13th Annual Conference and General Meeting
of the Neuroscience Society of Nigeria (NSN)

ABUAD 2015

Book of Abstracts & Programme of Events

Theme: Nervous System Disorders: African Challenge

Date: Wed. 11th - Sat. 14th Nov. 2015

Venue:
College of Medicine and Health Sciences,
Afe Babalola University, Ado-Ekiti, Nigeria.

Sponsors: Afe Babalola University, Ado Ekiti, Nigeria.
NEUROSCIENCE SOCIETY OF NIGERIA (NSN) ABUAD 2015

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Founder, Afe Babalola University, Ado - Ekiti

Chief Host: Prof. M. O. Ajisafe  
Vice Chancellor, Afe Babalola University, Ado – Ekiti

Host: Prof. J. O. Sanya  
Provost, College of Medicine and Health Sciences

Guest Speakers: Prof. Richard E. Brown  
Psychology & Neuroscience, Dalhousie University, Canada

Prof. S. A. Asala  
Provost, College of Health Sciences, Uniabuja

Plenary Speakers: Prof. Sola Oginiyi  
Dept. of Neurology, University of Ibadan

Prof. Amadi Ihunwo  
Morphological Anatomical Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa.

Prof. Rabiu Magaji  
Dept. Physiology, Amodu Bellow University, Zaria

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Editors: Dr. O. B. Akinola

Dr. Moses Ekong

FINAL ORDER OF PROGRAMME

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<td>Arrival of guests/ Registration</td>
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### Opening Ceremony

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<td>Introduction of guests</td>
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<td>Opening Address and declaration of the conference open by the Chief Host</td>
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### 08h30 – 10h00

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<tr>
<td>Prof. Richard Brown, Prof. of Psychology and Neuroscience, Dalhousie University, Canada</td>
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<td>Prof. S. A. Asala, Provost College of Health Sciences, University of Abuja, Nigeria.</td>
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<td><em>Chairs: Prof. James Olopade</em></td>
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### 10h00 – 11h30

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<td>Dept. Physiology, Amodu Bellow University, Zaria</td>
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<tr>
<td><em>Chairs: Dr M.S Ajao</em></td>
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<tr>
<td>Neuroscience teaching and Research in Africa:</td>
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<td>A need for Improvisation and Collaboration</td>
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### 11h30 – 12h00

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<td><em>And Dr Moses Ekong</em></td>
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<td>Presentations 1001-1035</td>
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### 14h00 – 17h00

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<td>1st Scientific Session:</td>
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<td><em>And Dr Moses Ekong</em></td>
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<td>College 2 F31/32 and F33/34</td>
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<td></td>
<td>Speaker: Prof. A. Ogunniyi, Professor of Medicine (Neurology), College of Medicine, University of Ibadan, Nigeria</td>
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<td><em>Chair: Prof. Amadi Ihunwo</em></td>
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<td></td>
<td>Neuroscience research challenges in Nigeria; past, present and future.</td>
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<td>09h30 – 10h00</td>
<td><strong>Tea/Break</strong></td>
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<tr>
<td>10h00 – 11h00</td>
<td>Speaker: Prof. Amadi Ihunwo. Morphological Anatomical Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa.</td>
<td>College 2 Auditorium</td>
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<td><em>Chairs: Dr P.D Shallie</em></td>
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<td></td>
<td>Hippocampal Plasticity in Health and Diseases</td>
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<td>11h00 – 12h00</td>
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<tr>
<td>12h00 – 12h30</td>
<td>Prof Amadi Ihunwo, Editor- in- chief, Nigeria Journal of Neuroscience</td>
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<td>12h30 – 13h30</td>
<td><strong>AGM</strong></td>
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<td>14h30 – 18h00</td>
<td><strong>Trip to Ikogosi Warm Spring &amp; Arinta Water fall.</strong></td>
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1002 Comparative Assessment of Glibenclamide, Metformin and Insulin on the Cerebrum of Streptozotocin-Induced Diabetic Pregnant Wistar Rats and Foetus
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1003 Neuroprotective effects of the ethanol extract of *Terminalia ivorensis* (chevalier a.) Stem bark in ketamine-induced schizophrenia-like behaviours and oxidative damage in the brain of mice
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1004 Antinociceptive Effects of Caffeine and Lecithin in Sciatic Nerve Ligated Rats: Roles of Autonomic Receptors
   Owoyele Bamidele Victor¹, Tafu Tosin¹

1005 Sodium Azide-Induced Degenerative Changes in The Dorsolateral Prefrontal Cortex of Rats: Attenuating Mechanisms of Kolaviron
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1006 Cadmium Poisoning Effects on Brain Lateral Geniculate Body of Juvenile Male Wistar Rats and Ameliorative Properties of Moringa Oleifera Seed Oil and Walnut Oil Antioxidants
   Omotoso OD¹, Owolabi JO², Dare BJ¹

1007 Evaluation of Adaptogenic-Like Property of Methyl Jasmonate in Mice Exposed to Unpredictable Chronic Mild Stress
   Solomon Umukoro¹², Oritoke M. Aluko¹, Anthony T. Eduviere³, Olatunde Owoeye⁴

1008 Effects of Chlorpromazine on the Brain Waves
   Adebimpe-John Omolola¹ and Adeosun Isaac Olulayode²

1009 *Rauwolfia Vomitoria* and Gongronema Latifolium Combination Protects the Cerebellum
   Moses B. Ekong¹, Aniekan I. Peter¹, Ubong U. Ekpenye², Theresa B. Ekanem³

1010 Inhibitory effect of *Phragmanthera incana* (schum.) Harvested from cocoa (*Theobroma cacao*) and kolanut (*Cola nitida*) trees on Fe²⁺induced lipid oxidative stress in some rat tissues -In vitro
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1011 Involvement of Serotonergic and Noradrenergic Neurotransmission in Antidepressant-Like Activity of Tramadol® in Mice
   Anthony Taghogho EDUVIERE*, Olusegun Adebayo ADEOLUWA³ and Adaeze Ngozi ADEBESIN⁷

1012 Effects of Nicotine and Moringa Tea on Enzyme Activities in the Frontal Cortex of Female Wistar Rat

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1Olusegun Adebayo Adeoluwa, 1Anthony Taghgho Eduviere and 2Oyinye Gladys Agu

Antinociceptive Effect of Methanol Leaf Extract of Grewia Bicolor Juss in Mice

Lydia O. Ayanwuyi*, Aaron A. Kolo, Damilola K. Ibrahim, Saeed Odoma

Effect of Virgin Coconut-Oil On Amphetamine-Induced Stereotype Motor Behavior in Wistar Rats


Progesterone Ameliorates Trimethyltin Neurotoxicity in the Hippocampus of Adult Male Wistar Rats

Okesina A.A, Ajao M.S

Black Seed Oil Ameliorated Scopolamine-Induced Memory Dysfunction And Cortico-Hippocampal Neural Alterations in Male Wistar Rats


Effect of Ethanol Pulp Extract of Tamarindus Indica on the Cerebral Cortex During Prenatal Ethanol Exposure in Wistar Rats

Usman, I.M., Buraimoh, A.A., Ibegbu, A.O., Ivang, A.E., Yabo, J., Bakanso, I., Ecifu, B.E., Mansir, A.

Effect of Dietary Supplementation of Ginger and Turmeric Rhizomes on Ectonucleotidases, Adenosine Deaminase and Acetylcholinesterase Activities in Synaptosomes From the Cerebral Cortex of Hypertensive Rats

Ayodele Jacob Akinyemi*a,b,c*, Gustavo Roberto Thomeb, Ganiyu Obohc, Maria Rosa Schetinger Schetingerb

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1,2 Olabiyi A.A., Oboh G and 3Allismith R.O

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The Effect of Aqueous Leaf Extracts of Young Kola nitida on Some Antioxidative Enzymes in Streptozotocin-Induced Diabetic Rats

*Onikanni Sunday Amos1, Akintehinise Oluwatumise2, Fakanule Bayo3

Alzheimer’s Disease Drug Design: A Structure-Based Design of β-Amyloid Protein Inhibitors

1Olabiyi O, 1Frenzel D, 1Bartnik D, 1Glück JM, 1Brener O, 1Nagel-Steger L, 1Funke SA, 1Willbold D, 1Bogdan B, 1Strodel B.
Brain Antioxidant Markers, Cognitive Performance and Acetylcholinesterase Activity of Lipopolysaccharide Induced Mice: Efficacy Of Three Nigeria Plants
   Olatunji B.P*,1, Fasola T.R2, Onasanwo S.A3, Adeniyi P.A4, Ishola A.O4 and Akinyemi A.J5

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Progesterone an Antioxidant; Its Involvement in Oxidative Stress Produced By Trimethyltin in the Hippocampus of Adult Male Wistar Rats
   Okesina A.A, Ajao M.S, C.N.B Tagoe

FIRST SCIENTIFIC SECTION (HALL F33/34)

2001
Lower Formation of Median Nerve: A Report of A Cadaveric Case From Sokoto, Nigeria
   *A. D. Zagg, A. Bello, A. Aliu, S. S. Bello, M. A. Musa. T. Ammani, G. B. Marwana, B. O. Onimisi and J. D. Usman

2002
Round Shaped Sella Turcica In Nigerian Children: Any Clinical Significance?
   Usman JD1, Musa MA1*, Bello A1, Abdulhameed A1, Yunusa GH2

2003
Prevalence and pattern of Epilepsy and Schizophrenia among children and adolescent out patients in Benin City
   Chikezie, Uzoechi Eze1, Allagoa, Leonardo Erefagha2

2004
Evaluation of Neuro-Trace Elements Using Neutron Activation -1(Naa-1 ) On Mercury Induced Brain Damage of Adult Wistar Rats
   1A.A Sadeeq; A.O. Ibegbu; J. A Timbuak; IS El-ladan; HA Rilwan2L. H. Adamu; 3H.O Kwanashie

2005
Jobelyn® Attenuates Ketamine-Induced Experimental Psychosis in Mice
   Itivere Adrian Omogbiya1,2, Benneth Ben-azu1, Solomon Umukoro2, Adegbuyi O. Aderibigbe2

2006
Antipsychotic Property of Ethanol Extract Terminaliaivoreensis Stem Bark in Mice
   Ben-Azu Benneth *’, Adegbuyi Oladele Aderibigbe2, Olusegun Adebayo Adeoluwa2, Ezekiel Oluwagbenga Iwalewa2

2007
Effects of Methyl Jasmonate On Acute Stress Responses In Mice Subjected To Forced Swim and Anoxic Tests
   OritokeAluko, Solomon Umukoro, Annafi Olajide, Folashade A. Adewole, Osarume Omorogbe

2008
Oxidative Stress After Acute Exposure of Mice To Generator Exhaust Fumes
   *Kurawa, M.I.1, Magaji, R.A2

2009
Building Sustainable Neuroscience Capacity In Africa: The Role of Non-Profit Organizations
   Ansa Cobham1, Tommy Karikari2, Ilya Ndams3, Victor Fischer1, Agbor Cyril1

2010
Vulnerabilities In Alzheimer’s Disease: An Ethical Framework For The African Context
   Michael O.S. Afolabi
2011
Antidotal Effects of *Nigella sativa* oil On Acetaminophen Induced Neurotoxicity in the Cerebellum of Wistar Rats (*Rattus norvegicus*)

*Adana MY, WADA FO, Ayelegun K, Usman MT

2012
Impact of *Carica papaya* on Methotrexate-Induced Neurotoxicity

1Mbagwu Smart I., 1Arji Aloysius O., 2Igwe Nancy P.

2013
Mobile-Based Expert Systems For Diagnosis and Therapy of Multiple Sclerosis

Olatunji K. A.

2014
Perception and Practices of Nurses and Community Health Workers Regarding Child and Adolescent Mental Health in Ado and Irepodun/Ifelodun Areas, Ekiti State, Nigeria

Akinyemi, Elizabeth O.

2015
Neuronal Network Models of Epileptogenesis: A review

Aminu T. Abdullahi1, Magaji G. Taura2, and *Lawan H. Adamu2

2016
Approaches To Understanding Mechanisms Between Environmental Chemical Exposure and Brain Development

Andrew Ewanlen, Surname: Aigbedion; Samuel Adetunji, Onasanwo. Harrison Bejakhalu, Ejiya; Abodunrin Adebayo, Ojetola.

SECOND SCIENTIFIC SECTION (HALL F31/32)

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Caffeinated Energy Drink Increase Nissl Granulations and Proliferation of Astrocytes in frontal cortex of Adult Male Wistar Rats

Memudu, Adejoke E1*, Akinrinade, Ibukun D1, Dada, Philip A1 and Ogundele, Olalekan M2

3002
Stereological Studies of the Olfactory Bulbs of African Giant Rats (*Cricetomys Gambianus*, Waterhouse -1840)

Musa1, 4, S. A., Hambolu2, J. O., Ojo2, S. A., Adebisi1, S. S., Ayo1, J. O. and Nyengaard4, J. R.

3003
Cyto-Architectural Changes In Foetal Cerebellar Cortex of Rats Following Administration Of Aqueous Leaf Extract of *Ocimum gratissimum* In Utero

OgunrinolaK.Y.1,2Enaibe B. U.2 and Olajide O. J.2

3004
Teratogenic Effect of Artesunate on Developing Olfactory Bulb of Wistar Rat Following Maternal Oral Administration

Musa, S. A., Kwado*, G.N., Mami, S. E., Evang, A., Nwankwo, M., Ibegbu, A.O

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Hippocampal Glial Degenerative Potentials of Mefloquine and Artequin in Adult Wistar Rats
*Nsikan-Abasi B. Udoh*, Theresa B. Ekanem, Moses B. Ekong, Aniekan Peter and Amabe O. Akpantah

Cannabis Sativa and the Expression of Glial Fibrillary Acidic Protein (Gfap) in the Rat Hippocampal Astrocytes

Oxidative Stress Does Not Predispose Neuronal Cells To Changes In G Protein Coupled Receptor Gene Expression In Cortical B50 Neurons In Culture
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Oxidative Stress Induced Effects On Neuronal Viability In Culture
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Immunohistochemical Assessment of the Cerebrum Following Consumption of Ethanolic Stem Extract And Juice Of Costus Afer Plant in Wistar Rats
Akpantah, Amabe. O.; Akpan, Ubon; Eluwa, Mekutima A.; Isamoh, Theresa. E.; Udonkang, Mfon; Ekanem, Theresa. B.

A Study on the Effects of Ethanolic Extract and Stem Juice of Costus Afer on the Neurohistology of the Cerebellum
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Histological study on the effect of aqueous fruit extract of phoenix dactylifera (date palm) l. On mercury–induced cerebral and hippocampal damage in Adult Wistar rats

The Effects of Monosodium Glutamate on the Histology Of Cerebral Cortex Of African Giant Rats (Cricetomysgambianus, Waterhouse 1840)
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Histological Impacts of Garlic on the Frontal Cerebral Cortex of Albino Wistar Rats
Folarin RO*, Omotoso GO*, Alliu AK*, Ibrahim RB*, Onanuga IO*

Morphological And Histological Studies of Artesunate on the Developing Cerebral Cortex of Wistar Rat Foetuses
Ivang, Andrew E; Samuel, E. Mami; Ibegbu, A.O

Some Effects of Crude Aqueous Extract Of Datura Metel Leaf and Vitamin C on the Histology of the Cerebrum of Adult Male Wistar Rats (Rattusnovergicus)
Ashamu E. A., Adefemi A. R., Oyeniran D. A., Adelakun S. A

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*Lewu F.S., Enaibe, B.U.

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Jobelyn® Prevents and Reverses the Schizophrenia-like Behaviour and Oxidative Damage Induced by Ketamine in Mice  
Iitésere Adrian Omogbiya¹², Benneth Ben-azu², Solomon Umukoro², Adegbuyi O. Aderibigbe², Kingsley Enokeran²

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Neurobehavioural Study of Female Wistar Rats Treated With Combined Oral Contraceptive Pills Using Morris Water Maze Test  
Nwakanma A.A.¹, Ekanem T.B.², Chuks O.V.³, Eluwa M.A.², Ekong M.B.⁴, O kafor I.J.¹

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*Salaudeen, A.D and Owoyele, B.V.

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Oluwafemi Gabriel Oluwole¹, Solomon Umukoro¹, Egbewunmi Henry¹, Anthony T. Eduviere², Itiviere Andrea³

4009
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"Yarube, I.U., Ayo, J.O., Magaji, R.A. and Umar, I.A.

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Muonagolu Ngozi J, Ekong Moses B, Mfon Ekpo M

4012
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O. M. Ochayi, A. B. Adelaiye and J. O. Ayo

4013
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FIRST SCIENTIFIC SECTION (HALL F31/32)
Characterization of Prefrontal Cortex Microstructure and Antioxidant Status in an Alzheimer’s-Diabetes Rat Model Induced by Aluminium Chloride and Multiple Low-Dose Streptozotocin

Rianat A. Adediran¹, Kehinde A. Adeniye¹, Fatimah C. Abdulquadir¹, Sikiru A. Biliaminu², Oluwole B. Akinola*¹
¹Department of Anatomy, and ²Chemical Pathology and Immunology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Ilorin, Nigeria.
*Author for correspondence: Dr. Akinola O. B.
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Abstract
Diabetes mellitus (DM) and Alzheimer’s disease (AD) do co-exist in several subjects. Most non-transgenic animal models of AD make use of oral treatment with aluminium chloride (AlCl₃) to induce neurodegeneration; besides, streptozotocin (STZ) can induce features of either AD or DM depending on the mode of treatment. The aim of this study was to characterize prefrontal microanatomy and antioxidant defence system in a rat model of AD with DM co-morbidity. Adult Wistar rats were randomly assigned to receive either intraperitoneal STZ (30 mg/kg/day for 3 days; to induce DM), oral AlCl₃ (500 mg/kg/day for 4 weeks; to induce AD); or both STZ and AlCl₃ (to induce AD with DM co-morbidity). Untreated rats served as controls. Blood glucose was evaluated during treatment. At euthanasia, prefrontal cortex was homogenized in PBS and the supernatants assayed for antioxidant enzymes (catalase, CAT; superoxide dismutase, SOD) and reduced glutathione (GSH). Moreover, prefrontal cortices were processed by the H&E or Congo red technique. In rats co-administered AlCl₃ and STZ (AD+DM rats), prefrontal levels of GSH reduced significantly (p<0.05), while reductions in SOD and CAT were not significant (p>0.05) compared with the controls. Moreover, AD+DM rats, extensive neuronal cell loss was observed in the prefrontal cortex, but Congophilic deposits were not present. The neurodegenerative lesions and antioxidant deficits characteristic of this AlCl₃+STZ (AD+DM) rat model were more pronounced than similar lesions associated with mono-treatment with either STZ (DM) or AlCl₃ (AD) alone. The AlCl₃+STZ rat model could serve as a suitable option for the study of neurodegenerative diseases (such as Alzheimer’s disease) with DM co-morbidity.

Key words: Alzheimer’s disease, diabetes mellitus, aluminium chloride, streptozotocin, antioxidants, prefrontal cortex

Comparative Assessment of Glibenclamide, Metformin and Insulin on the Cerebrum of Streptozotocin-Induced Diabetic Pregnant Wistar Rats and Foetus

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Abstract
This study aimed to determine the effects of glibenclamide, metformin and insulin on the cerebrum of Streptozotocin-induced diabetic pregnant Wistar rats and foetus. Thirty-five pregnant Wistar rats weighing 13th NSN NEUROSCIENCE CONFERENCE@ABUAD 2015
between 120g and 160g were used and randomly assigned to five groups: control group (A) was subdivided into four subgroups which received distilled water, vehicle of streptozotocin, insulin, metformin or glibenclamide. The streptozotocin-diabetic group was subdivided into four subgroups: untreated (B), insulin (C), metformin (D) or glibenclamide (E). Measurement of body weight and blood glucose was done. Histological examination of the maternal and foetal cerebrum was done after 19 days of treatment. There was significant reduction in blood glucose in rats treated with either glibenclamide or insulin compared with metformin-treated diabetic rats. There was no significant difference in body weights metformin-treated diabetic rats compared with insulin-treated diabetic rats but a negligible weight loss in glibenclamide-treated diabetic rats. Histological examination of diabetic cerebrum treated with either insulin or metformin showed reactive gliosis compared with glibenclamide group. There were no foetuses in the glibenclamide group. This data suggest glibenclamide as a factor inhibiting conception.

Keywords: Glibenclamide, metformin, insulin, cerebrum, streptozotocin, diabetes.

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NEUROPROTECTIVE EFFECTS OF THE ETHANOL EXTRACT OF TERMINALIA IVORENSIS (Chevalier A.) STEM BARK IN KETAMINE-INDUCED SCHIZOPHRENIA-LIKE BEHAVIOURS AND OXIDATIVE DAMAGE IN THE BRAIN OF MICE

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Abstract
Schizophrenia is a heterogenous chronic neurological disease characterized by severe behavioural perturbations. Several neurochemicals have been implicated in this disease; however the evidences derived from the central changes in oxidative defense system suggest the implication of oxidative stress in the pathophysiology of schizophrenia. In fact, the increasing body of evidence supports the claim that severity of symptoms of schizophrenia is dependent on the antioxidant levels. *Terminalia ivorensis* is an indigenous plant. Preliminary evidences from animal models predictive of human psychosis suggest that *T. ivorensis* possess antipsychotic-like activity in mice. Therefore, this study was designed to investigate the neuroprotective property of the ethanol extract of *T. ivorensis* stem bark (EETI) in the reversal treatment of ketamine-induced schizophrenia-like behaviours and oxidative damage in mice as an animal model predictive of human psychosis and oxidative stress. In the reversal protocol, animals received distilled water (10 mL/kg) or ketamine (20 mg/kg) once daily intraperitoneally (i.p.) for 14 days, and from the 8th to the 14th day, they were treated with EETI (125, 250 or 500 mg/kg), risperidone (0.5 mg/kg) or vehicle (10 mL/kg) treatment orally once daily. Behaviours related to positive (locomotor activity) and cognitive (Y-maze) symptoms of schizophrenia were also assessed. Glutathione (GSH), superoxide dismutase (SOD), catalase (CAT), protein levels and lipid peroxidation product (malondialdehyde, MDA) were measured in the whole brain using standard biochemical procedures. EETI (125, 250 or 500 mg/kg, p.o.) and risperidone reversed ketamine-induced behavioural perturbations, and oxidative alterations (i.e., ketamine-induced decrease in GSH, SOD, CAT, and increase in MDA), respectively. These findings suggest that EETI elicits its antipsychotic-like properties acting via a neuroprotective (antioxidant) property as its probable compensatory mechanism of action, and may be relevant in the management of psychosis.

Keywords: Schizophrenia, Antipsychotics, Oxidative stress, *Terminalia ivorensis*

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ANTINOCICEPTIVE EFFECTS OF CAFFEINE AND LECITHIN IN SCIATIC NERVE LIGATED RATS: ROLES OF AUTONOMIC RECEPTORS

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Abstract
Neuropathic pain is a complex, chronic pain state that is usually accompanied by tissue injury. This study therefore sought to evaluate the effect of oral administration of lecithin and caffeine on hyperalgesia induced by sciatic nerve ligation in male Wistar rats weighing 150±10g and the effect of concurrent administration of autonomic nervous system blocking drugs. The rats were randomly grouped into two major groups and eleven subgroups (A-K). Group 1 (A-G) was used to investigate the antinociceptive effect of lecithin and caffeine while group 2 (H-K) was used to investigate the involvement of autonomic receptor. Rats were rendered neuropathic by unilateral sciatic nerve ligation (SNL). The antinociceptive effect of two weeks oral administration of lecithin (20mg/kg), caffeine (15mg/kg) and their combination at low (lecithin 10mg/kg + caffeine 7.5mg/kg) and high dose (lecithin 20mg/kg + caffeine 15mg/kg) were assessed using tail flick tests and hot plate test(30 and 60min) on the 3rd, 7th and 14th day after ligation. The results showed that lecithin alone, caffeine alone and co-administration of lecithin and caffeine significantly (p<0.05) suppressed the nociceptive responses caused by thermal hyperalgesia in sciatic nerve ligated rats as shown by increase paw and tail withdrawal latencies in the treated group compared to the untreated ligated group. The effects were however abolished by pre-treatment with intraperitoneal injection of atropine, hexamethonium and propranolol. These findings show that lecithin and caffeine has antinociceptive activity which may involve autonomic receptor mechanism. The findings suggest that co-administration of lecithin and caffeine might be useful for the treatment of neuropathic pain.

Keywords: Caffeine; hyperalgesia; neuropathic pain; lecithin; antinociceptive; antioxidant; rats.

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SODIUM AZIDE-INDUCED DEGENERATIVE CHANGES IN THE DORSOLATERAL PREFRONTAL CORTEX OF RATS: ATTENUATING MECHANISMS OF KOLAVIRON

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Abstract
Evolvement of therapeutic targets following neurodegeneration is of major biomedical importance. Kolaviron (Kv) is a biflavonoid complex isolated from seeds of Garcinia kola - a common oral masticatory nut in West Africa known to hold medicinal value. Therefore, this study evaluated the therapeutic potentials of Kv on cells of the dorsolateral prefrontal cortex (DLPFC), before or after sodium azide (NaN₃)-induced neurodegeneration. Rats were randomly assigned into 5 groups (6/group) and treated daily (orally) as follows: 1 ml of corn-oil (vehicle of Kv, 21 days); Kv only (200 mg/kg) for 21 days; NaN₃ only (20 mg/kg for 5 days); NaN₃ (20 mg/kg for 5 days) followed by Kv (200 mg/kg for 21 days); Kv (200 mg/kg for 21 days) followed by NaN₃ (20 mg/kg for 5 days). After treatments, rats were sacrificed and perfused transcardially (with 4% PFA) with brains fixed in specificity of techniques demonstrated. DLPFC was examined in histology (H&E), immunoperoxidase (GFAP), immunofluorescence (iNOS&nNOS) and western blotting (MAPT, MAP2, Bax, BCL-2 and CAD). Quantitative analysis was done using ImageJ software and
statistical analysis with Graphpad prism (ANOVA) at P<0.05. NaN3 treatment induced neuronal damage, characterized by reduced relative brain weight, pyknosis, karyorrhesis, astrogliosis, axonal/dendritic damages and cytoskeletal dysregulation that subsequently resulted in increased expressions of apoptotic regulatory proteins. These degenerative changes were relatable to the observed iNOS and nNOS upregulations. However, Kv administration attenuated the NaN3-initiated destructive molecular cascades in the DLPFC of rats through mechanisms that involved: modulation of stressor molecules and toxic proteins, prevention of stress related biochemical redox, preservation of neuronal integrity, cytoskeletal framework and subsequently, reduced the level of apoptotic regulatory proteins. We concluded that Kv conferred therapeutic benefits on NaN3-induced neurodegeneration especially when administered before than after the damage.

Key Words: Kolaviron; Sodium Azide; Neurodegeneration; Cytoskeleton; Prefrontal Cortex.

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CADMIUM POISONING EFFECTS ON BRAIN LATERAL GENICULATE BODY OF JUVENILE MALE WISTAR RATS AND AMELIORATIVE PROPERTIES OF MORINGA OLEIFERA SEED OIL AND WALNUT OIL ANTIOXIDANTS

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Abstract
Cadmium is a toxic heavy metal of special concern because it is non-degradable and therefore persistent. Cadmium could accumulate in brains; it induces oxidative stress in organisms possibly resulting in cellular damages in various organs including the brain. Moringa seed oil is rich in antioxidants including palmitoleic, oleic and linoleic acids; Vitamins A, B, C and E and unsaturated fatty acid. Moringa seed oil has also been said to aid neurological development in infants. Walnut seed oil has a high concentration of omega-3 fatty acids, vitamins and minerals; it also helps to protect body organs from free radical damage. This investigation examined the potentials of the oils to ameliorate the toxic effects of cadmium poisoning on the lateral geniculate body of the experimental animals. Thirty five male juvenile Wistar rats were divided into seven groups labelled A-G. Group A animals- Control- received daily 3ml of 0.9% w/v normal saline orally for three weeks; Group C also received only 5mg/kg bw Vitamin C and 6mg/kg bw Vitamin E to observe the sole effects of these antioxidants on normal brains. Other groups were given 2.5mg/kg 3CdSO4.8H2O intraperitoneally to induce cadmium poisoning; then exposed to the various regimens after 72 hours of cadmium injection. Group B animals received 3ml of 0.9% w/v normal saline- placebo; Group D animals received 6mg/kg body weight of Vitamin E and 5mg/kg body weight of Vitamin C after cadmium poisoning; Group E and F received 4mg/kg body weight of Moringa Oleifera Seed oil and 4ml/kg body weight of Walnut oil respectively while Group G received a combination of 2mg/kg body weight moringa oil and 2mg/kg body weight walnut oil. Post cadmium-toxicity treatments across the groups lasted three (3) weeks. Basic and Special Histological Staining Techniques as well as Immunohistochemical demonstrations of the tissues of the Lateral Geniculate Bodies of the animals show that cadmium toxicity would affect cellular morphology and spatial relationships, vital molecular expressions were also disrupted. When the antioxidant-rich oils were administered, the deleterious effects of. Antioxidant contents of moringa seed oil and walnut oil helped to ameliorate the morpho-pathological changes caused by the cadmium toxicity to the Lateral Geniculate Body of the rats’ brain.

Key Words: Cadmium, Lateral Geniculate, Body, Moringa, Walnut Oil
EVALUATION OF ADAPTOGENIC-LIKE PROPERTY OF METHYL JASMONATE IN MICE EXPOSED TO UNPREDICTABLE CHRONIC MILD STRESS

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Abstract
Adaptogens are naturally occurring compounds with multipronged mechanisms of action that are generally believed to boost energy or resilience in the face of stress and to enhance the defensive mechanisms of the organism against stressors. This study was undertaken to evaluate the adaptogenic-like activity of methyl jasmonate (MJ), a naturally occurring 'anti-stress plant hormone' using unpredictable chronic mild stress (UCMS) model in mice. Male Swiss mice were treated with MJ (25-100 mg/kg, i.p.) 30 min before exposure to UCMS for 14 days prior to testing for memory and anxiety. Thereafter, the blood glucose and serum corticosterone levels were estimated using glucometer and ELISA. The brain concentrations of malondialdehyde (MDA) and glutathione (GSH) were estimated using spectrophotometer. Brain histology and the population of healthy neurons in the hippocampal regions were also assessed. MJ reversed anxiety and memory impairment produced by UCMS, which suggest adaptogenic-like property. The reduction in the weight of adrenal gland and liver in MJ-treated groups in mice exposed UCMS further indicates adaptogenic activity. It further decreases the blood glucose and serum corticosterone levels in UCMS-mice. Also, MJ decreases the concentrations of MDA and elevated the levels of GSH in the brain of UCMS-mice. Brain histology revealed that MJ attenuated UCMS-induced degeneration and death of neuronal cells in the pyramidal layer of the cornu ammonis 3 (CA3) and the sub-granular zone of the dentate gyrus of the hippocampus. Moreover, MJ decreased the population of dead neuronal cells of the pyramidal layer of the CA3 and the sub-granular zone of the dentate gyrus of the UCMS-mice suggesting neuroprotection. MJ demonstrated adaptogenic activity in mice and may be useful therapeutically for the treatment of stress-related disorders. Its adaptogenic property might be related to modulation of serum corticosterone levels, inhibition of oxidative stress and neuroprotection.

EFFECTS OF CHLORPROMAZINE ON THE BRAIN WAVES

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Abstract
Chlorpromazine (chloro-3 dimethyl-amino-3’propyl-10 phenothiazine; 4560RP*) an antipsychotic drug has been widely used in the treatment of many mental disorders. It is an alpha-adrenergic blocking agent which is thought to elicit its effect via interference with the central dopaminergic pathway areas of the brain, but the underlying biochemical mechanism of its action still remains unclear. To determine its biochemical mechanism of action analysing the brain waves and reduce measure of administration. Here we examine the human brain
wave profiles using EEG the alpha, beta, delta, theta and gamma waves after intramuscular administration of CPZ at a moderate dose of 100mg to thirty psychotic patients 15 males and 15 females not less than five years of sickness between the ages 18 - 65. there blood pressure was also measured. At this dose level the drug had systematic effects on the brain waves reducing the latency of onset in stage REM and the number of movement arousals while increasing the amount of slow-wave sleep, by transiently occupying the D2 receptors and then rapidly dissociating to normal dopamine neurotransmission. Frequency analysis of brainwaves revealed that CPZ produced a trend in increased alpha and beta activity recorded from the pre-central which spikes from increased theta and gamma activity with a reduced delta activity. Hence it could be concluded that CPZ a long term effect causes paralysis of the major integrating center of the brain which might lead to neuronal death.

Keywords: Chlorpromazine (CPZ), Brainwaves, Dopamine, Mental Disorders.

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RAUWOLFA VOMITORIA AND GONGRONEMA LATIFOLIUM COMBINATION PROTECTS THE CEREBELLUM

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Abstract
Rauwolfia vomitoria and Gongronema latifolium are two different medicinal plants whose combination has been reported to be beneficial to the nervous tissues. Individually these plants possess useful abilities, though some adverse reports have been ascribed to R. vomitoria. This study therefore investigated the potential of the combination of these plants on cerebella protection. Twenty young male Wistar rats of average weight 125 g were divided equally into 4 groups. Oral doses of Tween 20® (0.5 ml), 200 mg/kg of R. vomitoria (RV), 200 mg/kg of G. latifolium (GL) and the combination of both (RV + GL) were administered respectively to the control and groups 2 - 4 animals for 14 days. On day 15, the animals were sacrificed after ketamine sedation and perfuse-fixed with buffered-formalin. Each cerebellum was excised and processed for histomorphology, and immunolabelled for glial fibrillary acidic protein (GFAP) and Ki-67. Histomorphology result of the cerebella sections revealed slight atrophy of the cells in the molecular, Purkinje and granular layers with additional pyknosis in the molecular layer cells and karyorrhexis in the Purkinje cells of the RV group. The GL group had slight hypertrophy of the Purkinje cells, while the RV + GL group showed slight hypertrophy of cells of the Purkinje and granular layers. There was much expression of GFAP in the RV group, while the GL and RV + GL groups showed decreased GFAP expression. Ki-67 was positive in the cerebella sections of the RV, GL and RV+GL groups, all compared to the control group. In conclusion, RV+GL combination protects the cerebellum, modulates gliosis, while maintaining its proliferative status.

Key words: R. vomitoria, G. latifolium, Cerebellum, Histomorphology, GFAP, Ki-67, Wistar rat

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INHIBITORY EFFECT OF PHRAGMANTHERAINCANA (SCHUM.) HARVESTED FROM COCOA (THEOBROMA CACAO) AND KOLANUT (COLA NITIDA) TREES ON Fe²⁺ INDUCED LIPID OXIDATIVE STRESS IN SOME RAT TISSUES -IN VITRO

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Abstract
Evidence in both experimental and clinical studies has shown the participation of oxidative stress in the development and progression of diabetes mellitus. This study therefore, sought to investigate the inhibitory effect of methanol extract of *Phragmantheraincana* leaves, a mistletoe species harvested from Cocoa (*Theobroma cacao*) and Kolanut (*Cola nitida*) on FeSO$_4$ induced lipid peroxidation in rat pancreas, liver, kidney, heart and brain in vitro. The methanol extract was prepared with 90% methanol (v/v); subsequently, the antioxidant properties and inhibitory effect of the extract on Fe$^{2+}$ induced lipid peroxidation in some rat tissues were determined in vitro. Incubation of the different rat tissues homogenate in the presence of Fe caused a significant increase in the malondialdehyde (MDA) contents of the tissues. The methanol extracts of *Phragmantheraincana* leaves harvested from both Cocoa and Kolanut trees caused a significant decrease in the MDA contents of all the tissues tested in a dose-dependent manner. However, the extract of *Phragmantheraincana* leaves harvested from kolanut trees had a better inhibitory effect on Fe$^{2+}$- induced lipid peroxidation in the rat tissues homogenates than that of *Phragmantheraincana* leaves harvested from cocoa trees. This higher inhibitory effect could be attributed to its significantly higher antioxidant properties as typified by their phenol content, DPPH radical scavenging ability and reducing power. Oxidative stress associated with diabetes and its other complications could be potentially managed or prevented by harnessing *Phragmantheraincana* leaves as cheap nutraceuticals. However, *Phragmantheraincana* leaves harvested from kolanut trees exhibited better antioxidant properties.

KEY WORDS: *Phragmantheraincana*; Cocoa; Kolanut; Antioxidant properties; Lipid peroxidation; Malondialdehyde

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INVolVEMENT OF SEROTONERGIC ANd NORAdeRNERGICNEUROTRANSMISSION IN ANTIdEPRESSANT-LIKE ACTIVITY OF TRAMADOL® IN MICE

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Abstract
Tramadol® is a centrally acting analgesic used for the treatment of moderate or severe pain. It has been suggested that both opioid and monoaminergic systems play a role in affective disorders such as depression. The purpose of this studywas to evaluate involvement of serotonergic and noradrenergic neurotransmitter systemsin anti-depressant activity of Tramadol®(TM) in mice, utilizing forced swimming test (FST), tail
suspension test (TST), reserpine-induced depression test (RDT) and yohimbine-induced lethality test (YLT). Mice (5/group) were administered with acute doses of TM (12.5, 25 & 50 mg/kg, p.o.), one hour prior to FST, TST, RDT, YLT, and locomotor activity. The parameters assessed in both FST and TST was the duration of immobility (s). In the RDT, degree of ptosis, rectal temperature (°C) and present of diarrhea were recorded over 150 mins, post reserpine (2.5 mg/kg, i.p.) treatment. In the YLT, the mortality rate was recorded 24 h after yohimbine (35 mg/kg, i.p.) administration. The locomotor activity of mice was assessed using the open field chamber. TM (12.5, 25 & 50 mg/kg, p.o.) significantly (p < 0.05) decrease the duration of immobility both in the FST and TST, which suggests antidepressant-like effect. It also significantly (p < 0.05) reversed the parameters recorded in the reserpine test. Furthermore, TM (25 & 50 mg/kg, p.o.) potentiated the toxic effect of yohimbine, which further suggests antidepressant-like property and enhancement of both serotonergic and noradrenergic neurotransmissions. However, TM did not significantly affect the locomotor activity of mice in the open-field test. This study provides data with suggest that Tramadol® has antidepressant-like activity, which may be attributed to the facilitation of serotonergic and noradrenergic neurotransmissions.

Keywords: Tramadol®, reserpine test, yohimbine lethality test, noradrenergic neurotransmission, Antidepressant.

1012
EFFECTS OF NICOTINE AND MORINGA TEA ON ENZYME ACTIVITIES IN THE FRONTAL CORTEX OF FEMALE WISTAR RAT

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Abstract
Nicotine is one of the principal components of tobacco that has been implicated in various neuronal diseases. Several researches have shown the antioxidant properties of moringa tea. To determine the effect of nicotine and moringa tea on oxidative stress marker and total protein count in the frontal cortex. Female Wistar rats (N=30) were divided into groups; A(n=4), B(n=4), C(n=4) and D(n=4). Group A and B were orally treated with normosaline and Moringa tea respectively for twenty-one days. Group C was treated with nicotine while group D were treated orally with Moringa tea and intraperitonealy with nicotine for twenty-one days. Homogenate of excised frontal cortex of animal groups was obtained on the 22nd for analysis. The results showed that an increased malonaldehyde and catalase activities in group C and a slight increase in group D compared to group A while reverse was the case for superoxide dismutase and glutathione peroxidase. There was an increase in the total protein count of the frontal cortex in group B and a decrease in groups C and D compared to group A. The result suggested that moringa tea may reduce the negating activities of nicotine in the frontal cortex.

KEYWORDS: Moringa tea, nicotine, frontal cortex, oxidative damage

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QUERCETIN DEMONSTRATES ANTIDEPRESSANT-LIKE PROPERTY THROUGH MONOAMINERGIC TRANSMISSION IN ANIMAL MODELS OF DEPRESSION.

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Abstract
Quercetin is a flavonoid found in many foods such as onions, apples, berries, and red wine. It is also used as a supplement and has offered beneficial effect in asthmatic condition and demonstrated anti-tumor potential. Antimutagenic and antioxidant activity have been demonstrated. We evaluated antidepressant property of quercetin in animal models of depression. Antidepressant activity of Q(25, 50 & 100 mg/kg, i.p.) was investigated using forced swimming, tail suspension, yohimbine induced lethality and reserpine induced-depression tests. The unspecific locomotor effect was screened using open field test. The Q (25, 50 and 100 mg/kg, i.p) significantly reduced immobility in a dose dependent manner in forced swimming \( [F (5,24) = 197.9, p < 0.0001] \) and tail suspension \( [F (5,24) = 61.77, p < 0.0001] \) tests without causing changes in locomotor activity in open field test compared with control. It was also found that Q (25, 50 & 100 mg/kg, i.p.) significantly \( (p < 0.05) \) reversed hypothermia, ptosis and diarrhea in reserpine model of depression. Comparing with control, Q (25 & 50 mg/kg) potentiated yohimbine-induced lethality in mice. Anti-immobility effect of quercetin in the two predictive models of depression has corroborated some earlier studies pointing at its potential beneficial effect in affective disorder. However, its action on reserpine and yohimbine tests has further revealed involvement of monoaminergic transmission as one of the underlying mechanisms of action.

Keywords: Quercetin, affective disorder, Reserpine, monoaminergic
EFFECT OF VIRGIN COCONUT-OIL ON AMPHETAMINE-INDUCED STEREOTYPE MOTOR BEHAVIOR IN WISTAR RATS


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Abstract
Ketogenic diet (KD) has become useful in the clinical management of epilepsy and attention-deficit/hyperactivity disorder (ADHD) in young patients, especially those presenting with refractory epilepsy. However, despite its clinical application for over 80 years the mechanisms by which it elicits its anti-epileptic effect is still unclear. Activities in basal ganglia dopaminergic pathways involved in motor function has been implicated in the onset and termination of epileptic seizures type and has been said to constitute a “Seizure Gate” speculated to underlie the pathophysiology of epileptic seizures. The modulatory effect of KD on central dopamine-induced stereotype motor behavior (DSMB) in Wistar rats was evaluated in this study. Twenty (20) male Wistar rats weighing (140-180) grams were used for the study, five rats were randomly allocated into four groups; All the four groups were fed with standard feds (Growers Marsh: Protein 14%, Carbohydrate 35%, fat 7%) ad libitum. Groups III and IV are the KD group that received in addition, 5ml/kg/day of coconut-oil (92% medium-chain triglyceride), by oral route. Groups I and II received similar handling using 0.9% normal saline. Blood levels of β-Hydroxybutyrate (β-OHB) were measured by blood β-Ketone test strips (Abbott Diabetescare Ltd.). On the 15th day Groups II and III received amphetamine (10mg/kg, i.p.) to induce DSMB. The DSMB assessed includes circling, back walking, bar-climbing and biting, assessed by the all or none scoring method (5 minutes interval, 1 hour duration), according to Taylor et al. (1974). ANOVA and Students’t-test were used for data analysis. The results showed that, β-OHB was significantly increased in the KD groups. Groups I and IV did not exhibit any of the DSMB. But in Groups II and III the DSMB were significantly exhibited when compared across the four groups, however, the DSMB were significantly increased in Group II compared with Group III. KD attenuates central dopamine-induced stereotype motor behavior in Wistar rats and it may be considered in elucidating the mechanisms by which it elicits its anti-convulsive action.

Key words: Central dopamine transmission (CDT), dopamine-induced stereotype motor behavior (DSMB) and Ketogenic diet (KD).

PROGESTERONE AMELIORATES TRIMETHYLTIN NEUROTOXICITY IN THE HIPPOCAMPUS OF ADULT MALE WISTAR RATS

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Abstract
Environmental and genetic factors have been implicated in neurodegeneration. Neurodegeneration is a gradual process that leads to the loss of structures and functions of a neurone (i.e neuronal death). Most neurological disorders have been linked to ageing; therefore, the study of adult neurogenesis might provide a proper management therapy for neurodegenerative diseases. This study investigated the effect of treatments with
progesterone and trimthyltin on histoarchitecture and biochemical compositions in the hippocampus of adult male wistar rats. Progesterone (16 mg/kg) was given for five days while trimethyltin (TMT) (8mg/kg) was given as an acute dose. The whole administration lasted for 26 days and the brains were excised and processed for histological and biochemical analysis (Superoxide dismutase (SOD), catalase and cholinesterase activities). Cellular damage was found in the pyramidal layer of the hippocampus in trimethyltin exposed rats whereas in the progesterone treated some forms of cellular restoration were seen. In the TMT treated SOD, catalase and cholinesterase activities were significantly reduced (P<0.05) while the progesterone treated increased the activities of SOD, catalase and cholinesterase significantly as compared to the TMT treated rats (P<0.05). This study has shown that both TMT and progesterone has effects on the integrity and the biochemical composition of the hippocampal cells of adult male rats.

Keywords: neurodegeneration, trimethyltin, progesterone, superoxide dismutase, catalase, cholinesterase

1017
BLACK SEED OIL AMELIORATED SCOPOLAMINE-INDUCED MEMORY DYSFUNCTION AND CORTICO-HIPPOCAMPAL NEURAL ALTERATIONS IN MALE WISTAR RATS

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Abstract
This study is undertaken to evaluate cognitive enhancing effect and ameliorative effects of Black seed oil. These effects were investigated on scopolamine-induced dementia model in Morris water maze test (MWM) and Y maze test. We also examined the hippocampal histoarchitectural responses to scopolamine and Nigella sativa oil. Scopolamine (1 mg/kg, ip) was given to induce dementia, followed by oral administration of BSO (1 ml/kg) for 14 consecutive days. MWM and Y-maze paradigms were used to assess hippocampal and frontal dependent memory respectively, thereafter then rats were sacrificed and brains were removed for histopathologic studies. Scopolamine resulted in memory impairment, by delayed latency in the MWM, reduced percentage alternation in the Y maze that was coupled by alterations in the cortico-hippocampal neurons. Posttreatment of rats with BSO mitigated scopolamine-induced amnesia, by reducing latency period and increasing percentage alternation and histological changes. The observed anti-amnestic effect of BSO makes it a promising anti-amnesic agent for clinical trials in patients with cognitive impairment.

1018
EFFECT OF ETHANOL PULP EXTRACT OF Tamarindus indica ON THE CEREBRAL CORTEX DURING PRENATAL ETHANOL EXPOSURE IN WISTAR RATS

Usman, I.M., Buraimoh, A.A., Ibegbu, A.O., Ivang, A.E., Yabo, J., Bakenso, I., Echefu, B.E., Mansir, A.
Abstract
Alcohol abuse is a major global health concern; among its devastating consequences is Fetal Alcohol Spectrum Disorders (FASD). The aim of this study is to evaluate the effect of ethanol pulp extract of *Tamarindus indica* (EPTI) on the cerebral cortex during prenatal ethanol exposure in Wistar rats. The objectives of this study are to: Investigate change in oxidative stress marker and histo-architecteure of the Cerebral cortex associated with treatment with EPTI during prenatal ethanol exposure. Sixteen (16) pregnant rats were divided into 4 groups. Group 1 received 2ml of distilled water, Group 2 received 4ml (30%v/v) of ethanol, and Group 3 received 200mg/kg EPTI, while Group 4 received both 4ml (30% v/v) of ethanol and 200mg/kg EPTI. All administration was via oral route and lasted for 7days (prenatal day 7 to 14). Animals were allowed to litter naturally. On post-natal day zero, pups were humanely sacrificed and the brain dissected out for oxidative stress and histological studies. The result of the oxidative stress studies showed a significant decrease (P<0.05) in the mean levels of Catalase and Reduced glutathione concentration in Groups 2 and 4 when compared with the Control, while the mean concentration malondialdehyde showed a significant increase (P<0.05) in Groups 2 and 4, although there was no significant difference (p<0.05) in the mean concentration of Superoxide dismutase. Histological studies of the cerebral cortex showed a normal architecture in Groups 1 and 3 while, Groups 2 and 4 showed Degenerative changes, Pyknosis, Vaculation and Chromatolysis. In conclusion, treatment with EPTI has been shown to have potential protective effect on the Cerebral cortex of Wistar rats during prenatal ethanol exposure.

**Key words**: Cerebral cortex, Ethanol, Prenatal, *Tamarindus indica*

1019

**EFFECT OF DIETARY SUPPLEMENTATION OF GINGER AND TURMERIC RHIZOMES ON ECTONUCLEOTIDASES, ADENOSINE DEAMINASE AND ACETYLCHOLINESTERASE ACTIVITIES IN SYNAPTOSOMES FROM THE CEREBRAL CORTEX OF HYPERTENSIVE RATS**

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**Abstract**
Ginger and turmeric rhizomes are used in folk medicine for the treatment of several cerebrovascular diseases with limited scientific basis for their action. Hence, in this study, we investigate the effects of two Zingiberaceae varieties (ginger and turmeric) on ectonucleotidases (NTPDase and 50-nucleotidase), adenosine deaminase (ADA) and acetylcholinesterase (AChE) activities in synaptosomes of cerebral cortex from L-NAME induced hypertensive rats. The animals were divided into seven groups (n = 10): normotensive control rats; hypertensive rats; hypertensive rats treated with atenolol; normotensive and hypertensive rats treated with 4% supplementation of turmeric and ginger rhizomes, respectively. After 14 days of pre-treatment with both rhizomes the animals were induced with hypertension by oral administration of L-NAME. The results revealed...
an increase of ATP and AMP hydrolysis as well as ADA and AChE activities of cerebral cortex synaptosomes in induced rats when compared with the control. The supplementation of both rhizomes prevented these alterations by decreasing ATP and AMP hydrolysis and ADA and AChE activities in cerebral cortex. In conclusion, this study demonstrated that both rhizomes interfere with the purinergic and cholinergic neurotransmission in cerebral cortex of hypertensive rats. Therefore, we can suggest that both rhizomes exert neuroprotective potential under hypertensive state.

**Keywords:** Ginger, Turmeric, Hypertension L-NAME, Ectonucleotidase, Acetylcholinesterase

1020
**INHIBITORY EFFECT OF AQUEOUS EXTRACT OF TWO VARIETIES OF TIGER NUT (*CYPERUS ESCULENTUS*) ON ENZYMES LINKED WITH ALZHEIMER’S DISEASE**

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**Abstract**

This study sought to investigate the inhibitory effect of aqueous extractable phytochemicals from two varieties (roasted and fresh) of Tiger nut (*Cyperus esculentus*) on acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) activities as well as the antioxidant properties in rat brain- in vitro. Aqueous extract (1:10 w/v) of *C. esculentus* was prepared and the ability of the extract to inhibit the activity of AChE and BChE as well as activity of pro oxidant Fe2+-induced lipid peroxidation were determined spectrophotometrically. The results revealed that both varieties were able to inhibit the activities of AChE and BChE in rat brain in a dose dependent manner (0 – 11.54mg/ml). Also, the incubation of brain tissue homogenate in the presence of Fe2+ caused a significant increase in malondialdehyde (MDA) content (185.71%). Nevertheless, the introduction of the aqueous extract inhibited MDA production dose dependently (0 – 33.33mg/ml) and also exhibited further antioxidant properties as typified by high scavenging and Fe2+ chelating abilities. Inhibition of AChE and BChE activities has been the primary treatment for mild Alzheimer’s disease (AD). Therefore, the possible mechanism through which the nut aqueous extract exerts its neuroprotective effect may be by inhibiting cholinesterases activities as well as preventing oxidative stress induced neurodegeneration.

**Keywords:** Tiger nut, acetylcholinesterase, butyrylcholinesterase, alzheimer’s disease, antioxidant.

1021
**CALCITRIOL DEFENSE RESPONSES TO SLEEP AGAINST LIVER DAMAGE IN ABINO RATS**

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Abstract
Sleep may affect energy balance. Sleep may not be the only answer to the obesity pandemic, but its effect should be considered seriously, as even small changes in the energy balance are beneficial. Good sleep could be part of the obesity prevention approach. Calcitriol treatment of secondary hyperparathyroidism (HPT) in chronic kidney disease (CKD) patients can lead to increased serum calcium and phosphorus, which have been associated as risk factors for vascular calcification. Cinacalcet HCl (Sensipar/Mimpara) \{(aR)-(\text{-})\text{-amethyl-N-}3-\text{-}[3-(trifluoromethylphenyl)propyl]-1-naphthalenemethanamine hydrochloride\} lowers serum parathyroid hormone (PTH), calcium, phosphorus and calcium–phosphorus (CaP) product in stage 5 CKD dialysis patients; however, its effects on vascular calcification are unknown.

Keywords: calcimimetics; calcitriol; cinacalcet HCl; hypercalcaemia; secondary hyperparathyroidism; vascular calcification

1022
THE EFFECT OF AQUEOUS LEAF EXTRACTS OF YOUNG KOLA NITIDA ON SOME ANTIOXIDATIVE ENZYMES IN STREPTOZOTOCIN-INDUCED DIABETIC RATS

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Abstract
In the present study, antidiabetic potential of aqueous extracts of kola nitida has been evaluated in streptozotocin-induced diabetic rats. Six healthy, male rats were divided into four different groups including, Normal control, and Diabetic control, treated with 50, 100, 200, and 400mg/kg of aqueous leaves extract of the plant. The extracts were given orally for 14 days. At every 3rd day blood sample was collected the glucose level was determined and the end of 2 weeks of the experiment, the results was expressed in mean values. The blood glucose concentration was markedly elevated in the diabetic rats before treatment; suggesting a diabetic state with statistical significance at P < 0.05. The body weight was recorded on every 3th day’s interval. The data obtained revealed that aqueous leaves extracts reduced the glucose level and the body weight in group4 with 50 mg/kg b.w had serum glucose levels of 149.80 ± 10.99 and Body weight (g) observed in Streptozotocin-induced-diabetic animals treated with 50 and 100mg/kg of the extract are120.71 ± 0.66 and 111.80 ± 2.01 respectively.

Key words: Streptozotocin, Kola nitida extract, % Glucose, homogenates, Diabetes

1023
ALZHEIMER’S DISEASE DRUG DESIGN: A STRUCTURE-BASED DESIGN OF \(\beta\)-AMYLOID PROTEIN INHIBITORS

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Abstract

An important disease hallmark in Alzheimer’s disease is the misfolding and aggregation into neuro- and synaptotoxic oligomers of the 4-kDa β-amyloid protein (abeta). In our series of investigations, we employed abeta as drug target in the design of treatment. The ultimate goal aim is to develop a peptide-based drug treatment for Alzheimer’s disease. To this end we seek to obtain, at atomistic level, an understanding of the biophysical attributes of abeta peptide. Lastly, our studies seek to determine the mechanisms of action of two D-enantiomeric peptides which were rationally designed in the group using mirror image phage display method and shown to improve cognitive functions in transgenic mice. State-of-the-art computer-aided drug design methods were combined with traditional experimental analyses. Methods employed include molecular dynamics simulations used in studying the dynamical features of the apo and holo forms abeta units; global optimization for generating thermodynamically stable complexes of abeta with the investigational peptides (D3 and RD2); thioflavin T assay and surface-plasmon resonance experiments to characterize the inhibitory effect at the molecular level. The mechanism of action of D3 and RD2 were found to emanate from their ability to destroy both β-strand and helical structures in monomeric and oligomeric abeta peptides. Limited SAR analysis revealed the efficacy of D3 and RD2 to be finely dependent on peptide length, presence of multiple D-arginine residues, as well as the oligomeric state of the target abeta peptide. Early amyloid aggregation was also found to precede conformational change.

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BRAIN ANTIOXIDANT MARKERS, COGNITIVE PERFORMANCE AND ACETYLCHOLINESTERASE ACTIVITY OF LIPOPOLYSACCHARIDE INDUCED MICE : EFFICACY OF THREE NIGERIA PLANTS


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Abstract

Several factors including cholinergic deficit, oxidative stress contribute to the progression and development of cognitive impairment. Most non-transgenic animal models of Alzheimer’s disease (AD) make use of intraperitoneal treatment with Lipopolysaccharide (LPS) to induce neurodegeneration. Plants may serve as a promising alternative drug to increase the levels of the neurotransmitter acetylcholine in the brain and antioxidants, thus improving cholinergic functions in patients with AD. The aim of this study was to evaluate three Nigeria plants locally used for memory enhancement for their antioxidant properties and interaction with key enzymes linked with memory impairment. 35 adult male mice were randomly grouped (n=5). All animals except for group I control (vehicle), were injected intraperitoneally with LPS (250 µg/kg) once after pretreatment with oral drugs for 7 days. Group II received LPS (250 µg/kg) only, group III LPS + Sulindac

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Sulfide (SS 4mg/kg), group IV LPS + Donepezil (DPZ, 1mg/kg) group V, VI, and VII received LPS + 200 mg/kg of sample extracts [Scoparia dulci (SD), Bacopa floribunda (BF), and Cordia millenii (CM)] respectively. After the experiment, whole brain was homogenized in cold 0.1 M phosphate buffer, pH 8.0 and the supernatants assayed for acetylcholinestearase (AChE) antioxidant enzymes (catalase, CAT; superoxide dismutase, SOD; malondialdehyde, MDA and reduced glutathione, GSH). In mice, oral administration of BF and SD significantly inhibits AChE level while the untreated group (LPS (250 µg/ml)) showed significant increase in AChE activity in whole brain homogenates. There was significant change (P<0.05, and P< 0.01) observed in exploratory motor function (Y-Maze) associated with spatial working memory in BF and SD groups but has no significant change when compared with DPZ group while no significance was found in both controls and treated groups in the object recognition memory (NOR). Moreover, BF and SD significantly (p < 0.05) altered the concentration of SOD, GSH, CAT and MDA than CM when compared with the controls. B. floribunda and S. dulcis may exert inhibitory influence on neuroinflammation as indicated by decrease in LPS induced elevated level of AChE in brain and appreciable antioxidant effect which could be helpful for preventing neurodegenerative disorders.

**Keywords:** Scoparia dulci; Bacopa floribunda; Cordia millenii; Neuroinflammation; Lipopolysaccharide; Alzheimer Disease

1025
**PROGESTERONE AMELIORATES TRIMETHYLTIN INDUCED NEURODEGENERATION IN THE PYRAMIDAL CELLS OF HIPPOCAMPUS OF ADULT MALE WISTAR RATS**

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**Abstract**
Environmental and genetic factors have direct influence on neurodegenerative diseases and most neurological disorders have been linked with ageing, hence the study was designed to investigate the effect of progesterone following trimthyltin (TMT) administration on the histo-morphology of the hippocampus of adult male Wistar rats. Twenty four adult male wistar rats were used in the study and divided into three groups. Group A used as control were given 0.2mls of normal saline, group B were administered 8mg/kg TMT start dose only while group C were administered 8mg/kg start and 16mg/kg of progesterone daily for five days. The animals were sacrificed after 26 days, perfused transcardially using 4% paraformaldehyde and the brains were removed for histo-morphological analysis. Cellular damage and loss of nissl substance were seen in the pyramidal cells of the hippocampus in trimthyltin exposed rats whereas in the progesterone treated some forms of cellular restoration were seen. This study concludes that progesterone have the potentiating ability to restore cellular injury in TMT injured cells in the hippocampus.

**Keywords:** Neurodegeneration, Trimethyltin, Progesterone, Hippocampus.

1026
**PROGESTERONE AN ANTIOXIDANT; ITS INVOLVEMENT IN OXIDATIVE STRESS PRODUCED BY TRIMETHYLTIN IN THE HIPPOCAMPUS OF ADULT MALE WISTAR RATS**

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**Abstract**

Reactive oxygen species (ROS) are normal byproducts of mitochondrial respiratory chain activity. ROS concentration is mediated by mitochondrial antioxidants such as manganese superoxide dismutase (SOD) and glutathione peroxidase. Over production of ROS (oxidative stress), which also involve pool of unsaturated fatty acids which are liable to peroxidation. This made ROS concentration a central feature of all neurodegenerative disorders. Hence, this study is designed to investigate the antioxidant property of progesterone following trimethyltin induced neurotoxicity in the hippocampus of adult male Wistar rats. Twenty four adult male wistar rats were used in the study and divided into three groups. Group A used as control were given 0.2mls of normal saline, group B were administered 8mg/kg TMT start dose only while group C were administered 8mg/kg start and 16mg/kg of progesterone daily for five days. The animals were sacrificed after 26 days. The brains were excised and homogenize for enzyme analysis. The result of this study revealed that, in the TMT treated, SOD and catalase activities were significantly reduced and MDA levels were significantly increased as compared to the animals that received only normal saline. While in the progesterone treated after TMT, the activities of SOD increased significantly, catalase increased but not significant and MDA was significantly reduced as compared to the rats that took only TMT (P<0.05). this study concludes that progesterone has the ability to reduce the concentration of free radicals produced by trimethyltin in the hippocampus of adult male wistar rats.

**Key words:** Reactive Oxygen species, Progestrone, Trimethyltin, Hippocampus.
2001
LOWER FORMATION OF MEDIAN NERVE: A REPORT OF A CADAVERIC CASE FROM SOKOTO, NIGERIA

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Abstract
Nervous variations in the upper arm are of potential clinical importance for it is a frequent site of injury and also involved in many surgical and invasive procedures. To report a case of lower formation of the median nerve in a right upper limb of a black African. Cunningham’s Manual of Practical Anatomy Volume I, was used as a guide to dissect of a black African body during routine cadaveric dissection for undergraduate medical students in the Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria. The median nerve was formed in the upper half of the right upper arm. Accurate knowledge of mode of these variations is of considerable clinical importance in the conduct of surgeries around the shoulder and fracture management of the humerus.

Key words: Lower formation, median nerve, variation.

2002
ROUND SHAPED SELLA TURCICA IN NIGERIAN CHILDREN: ANY CLINICAL SIGNIFICANCE?

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Abstract
The knowledge of the normal radiographic anatomy of the sella turcica and sella point is of great importance to clinicians in enabling them quickly recognize, investigate or evaluate any deviation from normal as well as any pathological situation related to the pituitary gland. On a lateral skull radiograph the image of sella turcica is U shaped and the center of sella turcica (sella point) is routinely used as a cephalometric landmark to act as a reference point for evaluating spatial position of both jaws as they relate to the cranial base. A total of 250 lateral skull radiographs taken in the Department of Radiology, Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto from January 2013 to December 2014 were retrieved for the purpose of this study. Radiographs were mounted on the viewing box and variants of the anatomical shapes of the sella turcica were
studied and classified. Of the 162 radiographs used in this study, 114 (70.4%) sella turcica were round shaped while 48 (29.6%) oval in shaped. This observed difference was statistically significant (p< 0.001). Meanwhile, the floor of the sella turcica of the study participants showed a concave outline in 130 (80%) of the children and flat outline in 32 (20%) of the children. Sexual dimorphism was seen in this study with respect to shape of sella turcica. Round shaped sella turcica was predominant in Nigerian children used in this study. The prevalence and the relative frequencies of the normal variants of the anatomical shapes of the sella turcica of male Nigerian children differ significantly from those of their female counterparts. The morphology and size of sella turcica is of importance because within its center lies sella point which helps in evaluation of craniofacial morphology, orthodontic treatments as well as growth changes.

**Keywords:** Sella turcica, shapes, radiographs, children.

2003

**PREVALENCE AND PATTERN OF EPILEPSY AND SCHIZOPHRENIA AMONG CHILDREN AND ADOLESCENT OUT PATIENTS IN BENIN CITY**

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**Abstract**

Mental health disorders among children and adolescents may be more prevalent than thought. Epilepsy and schizophrenia among adults usually begin in childhood or adolescence. Since children and adolescents make up more than half of the Nigerian population, it is important that these disorders among them be fully explored and understood as this will aid early detection and management and reduce associated long term morbidity, thus improving overall quality of life. We conducted a retrospective study of 151 children and adolescents attending the out-patient clinic of a Psychiatric hospital in southern Nigeria. We analysed their case files for the diagnosis of epilepsy and schizophrenia, and the management modalities, comparing these to various socio-demographic indices where applicable. Data entry and analyses were done using SPSS-16. There were more males (60.9%) among the subjects. The mean age was 12.86 years with a range of 3 to 17 years. No significant age differences between males and females; 81.5% were brought to the clinic by their mothers alone. Most of the diagnoses were based on the clinical judgement of the consultant psychiatrists. The prevalence of Epilepsy (seizure disorders was 33.1% and Schizophrenia was 15.2%. The diagnosis differed between the age groups and co-morbid disorders were found among 21 (13.9%) subjects. The main therapy was use of medications (100%); use of other treatment modalities was generally limited and about 15% of subjects defaulted their first follow up visits.

Epilepsy and schizophrenia children and adolescents may be more prevalent than reported. Most cases do not present to the psychiatrist and those that do are often complicated or very severe at presentation. There is thus need for broad exploration of these disorders among children and adolescents to determine their exact nature and extent so as to aid adequate mental health care. There is also a need for massive public health education on these issues.
Keywords: Prevalence, patterns, children, adolescents, Epilepsy, Schizophrenia, Benin City, Nigeria, one year

2004
EVALUATION OF NEURO-TRACE ELEMENTS USING NEUTRON ACTIVATION -1(NAA-1 ) ON MERCURY INDUCED BRAIN DAMAGE OF ADULT WISTAR RATS

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Abstract
Mercury is a widespread environmental pollutant that occurs naturally and has been reported to cause some health problems worldwide (ATDRS, 2011). The present work aimed at evaluating the effects of mercury intoxication on trace elements (zinc and copper) using Neutron Activation Analysis (NAA-1) in the brain tissues of adult Wistar rats. Twenty four animals of both sexes were used for the studies, which were randomly divided into four groups of six animals per group. Group 1 was the Control and received normal saline, while group 2, 3 and 4 orally received 12.45mg/kg, 28.9mg/kg and 49.8mg/kg body weight of mercury Chloride respectively for twenty one (21) days. The animals were anesthetized and sacrificed humanely using chloroform, brain tissues were removed and fixed in Bouin’s fluid. The tissues were crushed after oven drying at 100°C for short and long-live tissue irradiation using Neutron Activation Analysis (NAA-1) method (IAEA, 2004).The brain tissues were exposed to characteristic Gamma-ray and reveal the presence of Zinc and Copper, which showed a significantly decreased (P≤0.05) in their concentrations among mercury treated animals. Zinc and Copper are essential neurotrace elements that serve as modulators for the neurotransmitters, glutamate and dopamine respectively (Gagelli, 2001). It was concluded from the present studies that mercury exposure has effects on the neurotransmitter modulators, zinc and copper which can in turn alter motor activity, spatial learning and memory.

Keywords: Trace elements, Mercury, Brain, Zinc, Copper

2005
JOBELYN® ATTENUATES KETAMINE-INDUCED EXPERIMENTAL PSYCHOSIS IN MICE

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Abstract

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Psychosis is a complex psychiatric disorder characterized by a breakdown of thought processes and deficit of typical emotional responses. The use of drugs believed to act through antagonism of N-methyl D-aspartate (NMDA) receptor of glutamate has been demonstrated to mimic relatively, a broader range of the behavioural symptoms of psychosis in putative animal models. Jobelyn® (JB) is an indigenous commercial herbal formulation that has been documented to show beneficial effects on psychosis. Its usefulness in neuropsychiatric disorders has been scientifically validated on dopamine-agonist-induced model of psychosis. Therefore, this study was designed to further evaluate the antipsychotic property of JB on ketamine (an NMDA receptor antagonist) models of psychosis. Antipsychotic activity of Jobelyn® (JB) (5, 10, and 50 mg/kg, p.o.) was assessed based on the inhibition of stereotyped behaviour induced by apomorphine or ketamine, and ketamine-induced hyperactivity in mice. Ketamine-enhanced immobility in forced swim test (FST), and drug-induced ptosis and catalepsy in mice were also employed to further evaluate the antipsychotic property of JB. JB (5, 10, and 50 mg/kg, p.o.) significantly \( p<0.05 \) inhibited stereotypy induced by apomorphine (1 mg/kg, i.p.) or ketamine (10 mg/kg, i.p.) and ketamine-induced hyperactivity. Furthermore, JB significantly \( p<0.05 \) reduced the enhanced immobility by ketamine (30 mg/kg, i.p.) in mice, suggesting antipsychotic activity. JB also dose-independently depleted the monoamine as indexed by the ptosis paradigm. However, JB (5, 10, and 50 mg/kg, p.o.) did not cause cataleptic behaviour, as it did not enhance the duration of stay of the animals on the inclined plane. This study provides valuable evidences that JB contains biologically active constituents that possess antipsychotic property. The constituents hence may be involved in the physiological regulation of dopaminergic, glutamatergic and serotonergic systems. Thus, justifying its ethnomedicinal claims in the management of psychotic disorders.

Key words: Psychosis, Schizophrenia, Antipsychotics, Jobelyn®

2006
ANTIPSYCHOTIC PROPERTY OF ETHANOL EXTRACT *Terminalia ivorensis* STEM BARK IN MICE

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Abstract
Psychosis is a heterogenous, chronic neurological disorder affecting 1% of the world population including Africa. Psychosis remains a major medical and social problem globally due to lack of coverage in health need and unavailability of essential drugs, as a result individuals with psychotic illness tend to seek help from traditional medical practitioners. *Terminalia ivorensis* is an indigenous plant which has been acclaimed to show beneficial effects in neurological disorders. However, its usefulness in psychosis has not been scientifically validated. Therefore, this study was designed to evaluate the effects of the ethanol extract of *T. ivorensis* (EETI) stem bark on animal models predictive of human psychosis. Antipsychotic activity of EETI [125, 250, 500 and 1000 mg/kg, per oral (p.o.)] was assessed based on the inhibition of stereotyped behaviour induced by apomorphine or ketamine, and ketamine-induced hyperactivity for positive symptoms in mice. Ketamine-enhanced immobility in forced swim test (FST) and reversal treatment of ketamine-induced cognitive dysfunction for negative and cognitive symptoms respectively; and drug-induced ptosis and catalepsy in mice
were also employed, to further evaluate the antipsychotic property of *T. ivorensis*. EETI (125-1000 mg/kg, p.o.) significantly (*p*<0.05) inhibited stereotypy induced by apomorphine [1 mg/kg, intraperitoneally (i.p.)] or ketamine (10 mg/kg, i.p.), and ketamine-induced hyperactivity. Furthermore, EETI significantly (*p*<0.05) reduced the enhanced immobility and reversed the cognitive dysfunction induced by ketamine (30 and 20 mg/kg, i.p.), respectively. EETI also dose-dependently showed the monoamine depletion, as indexed by the ptosis paradigm. Moreover, EETI (125-1000 mg/kg, p.o.) did not cause cataleptic behaviour, as it did not affect the duration of the imposed posture of the animals on the inclined plane. These findings thus provide valuable evidences that EETI contain some phytochemical constituents that have antipsychotic-like activity, and so may be beneficial in the management of psychosis.

**Keywords:** Psychosis, Schizophrenia, Antipsychotics, *Terminalia ivorensis*

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**2007**

**EFFECTS OF METHYL JASMONATE ON ACUTE STRESS RESPONSES IN MICE SUBJECTED TO FORCED SWIM AND ANOXIC TESTS**

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**Abstract**

Stress is an integral part of human life and has been known to have deleterious effects on the body for over a century; drugs which could ameliorate its pathological impacts are yet to be discovered. Methyl jasmonate (MJ) is an anti-stress hormone released by plants in response to external stressors and aids in adaptation to stress. To investigate the possible anti-stress properties of MJ using experimental animal models. This study was undertaken to evaluate the anti-stress activity of MJ using the forced swim endurance test (FSET) and anoxic tolerance test in mice. Male Swiss mice were given MJ (25–100 mg/kg, i.p) 30 min before the forced swim endurance test and anoxic test were carried out. The first occurrence of immobility, duration of immobility, time spent in active swimming, and latency to exhaustion were assessed in the FSET. The onset to anoxic convulsion was measured in the anoxic tolerance test. MJ significantly (*p* < 0.05) delayed the first occurrence of immobility and shortened the period of immobility, which indicates anti-stress property. MJ also increased the time spent in active swimming and prolonged the latency to exhaustion, which further suggests anti-stress activity. In addition, it also exhibited anti-stress property as evidenced by prolonged latency to first appearance of anoxic convulsions. The results of this study suggest that MJ demonstrated anti-stress activity and may be useful as an energizer in times of body weakness or exhaustion. Although more studies are necessary before concluding on how MJ exerts its anti-stress activity, the present data suggest an action similar to adaptogens in boosting energy and resilience in the face of stress.

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**2008**

**OXIDATIVE STRESS AFTER ACUTE EXPOSURE OF MICE TO GENERATOR EXHAUST FUMES**

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**13TH NSN NEUROSCIENCE CONFERENCE@ABUAD 2015**
Abstract
The study involved assessment of oxidative damage as a result of acute exposure of mice to carbon monoxide (CO) from exhaust fumes of gasoline powered generator (TIGER, TG950, 220v/240v) manufactured by Suzhou Tiger Power Machine Co., Ltd., China. Twelve animals were divided into two groups of six animals each. The control group was exposed to ambient room air, while the experimental group was placed in an improvised partially enclosed gas chamber and exposed directly to the fumes for 30 minutes, 1 hour and 2 hour periods before the neurobehavioral tests. Elevated plus maze (EPM) was used to assess learning and memory. Biomarkers of oxidative stress, specifically malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx) were estimated in the serum using standard kits from Northwest life sciences Ltd. Canada. Carbon monoxide monitor (Amprobe, CM100) was used to record the dose of CO in parts per million (ppm). The dose of 100–150 ppm of CO exposure was maintained throughout the study. During the learning task (Day 1), experimental animals showed significant decrease in the mean transfer latency (TL) of 13.4 ± 1.5 seconds and an increase of 73 ± 8.4 seconds at 30 minutes and one hour respectively, when compared to their controls (28.6 ± 5.2 sec.) and (21.8 ± 4.4 sec.). In day 2 (memory test), there were significant increases in the mean TLs during the 30 minutes (48.4 ± 12.8 sec.) and two hour exposures (66.8 ± 15.3 sec.) when compared to their corresponding controls (13.6 ± 1.9 sec.) and (22.6 ± 6.6 sec.) respectively. The result suggests decreased ability of the exposed mice to learn and also to recall the learned behavior. There were also significant increases in the MDA (2.63 ± 0.06), SOD (1.83 ± 0.09) and GPx (44.40 ± 1.16) of the experimental group when compared to their respective controls (2.26 ± 0.07), (1.57 ± 0.08), and (38.70 ± 1.19). Our results suggest that acute exposure to CO could be responsible for the significant oxidative damage and impaired cognition observed in the experimental mice. This proves our hypothesis that oxidative stress may serve as another mechanism of CO toxicity and can be linked to some neurodegenerative diseases seen in the elderly. Our findings also corroborate that of other studies where oxidative stress was implicated to be the main cause of significant CO-mediated neuronal injury. This could pave way for understanding the pathogenesis of delayed neurological syndrome (DNS) observed many days or weeks after CO poisoning.

Keywords: Carbon monoxide, learning and memory, oxidative stress.

2009
BUILDING SUSTAINABLE NEUROSCIENCE CAPACITY IN AFRICA: THE ROLE OF NON-PROFIT ORGANIZATIONS

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Abstract
While advances in neuroscience are helping to improve many aspects of human life, inequalities exist in this field between Africa and more scientifically-advanced continents. Many African countries lack the infrastructure and appropriately-trained scientists for neuroscience education and research. Addressing these challenges would require the development of innovative approaches to help improve scientific competence for neuroscience across the continent. In recent years, science-based non-profit organisations (NPOs) have been supporting the African neuroscience community to build state-of-the-art scientific capacity for sustainable education and research. Some of these contributions have included: the establishment of training courses and workshops to introduce African scientists to powerful-yet-cost-effective experimental model systems; research...
infrastructural support and assistance to establish research institutes. Other contributions have come in the form of the promotion of scientific networking, public engagement and advocacy for improved neuroscience funding. Here, we discuss the contributions of NPOs to the development of neuroscience in Africa.

**Keywords:** Africa, Neuroscience, Higher education, Non-profit organization, Scientific capacity, Research funding.

2010

**VULNERABILITIES IN ALZHEIMER’S DISEASE: AN ETHICAL FRAMEWORK FOR THE AFRICAN CONTEXT**

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**Abstract**

Alzheimer’s disease (AD) constitutes a neurodegenerative, long-lasting pathology which progressively wears away mental capacities and accumulated memories as a consequence of a complex interplay of amyloid on neuroinflammation, cell plasticity and vascular changes. Beyond the financial burden of healthcare intervention, AD fosters a number of ethical issues in relation to different degrees of vulnerabilities which arise largely as a result of the attendant depersonalization, existential suffering and the erosion of autonomy and human dignity. Patients with AD in Euro-American climes increasingly seek euthanasia and physician assisted suicide rather than face the associated vulnerabilities. With the rising elderly population in the African context, and the accelerated pace of social disconnection, these questionable options may however soon be at our doorsteps. This paper seeks to develop an ethical framework for engaging some of the moral issues faced by African patients with Alzheimer’s disease. It offers the idea of collective solidarity that involve members of the healthcare team and friends/families of such patients, and elaborates some of the public policy implications. This paper employs the archival method of academic research. Specifically, it adopts the casuistry healthcare ethics approach. Incorporating non-strangers (such as friends and family members) into the management of AD may help enhance communication, help patients construct meanings out of the transition and restore some form of relational autonomy and dignity. This will create an enabling environment for optimal clinical care.

2011

**ANTIDOTAL EFFECTS OF NIGELLA SATIVA OIL ON ACETAMINOPHEN INDUCED NEUROTOXICITY IN THE CEREBELLUM OF WISTAR RATS (RATTUS NORVEGICUS)**

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**Abstract**

The use of naturally existing antioxidants as free radical scavengers has the potential to prevent, delay, or ameliorate many neurologic disorders. *Nigella sativa* (NS) commonly called black seed oil has been used for thousands of years for its natural healing abilities. It has been shown to possess antioxidant properties and is considered to be ‘the greatest healing herb of our time.’ The aim of this work was to study the possible
Antidotal effects of *Nigella sativa* oil against Acetaminophen induced Neurotoxicity in the Cerebellum of Wistar rats. A total of 60 wistar rats were used in this study. The animals were placed in six groups, A-F of 10 animals each. Group A served as the control, group B were treated with 28ml/kg of NS oil daily for 14days. Group C were treated with single dose of 2g/kg Acetaminophen. Group D were treated with NS oil at 28ml/kg daily for a period of 7 days orally before subsequent oral administration of Acetaminophen. Group E animals were administered Acetaminophen orally, followed by subsequent oral administration of NS oil for a period of 10 days. Group F animals were given NS oil at 28ml/kg weekly for 3 weeks. The results showed that acetaminophen indeed had a toxic effect on the cerebellum of the rats manifesting as degeneration of neuronal cell bodies. NS oil at 28ml/kg daily dose resulted in vascular congestion with rapid and excessive growth of neuronal cell bodies. Both Acetaminophen treated and NS oil treated rats underwent oxidative stress as the amount of Glutathione decreased progressively and significantly from groups B to F. In conclusion, it can be said that both NS and Acetaminophen induced oxidative stress in rat’s brain. acetaminophen caused a decrease in number of neuronal cell bodies while NS oil encouraged growth of more neuronal cell bodies in the cerebellum but could not prevent neuronal cell bodies from degenerating after administration of Acetaminophen.

**Keywords:** Antidotal, *Nigella sativa* oil, Acetaminophen, Glutathione, Cerebellum, Vascular congestion

### 2012

**IMPACT OF CARICA PAPAYA ON METHOTREXATE-INDUCED NEUROTOXICITY**

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**Abstract**

Neurotoxicity is a prevalent dose-limiting complication of chemotherapy treatment and Methotrexate (MTX) is among the main chemotherapeutic agents reported to have toxic effects on the central nervous system (CNS). This study was carried out to investigate the effect of aqueous extract of *Carica papaya* leaf administration on the histology of the cerebral and cerebellar tissues in methotrexate induced neurotoxicity. Twenty four (20) Wistar rats were randomly divided into four (4) groups designated A-D. Group A served as control, while groups B-D served as the treated groups receiving 1.5 ml of MTX, 1.5ml of MTX and aqueous extract of *Carica papaya*, 1.5 ml of *Carica papaya* respectively. The duration of the experiment was for 21 days. The animals were sacrificed by cervical dislocation and brain was harvested and processed histologically for histopathological observations. The histological results revealed pathological status of the cerebrum in group B, and a recovering state in group C. There was no pathological observations in the cerebellum. The results of this study suggest that *C. papaya* attenuates the neurotoxicity induced by MTX in male adult Wistar rats. Therefore, *C. papaya*, may be used as a potential dietary supplement in preventing neurological diseases caused by MTX chemotherapy.

### 2013

**MOBILE-BASED EXPERT SYSTEMS FOR DIAGNOSIS AND THERAPY OF MULTIPLE SCLEROSIS**

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Abstract
Economic instability of African countries has given rise to backwardness in medical technological advancement. The rural dwellers do not have access to quality health care services and information, especially those affected by nervous system diseases. Multiple sclerosis is a nervous disorder disease that affects the brain and spinal cord; it is a life threatening disease that cannot be cured but managed. Thereby, this paper presents a mobile-based diagnosis and Therapy Expert Systems that allow information access to those in the rural areas. Neuro-fuzzy expert system helps in decision making regarding what to do when signs and symptoms of this disease is seen, and possible suggestions of how to manage and prevent the occurrence of this disease. The implementation is carried out using HTML5 and JAVA Script as the frontend and PHP and MySQL database as a backend.

Keywords: Neuro-Fuzzy, Expert system, Multiple sclerosis, Diagnosis, Therapy.

2014
PERCEPTION AND PRACTICES OF NURSES AND COMMUNITY HEALTH WORKERS REGARDING CHILD AND ADOLESCENT MENTAL HEALTH IN ADO AND IREPODUN/IFELODUN AREAS, EKITI STATE, NIGERIA

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Abstract
There is a huge gap in the provision of mental health services for children and adolescents in Nigeria primary health centres, where over half of children in the community access the primary healthcare facilities under the care of nurses and the community health workers (CHEWs and CHOs). This was designed to assess the perception and practices regarding child and adolescent mental health among the primary healthcare providers in Ekiti State Nigeria. A hospital based cross-sectional study was conducted in the selected local government areas using a three-stage sampling techniques to select two out of sixteen local government areas. Forty out of the 50 primary health centres in the two local governments were selected and 10 respondents from each of the centres making up to 400 respondents. The respondents were made up of 76.0% females, nurses were 51.5%. About half of the primary healthcare workers have worked for a period of 1-5 years. About two thirds of the respondents thought that CAMH is important while 68.5% of the respondents said that “divine punishment/God will are causes of mental illness in children. Nurses had better knowmledge of CAMH compared to the community health workers. However, high proportion (73.5%) of the PCHP said they have limited confidence in themselves to recognize when a child or adolescent has a mental illness. The good knowledge of CAMH care among the PHCPs did not translate to actual full involvement in good practice regarding child and adolescent mental health services but the level of practices were worse among the community health workers in Ado and Ifelodun/Irepodun LGAs in Ekiti state. Advocacy and training opportunities are needed to address the problem and regular training programmes in order to address specific needs such as prompt referral and correct treatment for CAMH.
Abstract
Epileptogenesis is the process that, following some trigger, transforms a normal brain to one that produces recurrent unprovoked seizures. The mechanisms involved are not fully understood but their study is of high importance as it may provide an opportunity for the primary prevention of epilepsy. In the search for the mechanisms that best explain the epileptogenic process, there is a growing body of evidence suggesting that the epilepsies are network level disorders. In this review, we briefly describe the concept of neuronal networks and highlight two methods used to analyse such networks. The first method, graph theory, is used to describe general characteristics of a network to facilitate comparison between normal and abnormal networks. The second, dynamic causal modelling, is useful in the analysis of the pathways of seizure spread. Finally, we concluded that recurrent seizures, the end result of the epileptogenic process, are better understood as not simply due to molecular or cellular derangements, but rather a result of abnormalities in the neuronal circuitry. In conclusion, the neuronal networks models of epileptogenesis attempt to generate a parsimonious explanation for the varied and disparate phenomena associated with epilepsy and seizures and to understand epilepsy beyond merely recurrent seizures but as a dynamic property of physiologic neuronal systems. The model offers a hope for better and more refined treatments for epilepsy.

Key words: Epileptogenesis, neuronal networks, graph theory, dynamic causal modelling.

2016
APPROACHES TO UNDERSTANDING MECHANISMS BETWEEN ENVIRONMENTAL CHEMICAL EXPOSURE AND BRAIN DEVELOPMENT

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Abstract
Environmental chemicals are not without effects on the developmental processes taking place in the brain, considering their involvement in its pathogenesis. The finding of 2006 survey showed the involvement of several environmental chemicals in neurobehavioral deficits in children following prenatal exposures. On the other hand, quantifying chemical exposure effects on neurodevelopment and brain disorders usually prove difficult being that the brain; the target organ of neurotoxicants, requires highly invasive or extremely costly methods (e.g. neuroimaging) to access. To date paucity of central nervous system or peripheral biomarkers are available as validated indicators for the mechanisms responsible for brain disorders. Available biomarkers so far for many environmental chemicals are indeed poor predictive factory. Combining insights from epidemiological studies and anecdotal clinical evidences in the field of neuroscience, this review
discusses existing literatures/experimental researches that have attempted to explain links between environmental chemicals and brain disorders.

research design of this century.

**Keywords:** Environmental chemicals, Brain disorders, Neuro-development, biomarkers, developmental neurotoxicity.
CAFFEINATED ENERGY DRINK INCREASE NISSL GRANULATIONS AND PROLIFERATION OF ASTROCYTES IN FRONTAL CORTEX OF ADULT MALE WISTAR RATS

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Abstract

Energy drinks are caffeinated non-alcoholic drink that contains high level of Caffeine among other compounds such as taurine, glucuronolactone, vitamin B complex and glucose. It consumption has both beneficial effects and adverse effects on the general system due to high level of caffeine range from 100mg-450mg. This study was aimed to investigate the effects of energy drink consumption on Nissl bodies and astrocytes in the frontal cortical neural tissues. Fifteen healthy adult male Wistar rats weighing between 120-150g were used for the study. They were divided into 3 study groups: Group A as the control; Group B and C received 2ml/day of energy drink 21 days and withdraw for 7 days (Group C). Animal were sacrificed via cervical dislocation. Brains for oxidative stress enzyme markers was kept in ice-cold 30% sucrose solution and homogenized for Superoxide Dismutase (SOD) activity while brain tissues for histochemical and immunohistochemical studies were preserved in 10% formol calcium and stain for astrocytes (GFAP – Glial Fibrillary Acid Protein) using GFAP – stain and Nissl Granules using CFV (Cresyl Fast Violet) stain. Indicates significant increases in activity, Nissl granulation and astrocytes proliferation in frontal cortex exposed to caffeinated energy drink as compared to control and withdrawal groups. These findings suggest that prolong intake of caffeinated energy drink can trigger oxidative stress processes in the frontal cortex that are harmful to the neurons while withdrawal aids recovery of neuronal cells exposed to oxidative stress mediators.

STEREOLOGICAL STUDIES OF THE OLFACTORY BULBS OF AFRICAN GIANT RATS (CRICETOMYS GAMBIANUS, WATERHOUSE -1840)

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Abstract

The African Giant rat (AGR) (Cricetomys gambianus, Waterhouse-1840), also known as the Gambian pouched rat is a wild rodent that belongs to the order Rodentia, and is quite common in Nigeria. An increasing amount of interest is presently being expressed on the biology of the AGR. The olfactory bulb is a structure of the vertebrate forebrain involved in olfaction, the perception of odours. Ten (10) adult AGR (Cricetomys gambianus, Waterhouse-1840), consisting of five (5) male and five (5) females were used for this study. The animals were captured alive around Zaria-Nigeria using locally made rat traps, without any injury on them. The animals were anaesthetized with chloroform and trancardially perfused with a phosphate buffered solution of (pH 7.2, $M = 0.12$) 4% formaldehyde and 1% glutaraldehyde. The brain was removed and the olfactory bulb
was separated placed in the same fixative. Designed-based stereological were used to count neuronal numbers and volumes of the layers of the olfactory bulb. Data were expressed as mean±SEM and statistical analyzed. AGR had an estimated neuronal number of 35.6 x 10^5 ± 23.1x 10^5 in the olfactory bulbs of adult AGR. Using Cavalieri Principle, the estimated mean volume of layers olfactory bulb was 68.8 x 10^9 ± 18.5 x 10^9 mm^3. The results obtained from this study may be used in comparative neuroanatomy of rodents of similar species.

Key words: African Giant rats, olfactory bulb, stereology.

3003
CYTO-ARCHITECTURAL CHANGES IN FOETAL CEREBELLAR CORTEX OF RATS FOLLOWING ADMINISTRATION OF AQUEOUS LEAF EXTRACT OF OCIMUMGRATISSIMUM IN UTERO

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Abstract
Ocimum gratissium (OG) is a local spice and traditional herbal remedy for various diseases. It is commonly cultivated in many gardens across West Africa for its medicinal and culinary uses. We investigated the effects of prenatal exposure of rats to aqueous extract of OG leaves (particularly on the cytoarchitecture of the cerebellum). Twenty-five adult female rats were randomly assigned into five groups (A-E) of 5 rats each and mated. Following confirmation of pregnancy, Group A (control) received phosphate buffered saline (PBS) throughout the duration of study. Group B, C and D received 300 mg/kgBw of OG extract (orally) at gestational days 3-5, 7-9, and 15-17 respectively, while Group E rats received 300mg/kg OG at gestational days 3-5 , 7-9, and 15-17. Litters in each group were sacrificed on postnatal days 1, 7, 14, 21, 28 and 35. Results indicated significant low mean brain weights (p<0.05) in all treated groups compared with the control. H&E staining of the cerebellum revealed variant changes in the developing cyto-architecture particularly within the external granular layer of Group B. Pathogenic changes are not apparent in other treated groups when compared with the control. Conclusively, the present study showed that aqueous extract of OG leaves conferred degenerative changes to cerebellar neurons of rats when administered early in pregnancy. Furthermore, OG treatment during second and third phases of pregnancy had little adverse effects on the cerebellum of young Wistar rats.

Keywords: Ocimum gratissimum, cerebellum, cytoarchitecture

3004
TERATOGENIC EFFECT OF ARTESUNATE ON DEVELOPING OLFACTORY BULB OF WISTAR RAT FOLLOWING MATERNAL ORAL ADMINISTRATION

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Abstract
This study was conducted to investigate the potential embryo-fetal toxicity and teratogenic effect of the antimalarial agent artesunate (ARTS) in Wistar rats. Pregnant rats were administered ARTS daily from

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gestational day 8–12 via oral gavage, at test doses of 0, 2, 4, or 8 mg/kg (4 females per group). The fetuses were examined for external morphologic and olfactory bulb abnormalities on gestational day 21. With regard to the dams there was significant reduction in the crown rump length, hind limb length, fore limb length and organ-bodyweight ratio, which is dose dependent, with more effect on the 8mg/kg group. There was significant decrease in the length, width, breath, and weight of the olfactory bulb which are statistically significant. Histological examination of olfactory bulb of the dams using Haematoxylin and Eosin (H&E) and Nissl Crystal stain for nuclei of neurons and dendrites, shows nuclear lesions and loss of dendrites that are indicative of a pathological expression of a chemical injury. The lesion is more pronounced in the 8mg/kg group than in the 2mg/kg group. The effect of artesunate is dose dependent, with the no-observable-adverse-effect level (NOAEL) to be 2 mg/kg/day for embryo-fetal development.

Key words: Teratogen, Artesunate, Olfactory bulb.

3005

HIPPOCAMPAL GLIAL DEGENERATIVE POTENTIALS OF MEFLOQUINE AND ARTEQUIN IN ADULT WISTAR RATS


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Abstract

Malaria is a tropical disease caused *Plasmodium* species; *falciparum, vivax,* and *malaria* despite efforts to control or eradicate the disease, Mefloquine and Artequin are two effective antimalarial drugs currently used in the treatment of uncomplicated malaria. This study was to investigate the hippocampal glial degenerative potentials of these drugs in adult Wistar rats as the hippocampus has been reportedly affected by these drug treatments. Forty-nine adult Wistar rats weighing 200g were divided into groups 1–7. Group 1 served as the control that received distilled water, while groups 2–7 received oral doses of 0.86/1.07mg/kg, 1.71/2.14mg/kg, and 3.24/4.28mg/kg of Artequin and 1.07mg/kg, 2.14mg/kg, and 4.28mg/kg of Mefloquine. The treatment lasted for three days, and on day 4 the animals were sacrificed. Their hippocampi were preserved in neutral formal saline and processed by silver impregnation method. The histomorphology of the hippocampal sections of rats in the groups treated with 2.14mg/kg and 4.28mg/kg of Mefloquine and 0.86/1.07mg/kg, 1.71/2.14mg/kg, and 3.24/4.28mg/kg of Artequin showed large and dense populations of astrocytes and astrocytes’ processes, with either loss or reduction in the population of oligodendrocytes and pyramidal neurons all compared with the control group. In conclusion, Mefloquine and Artequin administration induced dose-dependent reactive astrocytes and astrocytes’ processes formation in the hippocampus. This may impair the uptake of neurotransmitter and alter neuronal environment thus altering the hippocampal function

3006

CANNABIS SATIVA AND THE EXPRESSION OF GLIAL FIBRILLARY ACIDIC PROTEIN (GFAP) IN THE RAT HIPPOCAMPAL ASTROCYTES

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Abstract
The hippocampus is richly endowed with cannabinoid-1 (CB1) receptors and is associated with learning and memory. Delta-9-tetrahydrocannabinol (Δ9 – THC) produce their psychoactive effects by acting at the CB1 receptors (Herkenham, 1991), and also activates dopaminergic neurons (John, 2003). Recent studies in animal models and in the clinic suggest that CB1 receptor antagonists could prove useful in the treatment of parkinsonian symptoms. Research had also reported a correlation between Cannabis use and increased cognitive function in schizophrenic patients. Advanced grades of Huntington's disease (HD) showed an almost total loss of CB1 receptors in HD. To elucidate the best preparation, route of administration and form of therapeutic use of the opiate in front of different type of diseases. Group A rats, served as the control. Rats in groups B1, B2 and B3, were given 0.41, 0.2, and 0.13 mg/kg, respectively, of Soxhlet extract of Cannabis sativa via oral ingestion. Rats in groups C1, C2 and C3, were given 4, 2, and 1 grams, respectively, of grounded dried leaves of Cannabis sativa via inhalation. Rats in groups D1, D2, D3, were given amixture of 4, 2 and 1 grams of grounded dried leaves of Cannabis sativa and 90 grams of animal feed, respectively, while rats in Group E were given 1 gm of 10% Tween 80 via oral ingestion. Morris watermaze experiments and GFAP immunostaining method were done. Data were expressed as means ± standard error of the mean. One way ANOVA, Student-Newman-Keuls post hoc test and 95% level of significance (P = .05) were used. Cannabis sativa prepared via soxhlet extraction technique has a mild and tolerable psychoactive effect compared to other preparations. This mode of preparation may be employed in the development of therapeutic strategies (preparation of medical Cannabis) in view of its very low toxicity.

Keywords: Cannabis sativa; Hippocampus; Astrocytes; Albino rats; GFAP

3007
OXIDATIVE STRESS DOES NOT PREDISPOSE NEURONAL CELLS TO CHANGES IN G PROTEIN COUPLED RECEPTOR GENE EXPRESSION IN CORTICAL B50 NEURONS IN CULTURE

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Abstract
Oxidative stress adversely affects neuronal cells in which they may die when oxygen supply is reduced or eliminated and opioid receptor agonists have been shown to elicit several central nervous system effects. The aim of this study was to evaluate the effect of oxidative stress on G-protein coupled receptor gene expression in cortical B50 cells. The cells were cultured in normoxia, hypoxia and treated with opioid agonists; DAMGO (µ), DSLET (δ) and ICI—199,441 (κ) for 48 hours after 48 hours of initial culture at dose of 10µM, 50µM and 13TH NSN NEUROSCIENCE CONFERENCE@ABUAD 2015
The level of mu opioid receptor mRNA was assessed using RT-PCR. The results show that oxidative stress induced changes in B50 cells in hypoxia while mu opioid mRNA levels showed no change. The results showed that B50 cells are susceptible to damage by oxidative stress and opioid agonist treatments showed no change in the level of mu opioid receptor gene expression in B50 cells.

Keywords: Hypoxia. G-protein Coupled Receptor. Messenger RNA. Reverse Transcription-PCR. Cannabinoid Agonist. Neuronal Cells

3008
OXIDATIVE STRESS INDUCED EFFECTS ON NEURONAL VIABILITY IN CULTURE

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Abstract
Viability measurements are used to evaluate the number of live or dead neuronal cells in experimental conditions. The aim of the study was to assess the effect of oxidative stress on neuronal viability in cultured B50 cortical cells. Two methods were used to assess neuronal viability and to evaluate the live or dead cells in experimental conditions in B50 cells cultured under normal and hypoxic incubators. The methods were trypan blue exclusion and Lactate dehydrogenase (LDH) assay methods. The results showed that at 72 hours of culture, the normal culture had 18.80±5.09x10^6 cells/ml as total cell count, 17.11±4.41 x10^6 cells/ml as total viable cells and 91.24±3.77% as percentage viability and 83-95% as percentage total viability range, while the hypoxic cell culture had 12.62±4.90x10^6 cells/ml, 9.10±2.62 x10^6 cells/ml, 75.32±11.59% and 60-94% as total cell count, total viable cells, percentage viability and percentage viability range, respectively. The difference in the total cell count and total viable cells between the normal and hypoxic cells was statistically significant (P<0.05). The results showed that there was a progressive increase in viability of cells with time which gradually decreased as time increases further which showed oxidative stress inform of hypoxia affected B50 neuronal viability in culture.

3009
IMMUNOHISTOCHEMICAL ASSESSMENT OF THE CEREBRUM FOLLOWING CONSUMPTION OF ETHANOLIC STEM EXTRACT AND JUICE OF COSTUS AFER PLANT IN WISTAR RATS

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Abstract
Costus afer is a medicinal plant used as a therapy for diabetes and hypertension. The leaf extract has Antinociceptive(Ijioma et al ,2014) and hypoglycaemic and antihapatotoxic effects. The study investigated the effect of crude ethanolic extract of Costus afer (Monkey sugar cane)stem and its juice on the expression of Glial fibrillary acidic protein(GFAP) and neurofilaments in albino wistar rats. Twenty (20) rats were divided into four
groups of five (5) animals each. Group one (I) served as control, (II) served as experimental group and received 200mg/kg body weight of the crude ethanolic extract. Group three (III) an experimental group, treated with 500mg/kg body weight (high dose) of the extract and Group four (IV) was treated with 500mg/kg body weight of *Costus afer* stem juice. Treatment was orally using orogastric tube for twenty eight (28) days. At the end animals were sacrificed using chloroform anaesthesia. The organs were dissected out after perfusion with paraformaldehyde and preserved in same. Results showed a significantly positive expression of GFAP compared with the control group. GFAP may serve as a marker for brain injury. This suggest that *Costus afer* ethanolic stem extract and juice has a dose dependent adverse effects on the cerebrum.

**Key words:** Extract, Cerebrum, Glial fibrillary acidic protein

3010

A STUDY ON THE EFFECTS OF ETHANOLIC EXTRACT AND STEM JUICE OF COSTUS AFER ON THE NEUROHISTOLOGY OF THE CEREBELLUM

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**Abstract**

*Costus afer* is a plant material used in Nigeria as remedy for several ailments and infirmaties including cough, sleeping sickness and stomach problems. A comparison of the potential effect of the ethanolic extract and stem juice of *Costus afer* on the body morphology and cytoarchitecture of the cerebellum of adult Wister rats were investigated in this study. Twenty adult Wister rats weighing 150-180g were divided equally into four groups. Group A was control, Groups B and C received 200mg/kgbw (low dose) and 500mg/kgbw (high dose) of the crude ethanolic extract of *Costus afer* respectively. Group D received 500mg/kgbw of *Costus afer* stem juice. Treatment was orally using orogastric tube for twenty eight (28) days. Morphological result showed that there was no significant reduction in weight of the treated groups compared with the control group. Histological study showed normal cytoarchitecture of the cerebellum in the control group and group B treated with 200mg/kg of the crude ethanolic extract of *Costus afer*. Animals in group C and group D which received 500mg/kg of the ethanolic and stem juice of *Costus afer* exhibited mild histopathology as marked by cellular degeneration. From the result, it can be concluded that the components found in *Costus afer* extract and stem juice may cause cerebellar cytoarchitecture changes which is dose dependent.

**KEYWORDS:** *Costus afer*, Cerebellum, Ethanolic

3011

HISTOLOGICAL STUDY ON THE EFFECT OF AQUEOUS FRUIT EXTRACT OF *Phoenix dactylifera* (DATE PALM) L. ON MERCURY–INDUCED CEREBRAL AND HIPPOCAMPAL DAMAGE IN ADULT WISTAR RATS

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**Abstract**

Management of cognitive and anxiety disorders like dementia and Alzheimer’s disease has been challenging since no potential drug is available with proven efficacy. This has prompted many researchers to evaluate new 13th NSN NEUROSCIENCE CONFERENCE@ABUAD 2015
compounds in the hope that other anxiolytic and nootropic drugs will have less undesirable effects. This study was aimed to histologically evaluate the ameliorative effect of aqueous fruit extract of *Phoenix dactylifera* (AFPD) against mercury–induced cerebral and hippocampal damage in adult Wistar rats. Twenty-four (24) Wistar rats of either sex (150-200 g) were divided into six groups (I–VI) of four rats each. Group I served as control, administered distilled water (1 ml/kg, p.o), while groups II–VI were treatment groups. Brain damage was experimentally induced in Wistar rats by administering mercuric chloride (MCL). Group II was administered MCL (5 mg/kg, p.o). Group III was administered vitamin C (100 mg/kg, p.o), while groups VI–VI were administered AFPD (250 mg/kg, 500 mg/kg and 1000 mg/kg, p.o, respectively). Treatment groups were concomitantly administered MCL (5 mg/kg, p.o) for a period of 2 weeks. Histopathological analysis of brain sections, applying routine (H & E) staining techniques, was employed to study the activity of AFPD on the rats’ cerebral cortex and CA1 and CA3 regions of hippocampus. Histopathological examination of brain sections revealed neuronal degeneration of cerebral and hippocampal cells such as, neuronal shrinkage, perineuronal vacuolation, gliosis and alteration in the general histoarchitecture of cerebral cortex and hippocampus in MCL treated group. The administration of AFPD remarkably ameliorated neuronal damage induced by MCL administration, dose dependently, when compared with tissue sections of the control. Findings from this work revealed that AFPD is of ameliorative potentials on heavy metal-induced cerebral and hippocampal damage in Wistar rats, which could be tied to the phytochemicals like flavonoid present in AFPD.

Key words: Ameliorative, Cerebral cortex, Hippocampus, *Phoenix dactylifera*, Wistar rats

### 3012

THE EFFECTS OF MONOSODIUM GLUTAMATE ON THE HISTOLOGY OF CEREBRAL CORTEX OF AFRICAN GIANT RATS (*CRICETOMYSGAMBIANUS, WATERHOUSE 1840*)

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Abstract

African Giant Rats are often eaten and considered a delicacy in African. It can be trained to detect land mines and tuberculosis. Monosodium glutamate is sodium salt of glutamic acid, one of the most abundant naturally occurring essential amino acids which is used as a flavor enhancer. This study was carried out in order to investigate the possible effects that monosodium glutamate could have on the cerebral cortex of African Giant Rats. Twelve African Giant Rats were used for this study and divided into four groups. Group I was the control that received distilled water only while groups II, III, and IV received 1,245mg/kg, 2,490mg/kg and 3,735mg/kg of monosodium glutamate per body weight respectively for duration of two weeks. After expiration of two weeks of administration of various concentrations of monosodium glutamate to groups II to IV except for group I that received distilled water only, the Wistar rats were humanly sacrificed, the brain was dissected, fixed, processed and stained in Haematoxylin and eosin. The slides were viewed under a light microscope fitted to a digital camera and laptop for photomicrographs. **Results and Conclusion:** Histological observations revealed that group I which was the control had normal histological appearance of the cerebral cortex while monosodium glutamate treated groups showed, mild, moderate and massive necrosis respectively. Based on our observations, we conclude that Monosodium glutamate had neuro-degenerating effects on the cerebral cortex of African Giant Rats and hence caution should be taken in its usage.
**Key words:** Monosodium glutamate, Neuro-degenerating, Effects, Histology, cerebral cortex, African Giant Rats.

### 3013

**HISTOLOGICAL IMPACTS OF GARLIC ON THE FRONTAL CEREBRAL CORTEX OF ALBINO WISTAR RATS**

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**Abstract**

Garlic is a member of the Allium genus long acknowledged for its culinary and therapeutic reputation in folk and modern medicine. This hinted the investigation of its histological effects on the frontal cerebral cortex of Albino Wistar rats. Twenty rats were thus sorted into groups A through E of four rats each. The control group (A) was orally administered with 0.5 ml of distilled water, while the experimental groups B, C, D, and E were orally administered with 0.12 ml of garlic and Vitamin C, 0.12 ml of garlic alone, 0.24 ml of garlic and Vitamin C, and 0.24 ml of garlic alone respectively. The animals, upon their sacrifice on the 29th day showed no significant difference in their cerebral weights, measured immediately after sacrifice. However, it was discovered histologically that the higher the dose of garlic, the higher the population of pyramidal cells within the cortex. This submitted an advantageous effect of garlic on the frontal cerebral cortex of albino Wistar rats.

**Keywords:** Garlic, Frontal Cortex, Advantageous, Histology

### 3014

**MORPHOLOGICAL AND HISTOLOGICAL STUDIES OF ARTESUNATE ON THE DEVELOPING CEREBRAL CORTEX OF WISTAR RAT FOETUSES**

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**Abstract**

The longstanding use of Artemisinin and its derivatives, mainly Artesunate among pregnant women is recommended as first line treatment for malaria especially in endemic area like Nigeria. The present study investigated the morphological and histological effects of artemesunate on the developing cerebral cortex of Wistar rat foetuses. Twenty apparently healthy female Albino Wistar rats of average weight of 165g were grouped into 4 with each Group containing 5 rats. The rats were fed daily and water was allowed *ad libitum*. The animals were mated overnight with sexually matured males and were separated into different cages after confirmation of pregnancy. Oral doses of 0.2mg/kg, 0.4mg/kg and 0.8mg/kg body weight of artemesunate were administered to pregnant rats in Groups 2, 3 and 4 respectively from the 8th to the 12th day of gestation. Group 1 rats were used as the Control, and received distilled water on the same days. The results showed a significant reduction in the morphometry of some body parts. The foetal body weights were 5.33g, 5.14g, 4.67g and 3.78g in Groups 1, 2, 3 and 4 respectively, while the Crown-rump lengths were 3.67cm, 3.43cm, 3.00cm and 3.00cm in Groups 1, 2, 3 and 4 respectively. The histological examinations revealed some neurodegenerative changes in the developing cerebral cortex of Wistar rat foetuses. These neurodegenerative changes include reduction in thickness of the cortical zones, cell clustering and chromatolysis of the cells of cerebral cortex, following the administration of...
artesunate to the adult pregnant rats during neurogenesis. The results from the present study showed that artesunate when administered in high dosages could be dangerous to the developing foetuses.

3015
SOME EFFECTS OF CRUDE AQUEOUS EXTRACT OF DATURA METEL LEAF AND VITAMIN C ON THE HISTOLOGY OF THE CEREBRUM OF ADULT MALE WISTAR RATS (Rattus norvegicus)
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Abstract
Daturametel belong to the classic “witches weeds” along with deadly night shade. It is a medicinal plant widely used in phytomedicine to cure diseases such as asthma, cough, convulsion and insanity. The aim of this study was to investigate if crude aqueous extract of Daturametel leaf has any histological effect on the cerebellum of adult male wistar rats. Twenty-five wistar rats with average weight of about 150 g -160 g which were randomly divided into five groups with five animals each; Group A served as the control group, Group B and C animals received 100 and 200 mg/kg b.wt of aqueous extract of Datura metal leaf daily for 14 days respectively and Group D animals received 200 mg/kg b.wt of aqueous extract of Datura metal leaf daily and withdrawn for another 7 days, and group E received 200 mg/kg b.wt of aqueous extract of Datura metal leaf with 100 mg/kg b.wt of vitamin C daily for 14 days. At the end of the experiment all the animals were sacrificed and their brains were preserved in 10% formo-calcium for histological studies. The histological findings reveal hemorrhagic changes and neuronal cell degeneration evident with clear area in the Purkinje cell layer and granular layer of the cerebellum of the treated groups (Group B and C) when compared with control while the histological changes were reduced in the withdrawal. Group E that was treated with Vitamin C shows a protective of the cerebellar histo-architecture. However, there was an increase in body and organ weight of the Group E and a non-significant reduction in body and organ weight of the other experimental treated groups compared to the control group. From the result of this study, it was observed that Daturametel could be detrimental to the histology of cerebellum of an adult male wistar rats while Vitamin C could protect against its negative effect.

Key words: Daturametel, Cerebellum, Wistar rats.

3016
EFFECT OF ETHANOL PULP EXTRACT OF Tamarindus indica ON THE HISTOLOGY OF DEVELOPING CEREBELLUM DURING PRENATAL ETHANOL EXPOSURE IN WISTAR RATS
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Abstract
The purpose of this study is to evaluate the effect of ethanol pulp extract of Tamarindus indica (EPTI) on the cerebellum during prenatal ethanol exposure in Wistar rats. Sixteen (16) pregnant rats were divided into 4 13TH NSN NEUROSCIENCE CONFERENCE@ABUAD 2015
groups. Group 1 received 2ml of distilled water, Group 2 received 4ml (30%v/v) of ethanol, and Group 3 received 200mg/kg EPTI, while Group 4 received both 4ml (30% v/v) of ethanol and 200mg/kg EPTI. All administration was via oral route and lasted for 7 days (prenatal day 7 to 14). Animals were allowed to litter naturally. On post-natal day zero, the brain tissue of the pups was collected for routine (H and E) histological studies. The result of the histological examination showed thinning and disruption of the external granular layer, degenerative neurodegenerative changes such as vacuolation, chromatolysis and pyknotic necrosis in the inner granular layer of Group 2 rats; thinning but without disruption of external granular layer and mild degenerative changes were observed in the cerebellar sections of rats in Group 4; as administration of EPTI protected against the ethanol induced cerebellar damage when compared to the Control Group. In conclusion treatment with EPTI has potential protective effect on the cerebellum of Wistar rats during prenatal ethanol exposure.

**Key words:** Cerebellum, Ethanol, Prenatal, *Tamarindus indica*

### 3017 PRENATAL EFFECTS OF AQUEOUS EXTRACT OF *Hibiscus sabdariffa* PETALS ON THE CEREBELLUM OF WISTAR RAT PUPS

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**Abstract**

This study was carried out to determine the effects of prenatal administration of *Hibiscus sabdariffa* on the histology of the cerebellum and Nissl substance in wistar rat pups. Thirty adult female rats were mated and randomly assigned to five groups according to the stage of their estrous cycle. Mating was confirmed by the presence of spermatozoa through vaginal smear. The aqueous extract was prepared at a concentration of 250mg/kg body weight and administered orally to the pregnant rat as follows: 1st trimester (Group B); days 0-6, 2nd trimester (Group C); days 7-12, 3rd trimester (Group D) days 13-19 and all trimester (Group E); days 0-19, while Group A, representing the control group received equal volume of distilled water throughout gestation. The pregnant rats were sacrificed on day 19 of gestation while the litters were harvested and weighed. Their cerebella were excised from the brain tissue and weighed before being fixed in 10% formol calcium in preparation for histological studies using Cresyl fast violet. The aqueous extract of *Hibiscus sabdariffa* petals was associated with decrease in weight changes in the cerebellum with the experimental group showing significant statistical difference when compared with the control group. Also, some morphological changes in the Histology of the cerebellum was observed. Poorly stained cells were seen in all experimental groups especially in groups C, D and E when compared to those in the control group. These suggests that consumption of *Hibiscus sabdariffa* petals during pregnancy especially in the second, third and all trimester could impair cerebella function due to loss of weight and loss of Nissl substances in the cerebellum.

**Keywords:** *Hibiscus sabdariffa*, histology, Nissl substance, prenatal, cerebellum.

### 3018 HISTOCHEMICAL EVALUATION OF THE EFFECT OF VITAMIN E ON CYANIDE – INDUCED DAMAGE ON THE PREFRONTAL CORTEX OF SPRAGUE DAWLEY RATS

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Abstract
Cyanide is ubiquitous and the major source of human exposure is in diet. The exposure from diet is usually associated with consumption of cyanophoric plants such as cassava. Vitamin E is an important antioxidant. It acts as a free radical scavenger to prevent the by-products of chemical-cell interaction which causes cell damage. Twenty male Sprague Dawley rats about 140-160 g were used for the study. Ethical approval was obtained from the University’s ethical committee. The rats were randomly divided into 4 groups of 5 rats each. The timeline of administration and treatment are as follow: Rats in group A= free access to normal saline, Rats in group B= treated with 10.50 mg/kg of potassium cyanide, Rats in group C= treated with 200 mg/kg of Vit. E, Rats in group D= were co-treated with 10.50 mg/kg of KCN and 200 mg/kg of Vit. E. The duration of treatment was 30d. 24hrs after the last administration, the rats were sacrificed by cervical dislocation: the fraction of the brain for tissue histochemistry was fixed in formol calcium and later processed for Nissl’s staining techniques (cresyl fast violet) and general neuronal outline (H&E), and the other fraction meant for enzyme and/or marker histochemistry was processed accordingly for the activities of Catalase, SOD, GSH, and GPX. Vitamin E ameliorates the effects of cyanide on the PFC of rats. The maker of oxidative stress was statistically reduced in the rats in group D compared with the rats in group B. The histological profile of the PFC of rats in group A and C were preserved while that of the rats in group B displayed distorted cytoarchitectural profile with marked increase in apoptotic bodies, lateral deviation of neurons and marked increase in the activities of oxidative markers. The histoarchitecture of the rats in group D was also preserved.

Key words: Cyanide, apoptosis, oxidative markers, Vitamin E, neurons, cervical dislocation

3019
ACUTE INHALATION OF GASOLINE VAPOUR: EFFECT ON MOTOR CORDINATION AND HISTOMORPHOLOGY OF THE CEREBELLUM OF ABLINO WISTAR RATS

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Abstract
This study investigates the effect of acute inhalation of gasoline vapour on motor coordination and histomorphology of the cerebellum of albino wistar rats. In this study a total of 43 rats weighing about 200-280g were used. 15 out of the 43 rats were used for the Lethal Concentration 50 test (LC⁵₀ or limit study) and the remaining 28 for the test study. The LC⁵₀ for this vapour was found to be 89262 ppm from which the test concentration was derived. The test study consists of 4 groups of 7 rats each. Group A was exposed to ½ of the LC⁵₀, Group B to 1/3 of LC⁵₀, Group C to 1/10 of LC⁵₀ and a control group. A whole body exposure system was used for the study. All groups were exposed to a single exposure to gasoline vapour for 30 minutes inside an inhalation chamber except for the control group which were exposed to free air in the chamber for the same duration. The rats were then tested for motor coordination and neuromuscular deficit using Hanging wire test immediately after exposure, 7 days after exposure and 14 days after exposure to acute gasoline vapour. The brain tissues were obtained from the animals after the tests on the aforementioned days. From this study, it was observed that the rats showed significant low balance and muscle grip strength immediately after exposure, and a greater balance and muscle grip strength on the 7th and 14th day post gasoline exposure. There were slight vacuolations of the neurons in the white matter of the cerebellum and the purkinje layer of the cerebellar gray matter in gasoline exposed rats especially on the day of exposure and day 7 post exposure. There was no observable distortion in the morphology of neurons in any of the layers of the cerebellar cortex on day 14 after gasoline exposure and in the control group. Hence, it could be deduced that acute inhalation of gasoline vapour causes significant loss of balance and muscle grip strength as well as vacuolations on the purkinje layer of the cerebellum immediately after exposure and 7 days after exposure but these neuromuscular and histological effects disappear at about the 14th day after exposure.

Keywords: gasoline vapour, acute inhalation, albino wistar rats, cerebrum and histomorphology.
EFFECTS OF DICHLORVOS INHALATION ON THE LEARNING MEMORY AND BRAIN WEIGHTS OF ADULT WISTAR RATS

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Abstract

Dichlorvos is a volatile organophosphate that forms the active ingredient of locally formulated but popular insecticide and pesticide known as Otapiapia or Madarapiapia. It is an anti-acetylcholinesterase that binds irreversibly to acetylcholinesterase enzyme thereby leading to its inhibition. It is cheap in production, highly efficient and easily accessible thereby making it one of the most commonly abuse insecticide and pesticide. Although many studies were conducted on the hazardous effects of this chemical, less attention was paid to the memory and brain weight. The study aims at determining the effect of dichlorvos inhalation on the learning memory and brain weights in adult wistar rats. Twenty five apparently healthy adult wistar rats consisted of both sexes were randomly selected, divided into five groups and experimented for 28 days. Three groups were exposed to the graded doses of the dichlorvos in ethanol solution, whereas two groups were exposed to ambient air and ethanol solution as positive and negative controls respectively. After the experiments, the animals were made to undergo object recognition test (ORT) and their brains tissues were collected and weighed. Two samples t – tests and one-way ANOVA were carried out to determine the difference in the mean recognition time and brain weights in all the groups using Minitab (version 16) statistical package respectively. Although variable degrees in mean recognition time and brain weights were obtained following the dichlorvos inhalation, no statistically significant (P > 0.05) difference in the mean recognition time as well as brain weights were noticed in all the experimental groups. In conclusion, the prolong inhalation of dichlorvos could have no effect on the mean recognition time or brain weights of adult wistar rats.

Key words: Dichlorvos, learning memory, brain weights.

EVALUATION OF THE EFFECTS OF CODEINE ADMINISTRATION ON MOTOR EXPLORATORY ACTIVITY OF ADULTS WISTAR RATS

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Abstract

Among the many substances of abuse is codeine syrup, which is associated with many health problems. The present study was aimed at investigating the effect of codeine administration on motor exploratory activities of adults wistar rats.
adults Wistar rats. The work was limited to motor activity test and histopathological changes of the cerebellar cortex of adult male Wistar rats. Twenty four male adults Wistar rats of average weight 220g were divided into 4 groups with 6 animals per group. In addition to normal animals in group 1 (control) were given distilled water, while group 2, 3, and 4 were administered with 10.95mg/kg, 21.9mg/kg and 43.8mg/kg b.wt respectively, orally, daily for 2 weeks. Motor exploratory activity was assessed using Montoya stair case test method and the brain tissue was fixed in a Bouin’s fluid for histopathological examination. Motor assessment showed significant increased (\(P \leq 0.05\)) in the meantime taken to explore the activity cage in groups 2, 3, and 4 when compared with the control. While the histological observation of the cerebellar cortex showed normal neuronal architecture in group 1. Groups 2, 3, and 4 showed degenerative changes and necrosis of neuronal cell. Codeine administration result in Motor exploratory impairment which could be due degenerative changes in the cerebellar cortex of adults Wistar rats.

**Keywords:** Codeine, cerebellar cortex, Montoya stair case, Motor exploratory activity, Wistar rats.

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**4003**

**JOBELYN® PREVENTS AND REVERSES THE SCHIZOPHRENIA-LIKE BEHAVIOUR AND OXIDATIVE DAMAGE INDUCED BY KETAMINE IN MICE**

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**Abstract**

Schizophrenia is a chronic, debilitating psychiatric disorder affecting a large number of geriatric populations worldwide. Mounting evidences derived from central changes in antioxidant defense system suggest the implication of oxidative stress in the pathophysiology of schizophrenia. Beside their severe adverse effects, current therapeutics of schizophrenia are also grossly limited in their prophylactic and therapeutic potential against the cross-talk of central oxidative insults. Jobelyn® (JB) is a unique commercial herbal formulation widely acclaimed as an immune booster, antianaemic and potent antioxidant agent. Our preliminary experimental study suggests that JB treatment is highly efficacious in the treatment of psychosis in apomorphine and amphetamine models. The present validatory study investigated the probable mechanistic basis of JB in preventing and reversing the schizophrenia-like behaviours and oxidative damage in mice brains induced by ketamine – an N-Methyl D-Aspartate (NMDA) receptor antagonist. The study rationale employed two well-known validated protocols. In the prevention protocol, male albino mice were pretreated orally with JB (5, 10 or 50 mg/kg), risperidone (0.5 mg/kg) or saline (10 mL/kg) daily for 14 days. Between days 8 and 14, the mice were treated intraperitoneally with ketamine (20 mg/kg) or saline (10 mL/kg, p.o.). In the reversal protocol, mice were first treated with ketamine (20 mg/kg, i.p.), or saline (10 mL/kg, p.o.) before oral administration of JB (5, 10 or 50 mg/kg), risperidone (0.5 mg/kg) or saline (10 mL/kg) from days 8 to 14. 24 hours post 14th day treatment, behaviours related to positive (locomotor activity) and cognitive (Y maze) symptoms of schizophrenia were assessed. Superoxide dismutase (SOD), catalase (CAT), Glutathione (GSH) and thiobarbituric acid-reactive substances (TBARS) levels were also measured in mice whole brain. JB and risperidone significantly prevented (prevention protocol) and reversed (reversal protocol) the hyperlocomotion, cognitive alterations and oxidative damage (in mice whole brain) induced by ketamine in the behavioural and
biochemical paradigms. The present findings suggest that JB probable mechanism of action may include buffered neuroprotective and antioxidant machineries thus providing an insightful rationale for evaluating it as a novel psychotropic agent.

**Keywords:** Schizophrenia, oxidative damage, antioxidants, Jobelyn®, Ketamine

4004
NEUROBEHAVIOURAL STUDY OF FEMALE WISTAR RATS TREATED WITH COMBINED ORAL CONTRACEPTIVE PILLS USING MORRIS WATER MAZE TEST

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Abstract
The combined oral contraceptive pill (COCP) is a form of contraception for women. It contains two hormones – estrogen and progesterone. The brain contains receptors for these hormones and it is unclear whether these hormones affect cognitive functions. This study was to determine the effect of COCP on spatial learning and memory using Morris water maze test. Twenty-four female wistar rats weighing 180-220g were equally divided into three groups. Group A was the control and the animals received no treatment while groups B and C were the experimental groups. Group B rats were given 0.002mg/kg levonorgestrel plus 0.0043mg/kg ethinylestradiol orally for 21 days (active pill) and 1.07mg/kg ferrous fumarate (placebo) for 7days (28days dosage) while group C rats were given same treatment for 56days. Group B rats were exposed to Morris water maze from Day 22-28 while group C and control rats were exposed to Morris water maze from Day 50-56 of treatment. Data were analyzed using one way statistical analysis of variance followed by post-hoc Turkey test. There was significant difference (p<0.05) in time to platform on test day 1,3,4 and 5 and time spent in platform quadrant on day 3,4 and 5 in group B while there was significant difference (p<0.05) in time to platform on test day 1,4 and 5 and time spent in platform quadrant on all test days in group C rats compared to control. This study revealed changes in spatial learning and memory of rats after treatment with COCP indicating that COCP may cause memory changes and may affect learning.

**Keywords:** Combined oral contraceptive pill, neurobehaviour, learning and memory

4005
BEHAVIOURAL, BIOCHEMICAL AND NEUROCYTOARCHITECHURAL IMPACT OF MDMA IN MALE ADOLESCENT MICE

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13TH NSN NEUROSCIENCE CONFERENCE@ABUAD 2015
Abstract

3, 4-Methylenedioxymethamphetamine (MDMA; "ecstasy") have been described to be a popular recreational amphetamine analog that produces a unique set of effects in humans and animals. This study sought to investigate that MDMA causes behavioural, biochemical and neurocytoarchitectural change in male adolescent mice. Fifteen (15) adolescent male mice were used for this study. The mice were randomly divided into 3 groups, A, B and C of five mice each, Group A were control group receiving normal saline, group B were low dose (10 mg/kg) MDMA treated group and group C were high dose (20 mg/kg) MDMA treated group. The animals were subjected to behavioural tests to ascertain their motor activity. Biochemical analysis to test for level of catalase and monoamine oxidase activity was also done. The motor activity of animals treated with 10mg/kg and 20mg/kg of MDMA was significantly (*p < 0.05) lower than the control group in dose dependent manner. Likewise, there was reduction in the catalase and monoamine oxidase activity in the treated groups. Histologically, the treated groups had more number of cells/unit area both in the cerebellum and the hippocampus than the control group. It could therefore be concluded that MDMA affect the motor activity of the treated animals and thus cause alteration in the neurocytoarchitecture of the animals.

4006
NEUROBEHAVIOURAL STUDY OF FEMALE WISTAR RATS TREATED WITH COMBINED ORAL CONTRACEPTIVE PILLS USING MORRIS WATER MAZE TEST


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Abstract

The combined oralcontraceptive pill (COCP) is a form of contraception for women. It contains two hormones – estrogen and progesterone. The brain contains receptors for these hormones and it is unclear whether these hormones affect cognitive functions. This study was to determine the effect of COCP on spatial learning and memory using Morris water maze test.Twenty-four female wistar rats weighing 180-220g were equally divided into three groups. Group A was the control and the animals received no treatment while groups B and C were the experimental groups. Group B rats were given 0.002mg/kg levonorgestrel plus 0.0043mg/kg ethinylestradiol orally for 21 days (active pill) and 1.07mg/kg ferrous fumarate (placebo) for 7days (28days dosage) while group C rats were given same treatment for 56days. Group B rats were exposed to Morris water maze from Day 22-28 while group C and control rats were exposed to Morris water maze from Day 50-56 of treatment. Data were analyzed using one way statistical analysis of variance followed by post-hoc Turkey test. There was significant
difference (p<0.05) in time to platform on test day 1, 3, 4 and 5 and time spent in platform quadrant on day 3, 4 and 5 in group B while there was significant difference (p<0.05) in time to platform on test day 1, 4 and 5 and time spent in platform quadrant on all test days in group C rats compared to control. This study revealed changes in spatial learning and memory of rats after treatment with COCP indicating that COCP may cause memory changes and may affect learning.

**Keywords:** Combined oral contraceptive pill, neurobehaviour, learning and memory

### 4007

**RAPID EYE MOVEMENT (REM) SLEEP DEPRIVATION AND PAIN THRESHOLDS IN RATS WITH NEUROPATHIC PAIN: INVOLVEMENT OF AUTONOMIC RECEPTOR(S).**

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**Abstract**

Sleep deprivation is now recognized as an increasingly common condition inherent to modern society, and one that in many ways, is detrimental to certain physiological systems (Zager *et al.*, 2007). This study aimed at investigating the effects of 72 hours Rapid Eye Movement (REM) sleep deprivation on pain thresholds of rats with neuropathic pain using different thermal methods of pain assessment and the possible involvement of autonomic receptor(s). Forty male Wistar rats were equally divided into two study groups. Rats in study 1 were used to investigate the effects of REM sleep deprivation on pain perception while those in study 2 were used to investigate the mechanism of action. The animals were ligated by chronic constriction injury of the sciatic nerve except those in sham and un-ligated control groups. Then followed by 72 hours of REM sleep deprivation using the multiple platform method, after which pain threshold was assessed. The Test group showed a significant (p<0.05) increase in the mean reaction time to thermal hyperalgesia compared with ligated control. Also, there was a significant (p<0.05) increase in tail withdrawal latency in test group compared with ligated control. Compared with the test group, the mean withdrawal latency of rats in Atropine group was significantly lower, implying an increase in pain perception thus, reversing the observed effect. This study showed that REM sleep deprivation attenuated hyperalgesia induced by chronic constriction injury of the sciatic nerve as evidenced by an increase in the mean reaction time and tail withdrawal latency of rats to pain, an effect reversed by Atropine, a muscarinic-cholinergic receptor antagonist. Hence, a possible involvement of the muscarinic-cholinergic system of the parasympathetic pathway.

### 4008

**EFFECT OF MONOSODIUM GLUTAMATE ON BEHAVIORAL PERFORMANCE, LIVER FUNCTION ENZYMES AND BIOMARKERS OF BRAIN OXIDATIVE STRESS IN MICE**

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Abstract

Studies revealed that intake of monosodium glutamate (MSG) is neurotoxic and it can lead to neurological disorders. However, the doses used in these studies were too high and far above the possible amount consumed by humans. Therefore, the effects of low doses of MSG on the behavioral phenotypes and oxidative stress in the brain and liver function enzymes in the blood of mice were assessed. Male Swiss mice were treated orally with MSG (100, 250 and 500 mg/kg) daily for 21 days before memory, anxiety, spontaneous motor activity (SMA) and depression tests. Thereafter, mice were sacrificed and the brain levels of malondialdehyde and glutathione as well as the activities of the liver function enzymes like aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were determined in the blood spectrophotometrically. MSG did not impair memory performance in the Y-maze test (P>0.05), MSG did not modify the behavioral performance of mice in the Elevated plus maze and Light/dark transition tests. MSG had no significant effect on SMA but produced depressive symptoms in the forced swim test at 500 mg/kg. MSG elevated malondialdehyde and decreased glutathione concentrations in mouse brain. It also elevated AST and ALT activities. Our data showed that MSG induced oxidative stress in the brain and impaired liver function enzymes in the blood but did not produce any behavioral abnormalities at lower doses.

4009

EFFECT OF INSULIN ON LEARNING AND MEMORY IN MICE DURING MORRIS WATER MAZE AND BARNES MAZE TASKS

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Abstract

In addition to its conventional hypoglycaemic effect, insulin is being reported to have many physiological effects, including effect on cognition. This study was carried out to determine the effect of insulin administration on learning and memory in mice using a wet maze - Morris water maze, and its dry version – the Barnes maze. There were two groups of 6 mice each. The control and insulin groups received subcutaneous injections of distilled water and insulin (10 I.U./kg/day), respectively, daily for 7 days. Morris water maze and Barnes maze paradigms were used to assess learning and memory. Repeated measures ANOVA and Bonferroni post-hoc tests in the SPSS statistical package were used to compare means. In the 3-day Morris water maze task, there was significant reduction in latencies (between day 1 and day 2) for both the insulin (57.92 ± 5.5 and 42.50 ± 5.5 seconds) and control (55.08 ± 5.9 and 30.79 ± 4.9 seconds) groups, while the difference in latencies between the two groups was not significant. There was no significant difference in the time spent by the animals per quadrant, the number of head searches between the two groups in the probe trial (day 3). During the Barnes maze task, primary latency remained the same between the first and second day; while the number of primary head searches significantly reduced between day 1 and day 2 for both the insulin (11.45 ± 1.9 and 4.17 ± 0.8) and control (19.95 ± 4.5 and 10.00 ± 3.2) groups. There was no difference in primary latency and primary head search between the two groups. There was also no significant difference between the groups in the time spent by the animals per quadrant, the number of head searches...
searches per quadrant and the number of head dips in correct hole during the probe trial (day 3). It was concluded that insulin treatment did not impair or improve the ability of the mice to learn, or their long-term memory of the learned task.

**Key words**: Insulin, learning and memory, Morris water maze, Barnes maze, mice

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**4010**

**EFFECT OF INSULIN TREATMENT ON SHORT-TERM AND LONG-TERM VISIO-SPATIAL LEARNING AND MEMORY IN MICE**

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**Abstract**

Insulin is best known as a hypoglycaemic agent used in anti-diabetic therapy. Recently, a number of beneficial effects of insulin on different organ-systems have been reported. This study examined the effect of sub-acute insulin treatment on long-term visio-spatial learning and memory in young mice using Y maze and elevated plus maze. Two groups of mice (n=6) were treated subcutaneously for 7 days with insulin at the dose of 10 I.U./kg/day and distilled water (control), respectively. The Y maze was used to assess short-term memory, while the elevated plus maze was used to assess long-term learning and memory. Repeated measures ANOVA and Bonferroni post-hoc tests in the SPSS statistical package were used to compare means. During the Y maze task, no significant difference in the number of entries into each arm within and between the insulin-treated and control groups was observed. The time spent in arms (68.33 ± 10.0, 59.17 ± 9.5 and 108.00 ± 13.6 seconds in arm A, B and novel arm for control group; and 74.50 ± 5.6, 69.67 ± 10.7 and 103.83 ± 7.4 seconds in arm A, B and novel arm for insulin group, respectively) differed significantly within, but not between the groups – the animals in both groups showed preference for the novel arm. Number of triads and percent alternation performed by the two groups were the same. In the elevated plus maze for memory task, there was no significant difference between acquisition and retention latencies within and between the insulin-treated and control groups. Taken together, the findings indicate that insulin treatment had no significant effect on both short- and long-term visio-spatial learning and memory.

**Key words**: insulin, short-term memory, long-term memory, visio-spatial learning and memory, mice

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**4011**

**EFFECT OF ALLIUM SATIVUM ON THE PREFRONTAL CORTEX AND NEUROBEHAVIOUR OF ADULT WISTAR RATS**

13th NSN NEUROSCIENCE CONFERENCE@ABUAD 2015
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Abstract

*Allium sativum* effects have been investigated in various organs including the hippocampus, frontal lobe, heart, among others, and several benefits, as well as adverse effects have also been reported. Some of its beneficial effects are its neuroprotection against tumours, increase in memory retention (Haider *et al.*, 2008), and prevention of degeneration of the brain’s frontal lobe (Moriguchi *et al.*, 1997). Adverse effects include significant loss of normal cellular architecture of heart, liver and kidneys. This study was designed to assess the effects of *Allium sativum* extract on the prefrontal cortex and behaviour of adult male Wistar rats. Twenty-four male albino Wistar rats were grouped into 4 groups of 6 rats each. Group 1 was the control and received 1 ml of distilled water, while groups 2-4 served as test groups and received 78 mg/kg, 156 mg/kg and 312 mg/kg body weight of the extract, orally for 2 weeks noting the lethal dose of 625.08 mg/kg (Nwanjo and Oze, 2006). The T-maze was used to assess effect on neurobehaviour. On the 15th day, immediately after the behavioural test, the animals were anaesthetized using ketamine hydrochloride (Rotex Medica, Germany) i.p. and transcardially perfused by phosphate-base saline (PBS), and later perfused-fixed using 10% buffered formalin. The brains of all the animals were excised and fixed in 10% buffered formalin for 48 hours. Light microscopic observations were made on formalin-fixed, 8 µm thick paraffin sections stained using haematoxylin and eosin, and cresyl fast violet. Result revealed poor spontaneous alternation except in group 2 animals; the prefrontal cortical sections showed gradual cellular hypertrophy and hyperplasia, with loss of cellular membranes and loss of Nissl stain among the test groups, depending on the dosage of the extract. In conclusion, *Allium sativum* may modulate spontaneous alteration and cause alterations in cellular integrity of the prefrontal cortex, whose effects were dose dependent.

**Key words**: *Allium sativum*, Prefrontal cortex, T-maze, spontaneous alternation, Wistar rats

4012 EFFECTS OF SELENIUM YEAST ON ANXIETY-LIKE BEHAVIOURS AND OXIDATIVE STRESS BIOMARKERS OF RESTRAINT MALE WISTAR RATS

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Abstract

Restraint stress produces inescapable physical and mental stress which may alters behaviour, also result to imbalance in antioxidants status that leads to increased oxidative stress. The aim of this experiment is to determine if selenium yeast modulates behavioural change accompany in male Wistar rats subjected restraint stress. Methods: The experiment was carried out with 15 male Wistar rats weighing about 140-145g, randomly divided into three groups of five animals each. Group I-normal control, Group II-stress control group, Group III- selenium yeast + restrained stress. Restraint stress was induced by placing rats in specially constructed restraint meshes for 6 hours (between 9.00-15.00 h) for 15 days. The behavioural assessment was done at day 16, using open-field apparatus and elevated plus maze. Result: In open-field test, stress control group showed increased value of line cross, neck stretch and rearing, with rearing being statically significant (p<0.05) higher when compared with normal control, administrations of selenium yeast shows decrease activity in open field. In elevated plus maze, time spent in open arm, number of entries in open arms and number of entries in closed arms were significantly (P<0.05) higher in stress control group when compared to normal control group.Selenium yeast group shows a significant (p<0.05) decrease in entries and time in open arm, and also increase in time spent and entries in close arm. Brain tissue was evaluated for malondialdehyde, catalase, super oxidase and Glutathione. Stress control shows increase CAT and MDA activity when compared to normal

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control, and selenium yeast groups. SOD and GPx concentration in selenium yeast group was significant (p<0.05) higher when compared to stress control. In conclusion, restraint stress decreased anxiety-like behaviour and induces oxidative stress. Antioxidants selenium yeast ameliorates oxidative stress, but did not exert modulatory effect on anxiety-like behaviours in restraint Wistar rats.

**KEY WORD**: Anxiety-Behaviour, Restaint Stress, Selenium-Yeast, Oxidative Stress Makers

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**POSSIBLE EFFECT OF MONOSODIUM GLUTAMATE ON THE PERFORMANCE OF SWISS ALBINO MICE IN SOME LEARNING AND MEMORY NEUROBEHAVIORAL PARADIGMS**

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**Abstract**

Monosodium glutamate (MSG) is the sodium salt of glutamic acid, it is a common food flavour enhancer used by a wide range of people. MSG consumption has been reported to have unfavourable effects on the body. This study was designed to evaluate the possible effect of MSG on learning and memory neurobehavioral paradigms of Elevated plus maze for memory (EPM), Morris water maze (MWM), Y maze and novel object recognition test (NORT). A total of eighty adult Swiss albino mice, twenty mice for each behavioural paradigm was used for the study. The animals were randomly divided into four groups (n=5), group I served as control and was administered normal saline (10 ml/kg), groups II, III and IV were orally administered 1.5, 3 and 6 mg/kg of MSG respectively. Results obtained showed no statistically significant difference on acquisition [F (3; 15) = 2.616, P = 0.089] and retention [F (3; 15) = 2.441, P = 0.104] in EPM for memory between control and MSG-treated groups. Similarly, no statistically significant difference was observed during latency to locate platform [F (3, 15) = 1.985, P = 0.160] and frequency of platform crossings [F (3, 15) = 0.19, P = 0.996] in MWM between control and MSG-treated groups. Further, there was no statistical significant difference in the time spent in arm C [F (3, 16) = 1.703, P= 0.207]and percentage spontaneous alteration[F (3, 16) = 3.212, P= 0.05] between the control group and the MSG-treated groups. Also, no statistically significant difference was observed in time spent with object C [f (3, 16) =2.5, P=0.097], between MSG-treated groups and control in NORT. However, statistically significant difference was observed between MSG at a dose of 3mg/kg and control group in number of visit to object C[(3,16)=3.979,p=0.027] in NORT. This study suggests that MSG did not affect cognition in mice at the doses administered.

**Keywords**: Monosodium glutamate, Cognition, elevated plus maze for memory, Morris water maze, Y maze, Novel object recognition test

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**EFFECT OF ELECTROCONVULSIVE SHOCK ON CENTRAL DOPAMINE-INDUCED STEREOTYPE MOTOR BEHAVIOR IN WISTAR RATS**

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Abstract
Since the inception of therapeutic convulsion induced electrically, electroconvulsive therapy (ECT) has become useful yet controversial in the treatment of schizophrenia and bipolar disorders among others. Its mechanism of action (MOA) is still elusive despite its clinical application for over 70 years. Neurophysiology theories on the MOA of ECT proposed the involvement of central dopamine transmission (CDT) but the reports from studies on the effect of ECT on CDT have been contradictory and inconclusive. This study examines the effect of electroconvulsive shock (ECS) on central dopamine-induced stereotype motor behavior (DSMB) in Wistar rats. Twenty (20) male Wistar rats weighing (140-220) grams were utilized for the study, five rats were randomly allocated into four groups that received; Group I: control, Group II: amphetamine (10mg/kg, i.p.), Group III: ECS (100 volt, single pulse/0.2 sec. for 8 days using GRASS S9B Stimulator), Group IV: ECS and amphetamine. The DSMB assessed includes circling, repetitive head movements, back walking and biting, assessed on the 9th day by all or none scoring method (5 minutes interval, 1 hour duration), according to Taylor et al. (1974). ANOVA and Students’t-test were used for data analysis. The results showed that, Groups I and III did not exhibit any of the DSMB. But in Groups II and IV the DSMB were significantly exhibited when compared across the four groups, however, the DSMB were significantly increased in Group IV compared with Group II.

Conclusion: Increase in CDT may be considered in elucidating the MOA of ECT.

Key words: electroconvulsive therapy (ECT), electroconvulsive shock (ECS), central dopamine transmission (CDT), and mechanism of action (MOA).

4015
NEUROBEHAVIOURAL AND DEVELOPMENTAL TOXICITY STUDY OF ARTESUNATE ON WISTAR RATS OFFSPRING’S FOLLOWING MATERNAL EXPOSURE

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Abstract
Artesunate, a derivative of Artemisinin compound are fast acting and highly effective in the treatment of multi drug resistant malaria; hence, the probable resumption, neurotoxicity and altered developmental behavior observed in animal reproductive studies may contra-indicate artesunate usage during the first trimester. To characterize the developmental and behavioral alteration induced by artesunate to the developing offspring, pregnant wistar rats were exposed to oral administration of artesunate on an increasing doses of 2, 4 and 8mg/kg body weight (bwt) from gestational day (GD) 8 to 12, whilst controls received the vehicle similarly on the same gestational days and observed till parturition. Before weaning, all the offspring were weighted on Post-Natal Day-O (PND-0), assessed for physical development using Surface Righting Reflex (PND-5), Cliff – Avoidance (PND-6), Negative Geotaxis (PND-7), and Swimming Development (PND-10), on the groups that received the vehicle (control), 2 and 4mg/kg bwt whilst there were remarkable resorption and loss of pregnancy on the group that received 8mg/kg bwt. The pre-weaning offspring’s in the 2 and 4mg/kg bwt groups showed statistically
significant difference in their mean body weights, success rates in SRR, CA, NG and SD scores when compared with the control for swimming direction. The number of live and death fetuses, survival rates, mean fetal body weight and percentages of resorptions or malformations per litter were statistical significant in the group that received 8mg/kg bwt when compared with the control, 2 and 4mg/kg bwt respectively. These results indicate that, prenatal relatively high oral administration of artesunate may possibly delay early response development, impaired locomotor coordination, and impaired learning ability in the offspring of wistar rats, therefore its needs for pharmacovigilant.

**Key words:** Artesunate, Maternal, Neurobehavioral, Toxicity, Developmental

4016

**VITAMIN D3 RECEPTOR ACTIVATION RESCUED CORTICOSTRIATAL NEURAL ACTIVITY AND IMPROVED MOTOR-COGNITIVE FUNCTION IN – D2R PARKINSONIAN MICE MODEL**


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**Abstract**

Fourth generation antipsychotics have been implicated in the blockade of calcium signalling through inhibition of dopamine receptive sites on dopaminergic D2 Receptor (D2R). This leads to changes in the motor and memory neural axis leading to the observed behavioural deficits after prolonged use.

**Aim:** This study sets to investigate the role of VD3R activation after haloperidol induced Dopaminergic (D2R) blockade. PD was induced in adult BALB/c mice (−D2; n = 8) after 14 days of intraperitoneal haloperidol treatment (10 mg/Kg). A set of n = 4 mice were untreated (−D2) while the other group (n = 4) received 100 mg/Kg of VD3 for 7 days (−D2+/+VDR). The control groups (n = 4 each) were treated with normal saline (NS) and VD3 (+/VDR) for 14 days. At the end of the treatment phase, the animals were assessed on Rotarod, Parallel Bar, Cylinder, Y-Maze, one trial place recognition and novel object recognition (NOR) tests. Neural activity was measured using chronic electrode implants placed in the M1 (motor cortex), CPu (striatum), CA1 (hippocampus) and PFC (prefrontal cortex). Data were expressed as mean ± SEM (analysed using ANOVA with Tukey post-hoc test, significant level was set at 0.05). In vivo neural recordings suggest an increase in calcium hyperpolarization currents in the CPu and PFC of intervention mice (−D2+/+VDR) when compared with the parkinsonian mice (−D2). These animals (−D2+/+VDR) also recorded an improvement in spatial working memory and motor function versus the Parkinsonian mice (−D2). These outcomes suggest the role of CPu-PFC corticostriatal outputs in the motor-cognitive decline seen in parkinsonian mice. Similarly, VDRA reduced the neural deficits through restoration of calcium currents (burst activities) in the intervention mice (−D2+/+VDR). VDRA treatment reduced the motor-cognitive defects observed in haloperidol induced PD. Our findings suggest the role of VDRA in restoration of calcium currents associated with PFC and CPu corticostriatal outputs seen as burst frequencies in in vivo neural recording.

**Keywords:** Dopamine, D2R, VD3R, Corticostriatal, Neural System

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