcumin +50% Control diet). The administration commenced throughout lactation after which the offspring were weaned and placed on a standard diet until puberty onset. From PND 21, pups were monitored for balano-preputial separation and vaginal opening. At puberty onset, blood samples were collected from the offspring for the assay of leptin, ghrelin, reproductive hormones and oxidative stress markers. Offspring of Curcumin-treated groups showed a significant increase ($P < 0.05$) in food intake, body weight, leptin, reproductive hormones and antioxidant markers (CAT, SOD, GSH) and decreased ($P < 0.05$) ghrelin and MDA levels compared to FR control group. Curcumin administration significantly reduced ($P < 0.05$) the delay in puberty onset when compared with FR control. It was concluded that maternal consumption of Curcumin during lactation can mitigate the negative effects of food restriction on offspring by preventing the delay in puberty onset and development.

Keywords: *Food restriction, puberty onset, Curcumin, lactation, offspring*

NEUROPROTECTIVE EFFECTS OF N-HEXANE EXTRACT OF *Anacardium occidentale* NUT ON ACETIC ACID-INDUCED COLITIS-MEDIATED ANXIETY AND DEPRESSIVE-LIKE BEHAVIOUR IN WISTAR RATS

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Ulcerative colitis is a chronic inflammatory condition of the colon associated with oxidative stress, impaired antioxidant defenses, and mood disturbances. *Anacardium occidentale* possesses antioxidant and anti-inflammatory properties. This study investigated its neuroprotective effects on acetic acid-induced colitis in rats. Thirty rats were divided into six groups of five. Group 1 received saline, Group 2 acetic acid only, and Groups 3–5 varying doses of n-hexane extract of *A. occidentale* (25, 50, 100 mg/kg) for seven days before colitis induction. Group 6 received prednisolone (2 mg/kg) post-induction. Treatments continued for seven days, and behavioral tests—Open Field, Elevated Plus Maze, and Forced Swimming—were conducted. Biochemical assays assessed antioxidant (glutathione, catalase, GST) and oxidative stress markers (nitrites, malonaldehyde). Group 4 (50 mg/kg) showed enhanced locomotion, grooming, and greater time in the open arms, suggesting anxiolytic activity. Group 5 (100 mg/kg) displayed reduced immobility in the Forced Swimming Test, indicating antidepressant effects. Both extract-treated and prednisolone groups exhibited increased antioxidant levels and reduced oxidative markers compared to untreated colitis rats. The n-hexane extract of *Anacardium occidentale* attenuates anxiety and depressive-like behavior in ulcerative colitis through antioxidant enhancement and ROS suppression.

Keywords: *Anacardium occidentale, Colitis, n-hexane extract, Antidepressant*

MATERNAL VITAMIN E SUPPLEMENTATION PREVENTED THE DEVELOPMENT OF CARDIOVASCULAR DYSFUNCTIONS IN FEMALE OFFSPRING OF SLEEP-DEPRIVED WISTAR RAT DAMS

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Maternal sleep deprivation is known to negatively impact the cardiovascular health of offspring, primarily due to increased gestational oxidative stress. This study investigated the protective role of maternal vitamin E supplementation—a potent antioxidant—on cardiac function in female offspring of sleep-deprived pregnant Wistar rats. Twenty pregnant rats (120–150 g) were assigned into four groups from Gestation Day 1 (GD1): Control, Sleep-Deprived (SD), Vitamin E (200 mg/kg), and SD + Vitamin E. Sleep deprivation was induced from GD14 to GD20 for 20 hours daily using the Modified Multiple Platform Method, alongside concurrent vitamin E administration. Cardiovascular assessments were performed at Post-Natal Week (PNW) 25, and at PNW 26, biochemical and histological evaluations were conducted.

The SD group showed significant increases in body weight, heart rate, malondialdehyde, erythrocyte sedimentation rate, corticosterone, C-reactive protein, blood pressure, and mean arterial pressure. Antioxidant enzyme activities (superoxide dismutase, catalase, and glutathione peroxidase) were markedly reduced in this group. Vitamin E supplementation improved these enzyme levels and significantly attenuated blood pressure and inflammatory markers. Histology revealed mild myocardial inflammatory infiltration in both

SD and SD + Vitamin E groups. This study suggests that maternal vitamin E administration during late gestation may offer partial protection against prenatal sleep deprivation-induced cardiovascular dysfunctions—especially oxidative stress and hypertension—in female offspring.

VITAMIN D₃ MITIGATES MONOSODIUM GLUTAMATE-INDUCED TESTICULAR DYSFUNCTION AND SPERM DAMAGE IN RATS THROUGH ITS ANTIOXIDANT, ANTI-INFLAMMATORY, AND CALCIUM MOBILIZATION EFFECTS

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Western dietary habits have increased male exposure to monosodium glutamate (MSG), a common food additive linked to testicular and sperm dysfunction. This study explored vitamin D₃'s protective role against MSG-induced reproductive damage in male Wistar rats. Twenty rats (180–200 g) were divided into four groups: Vehicle control, MSG (150 mg/kg), vitamin D₃ (500 IU/kg), and MSG + vitamin D₃. Treatments were administered orally for 30 days. After sacrifice under anesthesia, the hormonal levels, oxidative stress markers, inflammation, apoptosis indicators, and sperm quality were evaluated using histological and biochemical methods. Statistical analysis was done using one-way ANOVA with Tukey's post hoc test (GraphPad Prism 10.3.0, $p < 0.05$). Vitamin D₃ significantly improved reproductive hormones (LH, FSH, testosterone), antioxidant enzyme activity (SOD, catalase, GST), sperm motility, viability, and Ca²⁺ ATPase function. It also reduced estradiol, MDA, TNF α , MPO, and caspase-3, indicating lower oxidative stress and inflammation. Histological damage from MSG was visibly reduced with vitamin D₃ co-treatment. Vitamin D₃ alleviates MSG-induced reproductive harm by improving biochemical and histological parameters. Further molecular studies are suggested.

Keywords: Monosodium glutamate, Vitamin D₃, Testicular functions, Sperm functions.

ANTIDEPRESSANT-LIKE AND ANXIOLYTIC-LIKE EFFECTS OF SESAME OIL IN MICE SUBJECTED TO OPEN-SPACE FORCED SWIM TEST

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Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest. This study investigated the effect of sesame oil on open-space forced swim-induced depression in mice. Thirty (30) apparently healthy Swiss albino mice (18–26 g), were assigned to six groups ($n=5$) and treated for 21 days. Group 1 received normal saline (NS) 10 ml/kg; Group 2 was subjected to open-space forced swim test (OSFST) + NS; Groups 3, 4, 5, and 6 were exposed to OSFST + Sesame oil 100, 200, 400 mg/kg, and fluoxetine 20 mg/kg, respectively. All administration of drugs was via oral gavage. At the end of 21 days, Neuro-behavioural assessments were carried out using sucrose preference test, open field test, Y-Maze, and NORT. The animals were sacrificed, and brain samples were obtained for serotonin levels assessment. All results were analyzed using ANOVA. Sesame oil (200 and 400 mg/kg) significantly decreased immobility time ($p < 0.05$) and increased sucrose preference ($p < 0.05$). Notably, sesame oil (100, 200, and 400 mg/kg) significantly increased serotonin levels in the brain ($p < 0.05$). In conclusion, the findings suggest that sesame oil may have antidepressant-like effects, with potential mechanisms involving modulation of serotonin levels and behavioural responses to stress.

ROLES OF PERIODIC ORTHOSTASIS ON THE ELECTROENCEPHALOGRAM IN YOUNG MALE INDIVIDUALS

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Monitoring brain waves through electroencephalography does not only help in prevention and treatment of diseases, but also provides information about physiological responses to physical changes. We investigated the effect of periodic orthostasis on the electroencephalogram. 30 of 40 male individuals recruited through respondent driven sampling who satisfied the inclusion criteria were selected for the study. The participants underwent orthostasis for 20 minutes at 10.00am, 2.00pm and 6.00pm respectively. Electroencephalogram was recorded using PowerLab 26T. On assumption of erect position, EEG recording was started and continued for 20 minutes during which the standing lasted. At the end of the 20th minute of standing, blood pressure and pulse rate were determined using standard procedures. Orthostasis in the morning caused significant increase and decrease in beta wave frequency and alpha/beta ratio when compared to afternoon respectively. Orthostatic baroreflex sensitivity was found to be significantly higher in the morning when compared to afternoon. However, there was no correlation between orthostatic alpha/beta ratio and orthostatic baroreflex sensitivity during morning, afternoon or evening. Morning orthostasis elicited increased cortical activity when compared to afternoon. Adequate attention should be given to the time of the day before the conduct of orthostatic tolerance test for the diagnosis of orthostatic hypotension, differentiation of the causes of syncope and evaluation of hypovolemia and autonomic dysfunctions.

Keywords: Orthostasis, Electroencephalogram, Baroreflex sensitivity, Alpha/beta ratio, Blood pressure

OC-D-9

INTEGRATING ARTIFICIAL INTELLIGENCE AND ENVIRONMENTAL PHYSIOLOGY TO PREDICT CLIMATE CHANGE IMPACT ON HEALTH IN NIGERIA

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Climate change presents significant health challenges, particularly in regions such as Nigeria where rising temperatures, extreme weather events, and environmental degradation are increasingly prevalent. Environmental physiology, which examines how variables such as temperature, humidity, and air quality affect human function, is critical for understanding these impacts. However, traditional research approaches often struggle to synthesise large, heterogeneous datasets, limiting their ability to generate timely, actionable insights.

This study applies artificial intelligence (AI), specifically machine learning and deep learning, to forecast climate change-related health risks. Multi-source datasets including meteorological records (temperature, humidity, rainfall, air quality), satellite observations, local health statistics (hospital admissions, disease incidence), and wearable physiological sensor data will be integrated. Rigorous data cleaning and ground-truth validation will ensure accuracy. Predictive models, such as neural networks and random forests, will be trained to identify complex relationships between environmental factors and physiological stress responses. Preliminary outcomes are expected to include spatial risk maps identifying health vulnerability hotspots and temporal forecasts for climate-sensitive disease outbreaks (e.g., malaria, heat-related illnesses). These tools will facilitate the development of early warning systems, guide targeted public health interventions, and inform policy measures, such as heat action plans and climate-resilient urban design. By integrating AI with environmental physiology, this work offers a scalable, data-driven approach to safeguard vulnerable populations, improve adaptive capacity, and support Nigeria's public health resilience in the face of climate change.

GLUCO-REGULATORY AND CHONDROPROTECTIVE EFFECTS OF MELATONIN IN DIABETES-OSTEOARTHRITIC MALE WISTAR RATS

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Type 2 diabetes mellitus (T2DM) is a chronic disorder with systemic metabolic abnormalities which influences the pathophysiology of osteoarthritis (OA) (He *et al.*, 2022). Melatonin (MEL), an endogenous hormone has anti-inflammatory, antioxidant, antiapoptotic and immunomodulatory effects. The present study is aimed to

examine the effect of melatonin on diabetes-osteoarthritic (DOA) male Wistar rats. Thirty male Wistar rats weighing 175-200 g were divided into five groups at random: control, sham, DOA, MEL and metformin groups. Fasting blood glucose was done before the rats were anaesthetised; OA was induced by injecting 2 mg of monoiodoacetate intra-articularly, while diabetes was induced by high-fat diet and streptozotocin (35 mg/kg). All drugs were administered orally. After 21 days of treatment, animals were anaesthetised; blood, synovial fluid and joint cartilage were collected for analysis. Data were analysed by one-way ANOVA at the $p < 0.05$ significance level. There was a significant increase in fasting blood glucose, insulin resistance, lipid profile, interleukin-1 β , tumor necrosis factor- α , caspase-3 levels and matrix metalloproteinase activity, and a significant decrease in catalase, superoxide dismutase and collagen type-2 in the DOA group compared to the control group. Also, immunohistochemical evaluation shows little expression of collagen type-2 in DOA group. However, administration of melatonin significantly reversed the trends. Melatonin improves gluco-regulatory and chondroprotective effects in the DOA Wistar rats via anti-inflammatory, antioxidant, and anti-apoptotic mechanisms. Therefore, melatonin could be used in the management of DOA.

Keywords: Melatonin; Weight; Lipid Profile; Fasting Blood Glucose; Apoptosis

EFFECT OF *ALLIUM SATIVUM* ON BLOOD GLUCOSE, TOTAL AND CONJUGATED BILIRUBIN, AND SERUM AMYLASE LEVELS IN WISTAR RATS

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Allium sativum (garlic) has been heavily employed in traditional medicine because of its hypoglycemic, hepatoprotective, and anti-inflammatory activities. Nevertheless, its specific actions on blood glucose levels, bilirubin metabolism, and pancreatic enzyme activity are not yet elucidated in detail. The objective of this work aimed at investigating the effects of ethanolic garlic extract on blood glucose level, total and conjugated bilirubin level, and serum amylase activity in Wistar rats. A total of 25 male Wistar rats after a 2 weeks acclimatization period were divided into five groups: a control and four treatment groups receiving 100 mg/kg, 250 mg/kg, 400 mg/kg, and 550 mg/kg BW of *Allium sativum* extract every two days for a four weeks administration period. Blood samples at the termination of the experiment were collected for biochemical analysis. The obtained data from all the groups were presented as Mean \pm S.E.M (Standard Error of Mean), (n=5) in each group and analyzed for statistical significance by using one-way Analysis of Variance (ANOVA). Values were considered significant at ($P \leq 0.05$). Blood glucose levels decreased significantly (** $p \leq 0.01$) in 250 mg/kg and 400 mg/kg groups, indicating a hypoglycemic effect. However, no significant change was observed in the 100 mg/kg and 550 mg/kg groups ($p > 0.05$). There was no significant difference ($p > 0.05$) in total and conjugated bilirubin levels, and serum

amylase activities. Conclusively, this study on the effect of *Allium sativum* demonstrated garlic's hypoglycemic potential at moderate doses.

Keywords: *Allium Sativum*, Glucose, Bilirubin, Serum Amylase, Wistar Rats.

MODULATORY EFFECTS OF CANNABIDIOL (CBD) OIL ON CIRCADIAN RHYTHM DISRUPTION IN PREGNANT SPRAGUE-DAWLEY DAMS.

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The suprachiasmatic nucleus (SCN) regulates circadian rhythms and responds to light cues. Disruption of circadian rhythm during pregnancy is linked to adverse maternal and fetal outcomes. While the endocannabinoid system modulates circadian rhythms, little is known about the effects of cannabidiol (CBD) oil during pregnancy. This study examined the modulatory role of CBD oil on light-induced circadian disruption in pregnant Sprague Dawley rats. Pregnant rats were randomized into five groups: (1) Control, (2) Constant Light (LL), (3) LL + CBD oil, (4) Constant Darkness (DD), and (5) DD + CBD oil, from gestational day 0 to 18. Parameters measured included daily food intake, weekly body weight, melatonin, Oxidative stress, and gene expression. Constant light increased gestational weight gain, indicating enhanced adiposity, while CBD reduced weight gain, particularly in the DD + CBD group. Lighting altered appetite, with DD increasing and LL reducing food intake. Melatonin was suppressed in LL and LL + CBD groups but elevated in DD and DD + CBD groups, suggesting CBD enhances melatonin signalling. LL + CBD group upregulated the expressions of CLOCK and BMAL1 genes. CBD oil was able to mitigate the adverse effects of circadian disruption in pregnancy by enhancing antioxidant defence, supporting melatonin secretion, and modulating circadian gene expression.

Keywords: Cannabinoid (CBD) Oil, Circadian rhythm, Melatonin, Pregnancy

SLEEP DEPRIVATION AGGRAVATE PLACENTAL OXIDATIVE STATUS AND ALTERS HAEMATOLOGICAL VARIABLES IN PREGNANT WISTAR RATS

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Prenatal sleep deprivation is associated with increased risk for preterm delivery and complications, partly due to burst in oxidative stress from increased placental mitochondrial activity and establishment of intervillous circulation. Studies linking this relationship is limited, hence, we evaluated how maternal sleep deprivation affect placental stress and

haematology in Wistar rats. Thirty pregnant Wistar rats (180g-200g) were assigned into six groups (n=5): control and sleep deprived (SD) subgroups for three Gestational periods/Days (GD1-7, GD8-14 and GD15-21). Sleep deprivation was by the multiple platform technique (20h/day for 7 days). The dams were euthanized on GD7, 14 and 21 respectively, after which the placentas were excised for biochemical studies and blood collected for haematological analysis. Haemoglobin level decreased significantly at GD15-21 (P<0.05), while WBC increased (P<0.0001) at GD8-14 and GD15-2, with concomitant increase in platelets (P<0.0001) at GD15-21 in the SD group. Lymphocytes increased (P<0.05) at GD1-7, whereas monocytes exhibited trimester-specific variation in SD rats, decreasing (P<0.05) at GD1-7 and increasing (P<0.05) at GD15-21. Eosinophils decrease (P<0.05) at GD15-21 in the SD. Placental SOD activity decreased (P<0.05) at GD1-7 while MDA levels increased (p<0.05) at GD1-7 and GD15-21 in SD, with no significant difference in catalase concentrations. Placental histology shows significant haemorrhage, disrupted cytoarchitecture of the frondosum layer and infiltration of inflammatory cells in SD. Maternal sleep deprivation worsens oxidative stress, impairs haematological functions and placental cytoarchitecture. This may adversely affect the mother and fetal health, with the potential to epigenetically program the fetus for increased susceptibility to chronic diseases later in life.

Keywords: Sleep deprivation, Pregnancy, Placenta, Oxidative stress, Haematology.

TIME-DEPENDENT EFFECTS OF ASCORBIC ACID AND α -TOCOPHEROL ON TOTAL WHITE BLOOD CELL COUNTS AND PLATELET INDICES, FOLLOWING LEAD ACETATE INDUCED IMMUNE TOXICITY IN MALE WISTAR RATS.

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The study was undertaken to establish the time-dependent effects of ascorbic acid and α -tocopherol on total white blood cell counts and platelet indices, following lead acetate induced immune toxicity in male wistar rats. 110 adult male wistar rats with an average body weight of 180 - 200g, were bought from the Animals house in Faculty of Basic Medical Sciences, University of Port Harcourt. The animals were acclimatized for two weeks and thereafter divided into 6 groups (groups 1 to 6). The study was carried out in 3 phases; acute (7 days), sub-chronic (30days) and chronic (60 days) phases. Group 1 represented the normal control and was given only distilled water and normal rat feed while the rest of the groups were orally given; group 2: 10 mg/kg body weight of lead acetate only, group 3: 200 mg/kg body weight of ascorbic acid only, group 4: 1000 iu/kg body weight of α -tocopherol only, group 5: 10 mg/kg of lead acetate + 200 mg/kg of ascorbic acid, group 6: 10 mg/kg of lead acetate + 1000 iu/kg of α -tocopherol respectively. At the expiration of the experimentation for each phase, five (5) rats were sacrificed and blood samples collected from each rat and examined for total white blood cell counts and differentials and platelet counts and indices. The results showed a significant decrease in the concentrations of the total white blood cell counts and differentials in the lead acetate group

with respect to the control indicating impaired immune functions, in all the phases. There was also a significant decrease in the concentrations of Plateletcrit (PCT) and Platelet count (PLT) and a significant increase in the concentrations of mean platelet volume (MPV), platelet distribution width (PDW) and Platelet large cell ratio (PLCR), all in the lead acetate group and in all the phases, with respect to the control group indicating their dysfunctions. However, there was significant increase in the concentrations of the total white blood cell counts in groups 5 and 6 with respect to lead acetate group indicating enhancement in the immune functions, across the phases. There was significant increase in the concentrations of (PCT) and (PLT) and a significant decrease in the concentrations of (MPV), (PDW) and (PLCR) in groups 5 to 6 with respect to lead acetate group indicating amelioration of the impaired functions across the phases. In conclusion, ascorbic acid and α -tocopherol demonstrated the ability to ameliorate the lead acetate induced immune toxicity on these parameters, in a time-dependant manner.

Keywords: Lead acetate, Ameliorate, total white blood cell counts and differentials, Platelet indices.

PERINATAL HIGH SALT EXPOSURE PROGRAMS HYPERTENSION AND OXIDATIVE STRESS IN ADULT OFFSPRING OF SPRAGUE-DAWLEY RATS

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Emerging evidence supports the concept that hypertension may have developmental origins, with perinatal environmental exposures such as maternal high salt intake implicated in the early programming of cardiovascular dysfunction. The heritability of salt sensitivity and the role of oxidative stress in vascular pathophysiology further strengthen this hypothesis. This study evaluated the effect of perinatal high salt exposure on blood pressure and oxidative stress markers in adult offspring. Pregnant Sprague-Dawley rats were assigned to either a normal salt (0.3% NaCl) or high salt (8% NaCl) diet throughout gestation and lactation. After weaning, the offspring were further maintained on either a normal or high salt diet until 14 weeks of age, forming four experimental groups. Systolic, diastolic, and mean arterial blood pressure were measured via femoral artery cannulation under IP anaesthesia with 25% urethane and 1% alpha-chloralose. Serum and urinary sodium and potassium concentrations were assessed, along with oxidative stress markers, including superoxide dismutase (SOD) activity and malondialdehyde (MDA) levels. Data were analyzed using one-way ANOVA with a significance threshold of $p < 0.05$. Offspring of high salt-fed dams exhibited significantly elevated mean arterial blood pressure even when maintained on a normal salt diet post-weaning. Although serum sodium levels were comparable across groups, urinary sodium and potassium excretion were higher in offspring exposed to post-weaning high salt diets. Offspring from high salt-fed dams also showed reduced SOD activity and elevated serum MDA concentrations, indicating heightened oxidative stress. These findings suggest that perinatal exposure to a maternal high salt diet predisposes offspring to adult-onset hypertension, potentially through mechanisms involving persistent oxidative stress. This supports the developmental

programming hypothesis and highlights the critical influence of maternal nutrition on long-term cardiovascular health.

Keywords: Perinatal programming, high salt diet, hypertension, oxidative stress, superoxide dismutase, malondialdehyde, developmental origins.

HAEMATORESTORATIVE EFFECTS OF CITRULLUS LANATUS JUICE IN PHENYLHYDRAZINE-INDUCED ANAEMIA IN SPRAGUE DAWLEY RATS

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Anaemia is a public health problem with a remarkable global impact, and haemolytic anaemia caused by oxidative erythrocyte damage poses a major concern. *Citrullus lanatus* (watermelon), known for its antioxidant and L-citrulline content, may support red blood cell recovery, yet its efficacy in haemolytic anaemic conditions appears to be remotely investigated. This study evaluated the haemorestorative potential of *C. lanatus* juice in phenylhydrazine-induced anaemia in male Sprague Dawley rats. Fifty rats were acclimatized for two weeks; five served as non-anaemic controls. The remaining forty-five were induced for haemolytic anaemia using phenylhydrazine hydrochloride and anaemia was confirmed by a packed cell volume (PCV) $\leq 20\%$. These were divided into three groups: distilled water (negative control), *C. lanatus* juice (10 ml/kg/day), and vitamin B complex plus folic acid (positive control). Treatments were administered orally for three weeks. Weekly, five rats per group were euthanized for haematological analysis using automated analyzer to assess RBC indices: RBC, HCT, HGB, MCV, MCH, MCHC, RDW-SD, and RDW-CV. Data were analyzed using one-way ANOVA ($p < 0.05$). By week one, all the anaemic groups showed significant reductions in red cell parameters when compared with the non-anaemic control. By weeks two and three, the *C. lanatus* group showed full restoration of erythrocyte indices, comparable to the vitamin-treated group ($p < 0.05$). These findings highlight the potential of *C. lanatus* juice as a natural, functional intervention in anaemia management. Follow-up study to ascertain the specific mechanisms is recommended.

Keywords: *Citrullus lanatus*; haemolytic anaemia; haematology; antioxidants; Sprague Dawley rats

INSUFFICIENT SLEEP MODEL AND MALE REPRODUCTIVE FUNCTION; THE ROLE OF CONCOMITANT ZINC SUPPLEMENTATION

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Insufficient sleep (IS) in today's society is gaining recognition as a public health concern, with increasing evidences that linked it to poorer health outcomes. Coincidentally, there is remarkable decline in fertility rates, in these industrialized societies which is believed to be due to lifestyle modifications. We therefore set up IS model of sleep deprivation (SD), to study its effects on male reproductive functions and the influence of concomitant Zinc supplementation on those effects. Twenty-four (24) male Wistar rats (aged 12- 14 weeks) were randomly grouped into three: Control, IS and ISZ models. IS and ISZ models were subjected to SD for 18 hours (07:00pm – 01:00pm next day) using Modified Multiple Platform Method (MMPM). The rats in ISZ model were given orally given Zinc sulphates (5mg/animal/day) while those in control and IS models were given distilled water (1ml/animal/day) daily for 56 days respectively. Sleep deprivation in IS model resulted in significant increase ($p<0.05$) in serum Corticosterone, testicular tissue MDA, serum FSH and significant decrease ($p<0.05$) in testicular tissue TAC, serum Testosterone, serum Estradiol, sperm count and percentage of sperm with active progressive motility compared to the control. On the other hand, concomitant Zinc supplementation (ISZ model) significantly ($p<0.05$) increases testicular tissue TAC, serum Estradiol and significantly ($p<0.05$) decreases testicular tissue MDA and serum FSH compared to the IS model. The IS model of SD deteriorates male reproductive functions, while concomitant Zinc supplementation ameliorates some of these functions.

Keywords: *Insufficient Sleep; Sleep Deprivation; Total Antioxidant Capacity;*

CASTRATION AND METFORMIN SYNERGISTICALLY REPRESS P16 SENEESCENCE ASSOCIATED GENE THROUGH P16 DNA HYPERMETHYLATION IN MALE PIGS

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P16 is a senescent-associated gene whose expression increases with age to reflect the rate of ageing at a molecular level. This study's aim was to investigate the combined effects of metformin and castration on P16 gene expression and DNA methylation. Twenty clinically healthy, young male pigs (51 ± 11.4 days old) from two paternal and five maternal bloodlines were randomly assigned into four equal experimental groups (n=5): Group-A: Control (saline), Group-B: Metformin-only, Group-C: Unilateral castration + Metformin, Group-D: Bilateral castration + Metformin. Treatment was administered orally, daily for 120 days at 25 mg/kg BW. Following sacrifice 24 hours after the final dose, blood and thymus samples were harvested for gene expression and DNA methylation analyses. Data were evaluated using one-way ANOVA and Tukey's multiple comparison test. $P<0.05$ was considered statistically significant. Metformin alone significantly down-regulated P16 gene both in the blood and thymus ($P<0.05$). Metformin and castration synergistically repressed P16 gene expression in the blood and thymus ($P<0.05$) with bilateral castration significantly more potent than unilateral castration

particularly in the blood. Metformin alone resulted to significant P16 DNA hypermethylation ($P<0.05$) suggesting a mechanism for its down-regulation. Metformin combined with unilateral castration resulted to further P16 DNA hypermethylation though not significantly ($P>0.05$). Bilateral castration with metformin significantly resulted to P16 DNA hypermethylation aligning with its gene repression. This study demonstrated a synergy between metformin and castration in down-regulating P16 gene in blood and thymus likely through P16 DNA hypermethylation with implications of improving ageing in male pigs.

AMELIORATIVE EFFECT OF *Solenostemon monostachyus* (African Dead Nettle) ON LIVER FUNCTIONS IN STZ-INDUCED DIABETIC RATS

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Diabetes mellitus is a widespread metabolic disorder causing systemic complications. *Solenostemon monostachyus* may improve hyperglycemia associated with diabetes, but there is a paucity of information on its effect on diabetes related liver dysfunctions. It becomes expedient to access its ability to not only ameliorate diabetes but also diabetes induced disorders on liver functions with emphasis on Bile secretion, Bile electrolytes and Liver enzymes. A total of twenty-five (25) Wistar rats grouped into five groups of 5 (five) rats weighing 110 – 200g were used. The first group was the control group (3ml of normal saline daily), the second group was the diabetic untreated (50mg/kg), the third group was administered metformin (200mg/kg), while the fourth and fifth groups were administered low dose (200mg/kg) and high dose (400mg/kg) of *S. monostachyus* extract respectively after STZ induction. The treatment lasted for 21 days. The result showed a significant ($P<0.05$) increase in the extract treated group compared to the control group on bile secretion. The results on the electrolytes showed a significant ($P<0.05$) increase in the extract treated groups compared to the control group except in the case of chloride ion concentration which showed a decrease in the extract treated groups. The result showed a significant ($P<0.05$) decrease in enzymes concentration in the extract treated groups compared to the untreated group. There was amelioration of hepatocytes and cytoplasmic granularity in the extract treated group. The results show that *S. monostachyus* may not have a significant ameliorative effect on liver damage.

EFFECTS OF PAPHONIN AND PHYCOCYANIN ON SOME BIOCHEMICAL PARAMETERS AND LIVER HISTOLOGY IN WISTAR RATS.

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Papain (from *Carica papaya*) and phycocyanin (from *Spirulina platensis*) are widely consumed food additives with digestive and antioxidant roles. However, their systemic impacts remain poorly understood. This study assessed the individual and combined effects of papain and phycocyanin on serum electrolytes, protein profile, lipid parameters, and liver histology in Wistar rats. 20 Male Wistar rats were divided into four groups and administered potable water and rat feed (control), papain (100 mg/kg), phycocyanin (200 mg/kg), or both papain + phycocyanin, orally for 28 days. After which the animals were sacrificed and blood samples were collected via cardiac puncture and analyzed for serum electrolytes- Na⁺, K⁺, Cl⁻, HCO₃⁻, serum proteins- total protein, albumin, globulin, Lipid profile- total cholesterol, triglycerides, HDL-c, LDL-c, and VLDL-c while Liver tissues were examined histologically using H&E and Masson's Trichrome stains. Papain treatment led to hyperkalemia, hypoproteinemia, altered lipid profile, and centrilobular hepatic damage. Phycocyanin significantly improved electrolyte and lipid indices and preserved hepatic architecture. Co-treatment attenuated papain-induced disruptions, showing intermediary effects between monotherapies. Papain may cause systemic and hepatic stress, whereas phycocyanin confers hepatoprotection. Co-administration offers a protective balance and supports phycocyanin's potential as a nutraceutical adjunct.

6''-O-ACETYLGENISTIN-RICH FRACTION OF TELFAIRIA OCCIDENTALIS ACTIVATES GLP-1 AND IRS2/PI3K/AKT/PDX1 PATHWAYS IN HIGH-FAT DIET/STREPTOZOTOCIN-INDUCED DIABETIC RATS

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Telfairia occidentalis (TO) is reported to have hypoglycaemic and antidiabetic potential, although the mechanisms remain unclear. This study evaluated the effect of 6''-O-Acetylgenistin-rich fraction of TO (AG) on insulin resistance, pancreatic β -cell function, and survival in type 2 diabetes (T2D). Thirty male Wistar rats (180 – 210 g) were randomly assigned to normal control (NC) and diabetic control (DC) groups, which received 1 mg/kg distilled water, while G5, AG100, AG200, and AG600 were high-fat diet/streptozotocin diabetic rats treated orally for 14 days with 5 mg/kg Glibenclamide, 100 mg/kg, 200 mg/kg, and 600 mg/kg AG, respectively. Serum, liver, and pancreas were evaluated for hormonal levels, histopathological changes, and protein expression. Results showed a significant ($p < 0.001$) reversal of elevated glucose and HOMA-IR in G5, AG100, and AG600, with a mitigating effect in AG200. Moreover, the reduced insulin sensitivity index (ISI) in untreated diabetic rats was markedly reversed in G5, AG100, and AG600, and mitigated in AG200. Similarly, the reduced HOMA- β was reversed in G5, AG100, and AG600. GLP-1 levels were elevated in rats treated with AG or Glibenclamide, while insulin levels increased in G5, AG100, and AG600. Reduced islet

cellularity was fully reversed in G5 and AG100, increased significantly in AG200, and showed a slight increase in AG600. Insulin- and PDX1-positive cells increased in G5, AG100, and AG600. All treatments triggered an increase in p-PI3K expression. G5, AG100, and AG600 also exhibited increased expression of p-IRS2 and p-Akt. AG potentially attenuates insulin resistance and β -cell dysfunction via GLP-1 and IRS2/PI3K/Akt/PDX1 pathways.

Keywords: *Telfairia occidentalis*; 6''-O-Acetylgenistin; insulin; IRS2; PI3K; Akt; PDX1

EFFECT OF PEPEROMIA PELLUCIDA (PEPPER ELDER) ON ELECTROCARDIOGRAM AND CARDIAC INFLAMMATORY MARKERS IN WISTAR RATS FOLLOWING ADRENALINE-INDUCED MYOCARDIAL INFARCTION

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Myocardial infarction (M.I), commonly called heart attack is a cardiovascular condition that occurs when the blood flow is decreased or terminated to a part of the heart, thereby resulting in damage to the heart muscle. A study shows that *P. pellucida* has an ameliorative effect on certain cardiovascular diseases. This present study was therefore targeted towards the Effect of *Peperomia pellucida* on the electrocardiogram and Cardiac inflammatory markers in albino Wistar rats following adrenaline-induced myocardial infarction. A total of twenty-five (25) *Wistar* rats grouped into five groups of 5 (five) rats weighing 110 – 200g were used. The first group was the control group, the second group was the adrenaline group (85mg/kg), the third group was administered the extract *P. pellucida*, while the fourth and fifth groups were administered adrenaline+extract and captopril (50mg/kg) respectively. The treatment lasted for 21 days. The result showed a significant ($P < 0.05$) decrease in R-R, P-R, Q-T and QRS complex of extract treated groups compared to the control but no significant difference in the R-T interval. The ECG tracings showed amelioration upon administration of the extract. The cardiac inflammatory markers, Interleukin 6 and C - reactive protein showed a significant ($P < 0.05$) decrease in all treated groups compared to the control. It is concluded that ethanolic extract of *P. Pellucida* has cardioprotective ability and is able to prevent myocardial injury induced by adrenaline toxicity, probably due to active phytochemicals present in the plant extract.

A SYSTEMATIC REVIEW EXPLORING THE ROLE OF KISSPEPTIN IN PROSTATE CANCER

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Prostate cancer (CAP) is the second most commonly diagnosed cancer and the leading cause of cancer-related death in men globally. The growth and progression are dependent on androgens, which are regulated by the hypothalamic-pituitary-testicular (HPT) axis. Kisspeptin (Kiss1), the endogenous ligand for the G protein-coupled KISS1 receptor (KISS1R; also known as GPR54), is crucial in regulating the HPT axis and has emerged as a significant player in prostate cancer. Nonetheless, available data in the literature is scanty. The present study is a systematic review of human and animal studies evaluating the role of Kiss1 in

CAP growth. This study was conducted in accordance with the PRISMA guidelines. After a pre-defined strategic protocol, 122 studies were screened, and 8 articles were identified as eligible for this study. The studies were observational (1), *in vitro* using human cell lines (2), randomized placebo-controlled (1), and animal studies (4). The expression of Kiss1 was downregulated in CAP cells. In addition, administration of Kiss1 analogue upregulated Kiss1 and KISS1R expression. Moreover, Kiss1 administration suppressed GnRH, LH, FSH, testosterone, and *Fsh* and *Lh* mRNA, demonstrating the suppressor effect of Kiss1 on the HPT axis. Also, Kiss1 administration reduced prostate tumor volume and prostate-specific antigen. Furthermore, Kiss1 administration downregulated *VEGF* mRNA and the migration and invasion of endothelial cells. This study reveals the role of Kiss1/Kiss1R signaling in incident CAP and its progression. Kiss1 suppresses prostate tumors by downregulating the HPT axis and *VEGF* mRNA.

Keywords: KISS1R; kisspeptin; malignancy; prostate cancer; testosterone; sex hormones