

2nd NEUROSCIENCE STEREOLOGY
and
SCIENTIFIC WRITING
SYMPOSIUM

Abstracts Book
15-19 March 2016, Arusha, Tanzania



Venue: Nelson Mandela African Institute of Science
and Technology



The "**2nd Neuroscience Stereology and Scientific Writing Symposium**" was held on 15-19 March 2016 at the Nelson Mandela African Institute of Science and Technology, in Arusha, Tanzania. This symposium was organised in collaboration with Turkish Society for Stereology, Nelson Mandela African Institute of Science and Technology and TIKa. A total of 32 speakers and 81 participants attended the symposium.

The symposium was organized under three headings and the first two days were devoted to neuroscience, the third day to scientific writing and the last day to stereology. The speakers from America, Egypt, India, United Kingdom, Somalia, Sudan,, Tanzania and Turkey had shared the information about the neuroscience, scientific writing and stereology. Through the stereology workshop, participants learned about stereological techniques.

This abstract book contains the abstracts of the presentations of the "**2nd Neuroscience Stereology and Scientific Writing Symposium**" that were received from the authors.

Presidents of the Symposium
Prof. Dr. Suleyman KAPLAN

**2nd Neuroscience Stereology and Scientific Writing
15-16 March 2016**

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Program

2nd NEUROSCIENCE STEREOLOGY AND SCIENTIFIC WRITING SYMPOSIUM

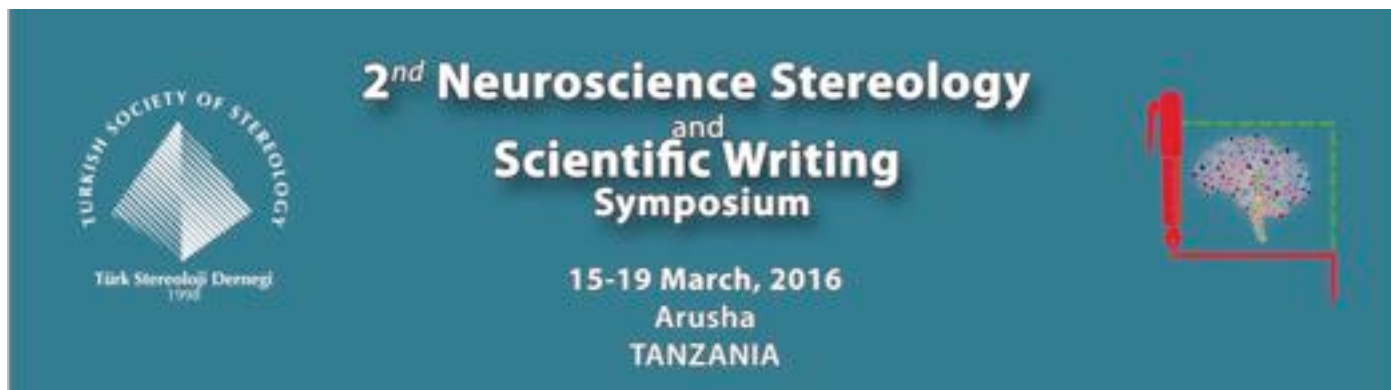
15th March 2016, Tuesday	
08:30-09:10	Registration
09:10-09:20	Opening ceremony
09:30-10:30	Chaired by: Lloyd Morgan and Murat Terzi
	Development of repurposed drugs for neuroscience: an example from academia Trevor Sharp (Oxford, England)
	Quantitative Analysis of neurotransmitters by chromatographic techniques Abdurrahman Aksoy (Samsun, Turkey)
10:45-12:10	Chaired by: Wahabu Kimaro and Abdurrahman Aksoy
	Tumor studies from exposure to cellphone radiation. Lloyd Morgan (San Francisco, USA)
	Demyelinating diseases of the central nervous system Murat Terzi (Samsun, Turkey)
	Use of patch-clamp technique on investigation of TRP channels in neurons Mustafa Naziroğlu (Isparta, Turkey)
14:00-15:30	Chaired by: Trevor Sharp and Ertuğrul Can
	Cerebral aneurysms: endovascular treatment Hüseyin Akan (Samsun, Turkey)
	Cannabinoids and epilepsy Erdal Ağar (Samsun, Turkey)
	The use of Immunohistochemistry in neuroscience Wahabu Kimaro (Morogoro, Tanzania)
15:45-17:00	Chaired by: Erdal Ağar and Hazem Elhaddad
	The ethical issues in animal researches Abdurrahman Aksoy (Samsun, Turkey)
	Color Vision Ertuğrul Can (Samsun, Turkey)
	Discussion is conducted by Lloyd Morgan

16 th March 2016, Wednesday	
09:00-10:30	Chaired by: Mohammed Nurein and Aydın Him
	Development of the human auditory pathway Sabita Mishra (New Delhi, India)
	The FDTD computer simulation results Lloyd Morgan (San Francisco, USA)
	Surgical treatment of nerve injuries Hazem Elhaddad (Mogadishu, Somalia)
10:45-12:15	Chaired by: Aymen Warille and Murat Çetin Ragbetli
	Use of animal models in biomedical research Maulilio Kipanyula (Morogoro, Tanzania)
	In vitro techniques in neuroscience Gürkan Öztürk (İstanbul, Turkey)
	Mechanisms of transneuronal degeneration in an in vitro model Aydın Him (Samsun, Turkey)
14:00-15:30	Chaired by: Sabita Mishra and Cennet Ragbetli
	Teaching neuroscience in medical schools Mohammed Nurein (Omdurman, Sudan)
	Varations in innervation of the hand; cadaveric based study Aisha A. Majid (Omdurman, Sudan)
	Key performance indicators for quality measurement in medical schools Aymen Warilla (Saudi Arabia)
15:45-17:00	Chaired by: Mustafa Naziroğlu and Aisha A. Majid
	Improving quality of scientific publications from African institutions Idris Rai (Zanzibar, Tanzania)
	Investigation of the Carbapenem resistance in multi-drug resistant acinetobacter and pseudomonas isolets from an intensive care unit infections Cennet Ragbetli (Van, Turkey)
	Discussion is conducted by Gürkan Öztürk

17 th March 2016, Thursday	
09:00-10:15	Chaired by: Mohammed Sheikh and Mustafa Ayyıldız
	How to write a scientific paper Trevor Sharp (Oxford, England)
	Translation competence as a concept beyond bilingualism in translating research paper Oktay Eser/Metin Orbay (Amasya, Turkey)
	The ethical issues in human researches A. Tevfik Sünter (Samsun, Turkey)
10:30-11:45	Chaired by: Trevor Sharp and A. Tevfik Sünter
	The development of universities in the world of Turkish science Tarık Yanlgaç (Ordu, Turkey)
	How to make a quantitative graph? (Preparing figures for publication) Gürkan Öztürk (İstanbul, Turkey)
	Writing discussion section Aydın Him (Samsun, Turkey)
13:30-14:45	Chaired by: Gürkan Öztürk and Aydın Him
	How to write a win grant proposal? Mohammed Sheikh (Zanzibar, Tanzania)
	Which points are important for editors and reviewers? Mustafa Naziroğlu (Isparta, Turkey)
	Impact factor and h index Mustafa Ayyıldız (Samsun, Turkey)
15:00-16:00	Chaired by: Mustafa Naziroğlu and Berrin Zuhale Altunkaynak
	Research impact and intellectual asset Mohammed Sheikh (Zanzibar, Tanzania)
	Application of technology in scientific writing Dr. Sahal (Omdurman, Sudan)
	Feedback and closing ceremony of scientific writing

Program

18 th March 2016, Friday	
09:00-10:30	Chaired by: Niyazi Acer
	Microscopy, tissue & tissue processing: Overview Sabita Mishra (New Delhi, India)
	Introduction to stereology and sampling strategy in stereology Süleyman Kaplan (Samsun, Turkey)
	Stereological estimation of peripheral nerve fibers Adem Kocaman (Samsun, Turkey)
10:45-12:15	Chaired by: Sabita Mishra
	Estimation of particle number of physical and optical sections: Physical and optical dissector Ömür Gülsüm Deniz (Samsun, Turkey)
	Estimation of particle number of physical and optical sections: Physical and optical fractionator Aysın Pınar Türkmen (Samsun, Turkey)
	Estimation of volume and volume fraction on macroscopic and radiological sections Berrin Zühal Altunkaynak (Samsun, Turkey)
14:00-15:30	Chaired by: Berrin Zühal Altunkaynak
	Quantitative morphology of the corpus callosum of ADHD using an atlas based analysis Niyazi Acer (Kayseri, Turkey)
	Evaluation of stereological data: Coefficient error and coefficient variation Arife Ahsen Kaplan (Samsun, Turkey)
	Techniques for section thickness estimation Kıymet Kübra Yurt (Samsun, Turkey)
15:45-18:00	Chaired by: Aysın Pınar Türkmen
	Using reference software (EndNote) Adem Kocaman (Samsun, Turkey)
	Gadgets used in stereological analyses İşinsu Alkan (Samsun, Turkey)
	Feedback and closing ceremony of scientific writing
18:30-20:30	Three or hours: Volume calculation on MR T1 images by using brain parcelling Niyazi Acer (Kayseri, Turkey)



Oral Presentation

Quantitative analysis of neurotransmitters by chromatographic techniques

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Keywords:

Analysis
Chromatography
Neurotransmitters

ABSTRACT

There are many applications have been developed with regard to quantitative analysis of neurotransmitters in the body tissues and fluids. The classical methods for the measurement of neurotransmitters depend on their chemical structure (amins, amino acids etc.), analytical methods (TLC,HPLC, GC, LC/MS/MS), equipment capability (LOD, LOQ). Chromatographic techniques are divided into different types based on: The type of the chromatographic bed used (i.e. column chromatography (gas chromatography) and planar chromatography (paper and thin layer), the physical state of the mobile phase (i.e. gas chromatography and liquid chromatography) and the separation mechanism such as ion-exchange and size exclusion. Nowadays, one of the most used methods is based on liquid chromatographic (HPLC, UHPLC, LC/MS) techniques. Analysis of neurotransmitters in the body tissues and fluids have some limitations because of the very low amounts and other analytical procedures. In this review, quality parameters and definitions and our laboratory applications, particularly in liquid chromatographic analysis of neurotransmitters, were summarised.



Oral Presentation

Tumor studies from exposure to cellphone radiation

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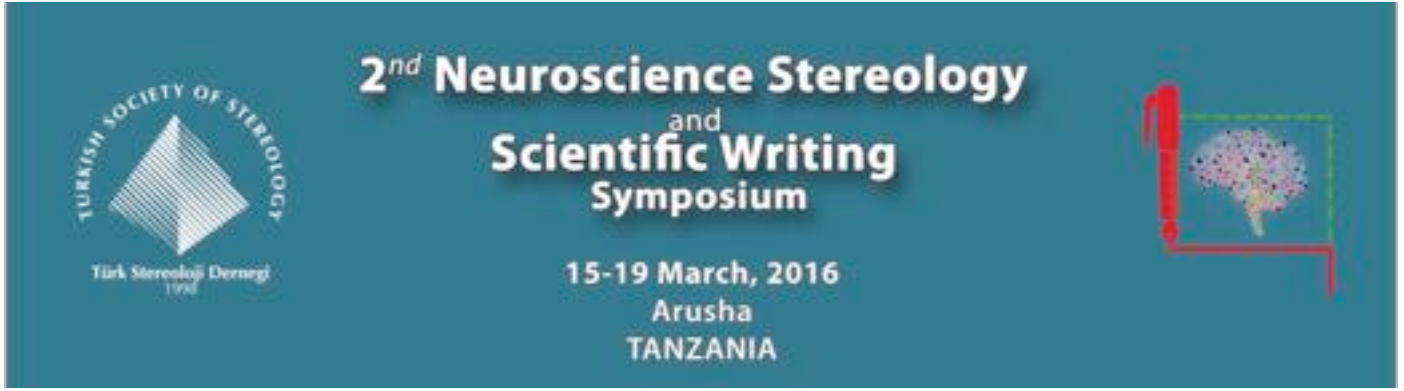
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Keywords:

Digital enhanced
Cordless telecommunications
Specific absorption-rate
International Agency for Research on Cancer
GSM mobiles

ABSTRACT

In May, 2011 the World Health Organization (WHO) through its International Agency for Research on Cancer (IARC) declared radio frequency radiation (RFR) was a Group 2B (possible) Human Carcinogen. Its announcement of this declaration in Lancet Oncology stated in part: In May, 2011, 30 scientists from 14 countries met at the International Agency for Research on Cancer (IARC) in Lyon, France, to assess the carcinogenicity of radiofrequency electromagnetic fields (RF-EMF). These assessments will be published as Volume 102 of the IARC Monographs. Human exposures to RF-EMF (frequency range 30 kHz–300 GHz) can occur from use of personal devices (e.g., mobile telephones, cordless phones, Bluetooth, and amateur radios), and from environmental sources such as mobile-phone base stations, broadcast antennas, and medical applications. The average exposure from use of digital enhanced cordless telecommunications (DECT) phones is around five times lower than that measured for [2G] GSM phones, and third-generation (3G) phones emit, on average, about 100 times less RF energy than GSM phones. Similarly, the average output power of Bluetooth wireless hands-free kits is estimated to be around 100 times lower than that of mobile phones. Holding a mobile phone to the ear to make a voice call can result in high specific RF energy absorption-rate (SAR) values in the brain. When used by children, the average RF energy deposition is two times higher in the brain and up to ten times higher in the bone marrow of the skull, compared with mobile phone use by adults. The evidence for this declaration came substantially from case controls studies on the risk of brain cancer and hearing nerve tumors (acoustic neuroma). Here we report on risk of brain cancer in adults and children, increase blood-brain-barrier permeability results in risk of brain cancer from exposure to various chemical only with combined with an RFR exposure, risk of salivary gland, eye, breast, testicular, cancers combined with sperm damage and leukemia. Lastly we report on methods to reduce exposure such that cellphone use can become “safe enough.”



Oral Presentation

Use of patch-clamp technique on investigation of TRP channels in neurons

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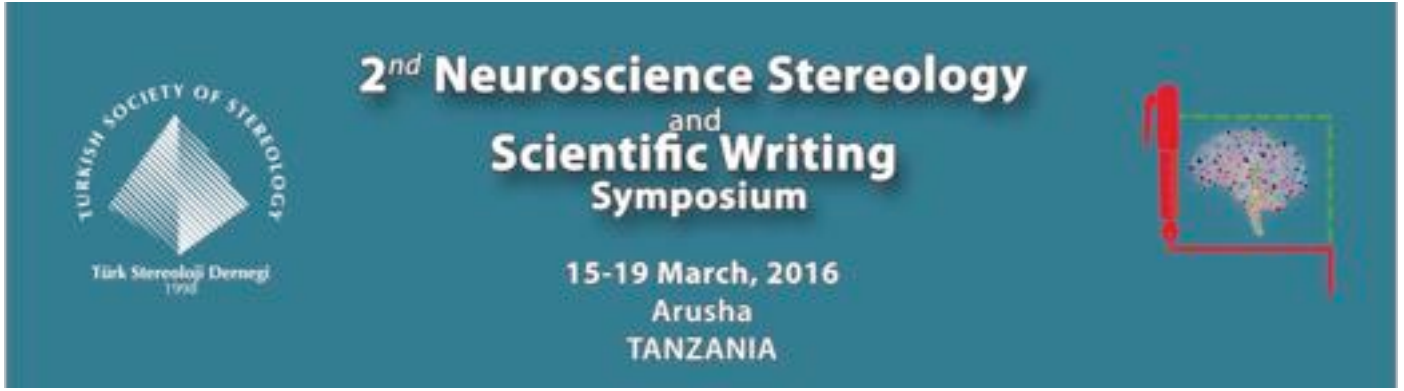
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Keywords:

TRP cation channels
Patch-clamp technique
Calcium ion
Neuronal cells

ABSTRACT

Ca²⁺ concentrations are 10,000-20,000 times higher in outside of the cells than in inside of the cells. During depolarization, cytosolic Ca²⁺ concentrations increase from 50-80 nM to 1-3 mM. The Ca²⁺ pass the cell membrane through ion channels and one member of the ion channels is transient receptor potential (TRP) channels. Some subfamilies of the TRP channels such as TRPV1 (vanilloid) and TRPM2 (melastatin) were discovered within last 12 years and they are activated by oxidative stress and they are involved in Ca²⁺ homeostasis disruption in neuronal cells. Subtype of TRPM2 and TRPV1 cation channels is widely expressed in neuronal and the brain cells. TRPV1 is a gated by noxious heat, oxidative stress and the pungent ingredients of hot chili peppers (capsaicin) and it is inhibited by capsazepine. TRPM2 channels are also activated by oxidative stress and they are inhibited by 2-Aminoethoxydiphenyl borate (2-APB) and anthranilic acid (ACA). However, there is scarce report on activation and inhibition mechanisms of the channels. In the current presentation, I aimed to review molecular roles of TRPM2 and TRPV1 cation channels on Ca²⁺ signaling in pathophysiology of neurological diseases such as peripheral pain and epilepsy. Patch-clamp technique is discovered at 1976. In the method, the cells are attached by a borosilicate capillary tube for induction of gigaohm seal. There are four types of patch-clamp technique namely on-cell, whole-cell, inside-out and outside-out. In recent years automatic patch-clamp techniques were also discovered but there is discussion on success rate of the automatic patch-clamp cells in cell records. Over production of reactive oxygen species (ROS) through TRPV1 and TRPM2 channels induces over Ca²⁺ influx in neuronal cells and the cells will expose either programmed death (apoptosis) or decrease of physiological functions. It is well known that cytosolic Ca²⁺ influx has important role on induction of peripheral pain. Recently we have firstly indicated importance of oxidative stress-dependent activated TRPM2 channels in dorsal root ganglion and hippocampus of rats. In conclusion, Patch-clamp technique is best technique on oxidative stress-dependent activation of TRP channels in neuronal cells. I observed that TRPV1 and TRPM2 channels has important role on pathophysiology of neurological diseases. However, there is need future studies on antagonists of TRPV1 and TRPM2 channels in neuronal cells.



Oral Presentation

Cerebral aneurysms and endovascular treatment (EVT)

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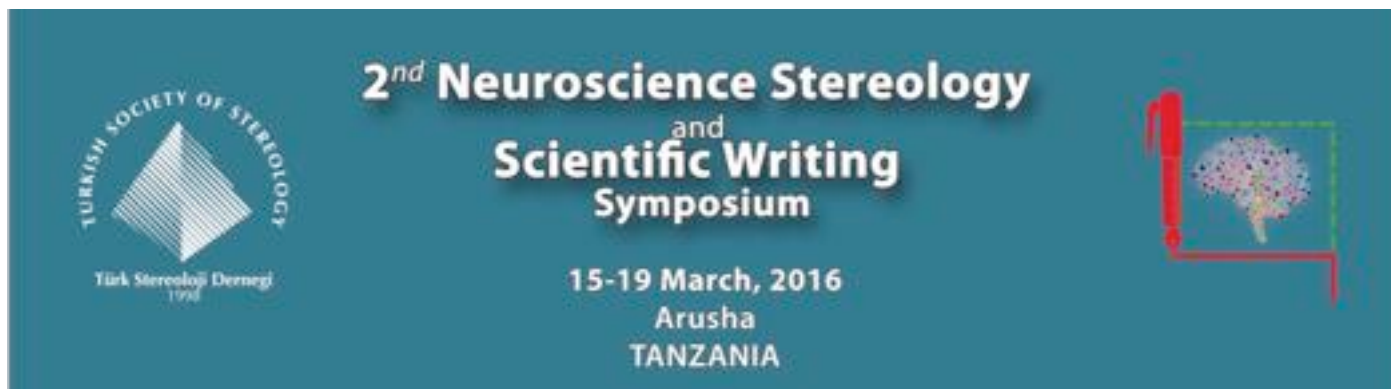
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Keywords:

Aneurysm
EVT methods
Subarachnoid hemorrhage
Balloon modelling

ABSTRACT

Aneurysms are defined as pathological dilatations in vessels. They can be morphologically classified as saccular and fusiform. Their prevalence is up to 5% in large autopsy series. Mechanism of aneurysm formation is weakening of the vessel wall with increasing of pressure and/or flow in the vessel. Symptoms of the intracranial aneurysms may be headache, TIA, seizure, mass effect resulting in cranial neuropathy, visual field defects, trigeminal neuralgia, pituitary dysfunction and most importantly subarachnoid hemorrhage (SAH). SAH is the most serious result of intracranial aneurysms. SAH is responsible for 25% of all deaths from cerebrovascular diseases. Major neurological deficits were seen in 30-50% of the survivors. In SAH, rebleeding is seen 15% (2-25%) in the first hours, and cumulative rebleeding rate is 20-40% in the next 4 weeks. For the treatment of intracranial aneurysm, options are surgery and endovascular therapy (EVT). EVT methods for intracranial aneurysms are parent vessel occlusion, standard coil embolization, coil embolization with balloon modeling, stent-assisted coil embolization, flow diverters, intra-aneurysm flow disruption. Treatment strategy depends on both deciding the best possible method and clinical status of the patient. In ruptured patient, treatment should be accomplished earlier. Standard coil embolization is a common EVT method. Treatment of the aneurysm is accomplished by filling of the sac with suitable diameter, length and configuration of the coils. In cases of wide-neck saccular aneurysm where the coils will not be kept in the sac, neck modeling technique with balloon or stent is applied. Another method of EVT for intracranial aneurysms is placement of flow diverters. They cause stagnant intraaneurysmal flow which causes thrombosis of aneurysm over time. The patients have to use antiagregan lifetime after stent placement due to increased intravascular



Oral Presentation

Cannabinoids and epilepsy

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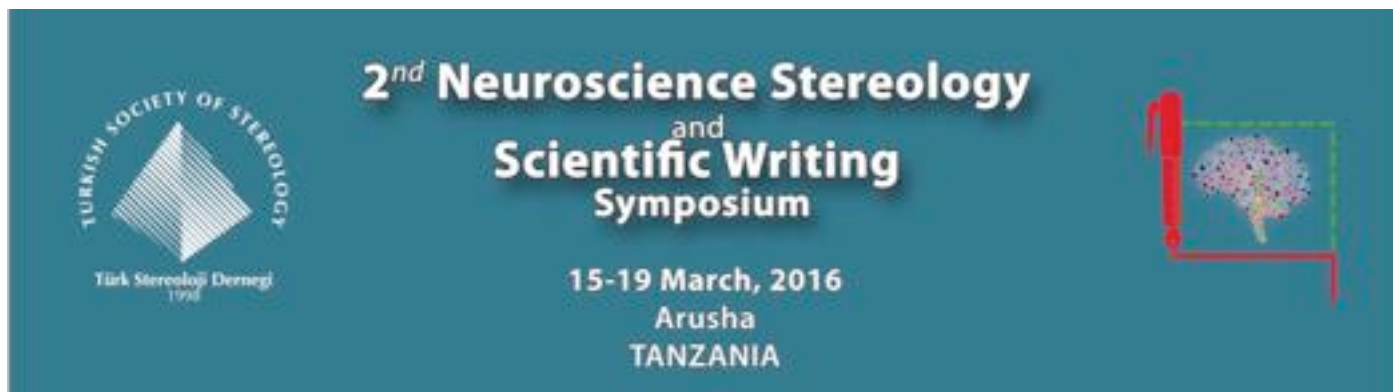
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Keywords:

Anticonvulsant activit
Cannabinoids
Epilepsy
CB receptors
Seizure

ABSTRACT

Cannabinoids exert a neuroprotective influence on some neurological diseases, including epilepsy. Synthetic cannabinoid receptor agonists/antagonists or compounds can provide symptom relief or control the progression of neurological diseases. However, the molecular mechanism and the effectiveness of these agents in controlling the progression of most of these diseases remain unclear. Epilepsy is a common chronic neurological disease, which is characterized by recurrent spontaneous seizures that are associated with an imbalance between excitatory and inhibitory systems in various regions of the brain. Researchers have proposed several mechanisms have to explain why the excitability of neurons increases in epilepsy. Cannabinoid systems appear to regulating seizure activity in the brain through the activation of cannabinoid CB1 receptors. An abundant series of cannabinoid analogues have been tested in various models of epilepsy. Δ^9 -tetrahydrocannabinol (THC) reduced the seizure frequency or severity of epileptic activity in most experimental models of epilepsy, whereas it had no effect on or potentiation of epileptic activity in other studies with different types of epilepsy models, indicating that THC is likely not involved in the anti-epileptic effects of cannabis. Although the certain molecular mechanism for these opposite effects is not known, most probably, the activation of CB1 receptors is not sufficient to yield therapeutic effects in epilepsy. Cannabidiol (CBD) exerted anticonvulsant effects in both in vivo and in vitro models of epilepsy. Despite the convincing demonstration of the anticonvulsant properties of CBD in various experimental models of epilepsy, CBD did not alter the frequency of seizures in cobalt-epileptic rats. However, possible multiple mechanisms have been suggested for the anti-epileptic effects of CB. These include the activation of the nuclear peroxisome proliferator-activated receptor- γ , 5-HT_{1A} receptors; the activation of the transient receptor potential of vanilloid-type 1 (TRPV1) and TRPV2 channels; inhibition of the cellular uptake and degradation of the endocannabinoid anandamide; and inhibition of the uptake of serotonin, adenosine, noradrenalin, dopamine, GABA and t-type calcium channels. Although a few reports on the clinical use of cannabinoid extracts as anti-epileptics have been published, it is unclear whether cannabinoids might be efficacious and safe in the treatment of epilepsy.



Oral Presentation

The ethical issues in experimental animal research

Abdurrahman Aksoy

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ARTICLE INFO	ABSTRACT
<p>* Correspondence to: Abdurrahman Aksoy Department of Veterinary Pharmacology and Toxicology, Ondokuz Mayıs University, Samsun, Turkey</p> <p>e-mail: abaksoy@gmail.com</p> <hr/> <p>Keywords: Ethics Animal experiments Animal rights Computer simulations</p>	<p>Annually, more than one hundred million laboratory animals are used in scientific studies worldwide. While the need for studies on the laboratory animals is gaining importance day by day, the debate has been growing over the use of animals for scientific purposes, focusing on protecting the rights and improving the welfare of laboratory animals. The ethical concerns from the society have enabled the development of alternative methods that could replace the use of laboratory animals. In the meantime, some rules on the use of the animals in experiments have been incorporated into the national and international legislations and become legally binding. In Turkey, animal experiments are regulated in compliance with European Union standards, for which the legal basis is constituted by two ordinances that are published in 2011 and 2014. In this presentation, use of the laboratory animals in the World, and particularly in Turkey, ethical legislations on experimental animal studies (European Union, USA, Canada, African Countries etc.), ethical committee application procedures, alternatives to laboratory animals (cell cultures, computer simulations, isolated organ systems) are summarized.</p>



Oral Presentation

Development of the human auditory pathway: A morphological study

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Keywords:

Cochlea
Cochlear ganglion
Cochlear nucleus
Auditory cortex

ABSTRACT

Human auditory system undergoes absolute sensitivity, sound localization and perception to sound at the time of birth. Brain activity and responses to auditory stimuli have been demonstrated during the last trimester of gestation. On the contrary, studies conducted in lower animals have an immature auditory system at the time of birth. In these animals anatomic maturation of the cochlea, cochlear ganglion, cochlear nerve and cochlear nuclei and auditory cortex is attained by two to three weeks postnatally. The physiological maturation also correlates well with the anatomic maturation of the auditory structures. Following the onset of physiological hearing there is a critical period during which appropriate auditory stimulus is required for normal and fine tuning of acoustic characteristics in adults. The present paper discusses a series of studies undertaken to observe the morphological maturation of the human cochlea, cochlear ganglion and cochlear nucleus and auditory cortex during prenatal period. SEM studies of the cochlear hair cells showed undifferentiated pseudostratified epithelium at 14th weeks; differentiation of hair cells started by 16th week of gestation and at 37th weeks of gestation, they were well defined and mature. The cochlear ganglion was immature at 14th weeks of gestation. An increasing trend of maturation of cochlear ganglion neurons was observed from 16th weeks to 22th weeks. At full term the ganglion cells displayed adult morphology with evidence of myelination and synapse formation. The cochlear nuclei demonstrated three components, the anteroventral, posteroventral and dorsal, clearly identified by the 16th week. Total neuronal count and cell density of the ventral cochlear nucleus was calculated by the dissector method. A steady increase in the volume of the nucleus, the size and total number of neurons was observed with increasing ages of gestation. Functional maturation of the cochlear nucleus was assessed by parvalbumin, synaptophysin and GABA. Earliest presence of markers was detected at 16th weeks of gestation and a distinct adult pattern was observed at 37th weeks of gestation. Normal morphogenesis of the auditory cortex and the expression of neuronal markers like N-CAM, synaptophysin, BDNF and MAP2 were conducted. At 14th weeks 3 layered cortex was visualized and six layers of auditory cortex were observed at 20th weeks and mature neurons were seen at 30th weeks. NCAM expression was visualized in the most superficial layers at 14th weeks; while in the later ages expression was in the deeper layers. Thus N-CAM expression is present throughout as the cortex reaches maturity at the post natal state. On the other hand synaptophysin expression was faint at 16th weeks and increased gradually till the 30th weeks indicating mature synapses forming at 30th weeks. From the above series of study it is evident that the auditory pathway attains morphological maturation at the time of 37th weeks of gestation.



Oral Presentation

FDTD computer simulation results

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Keywords:

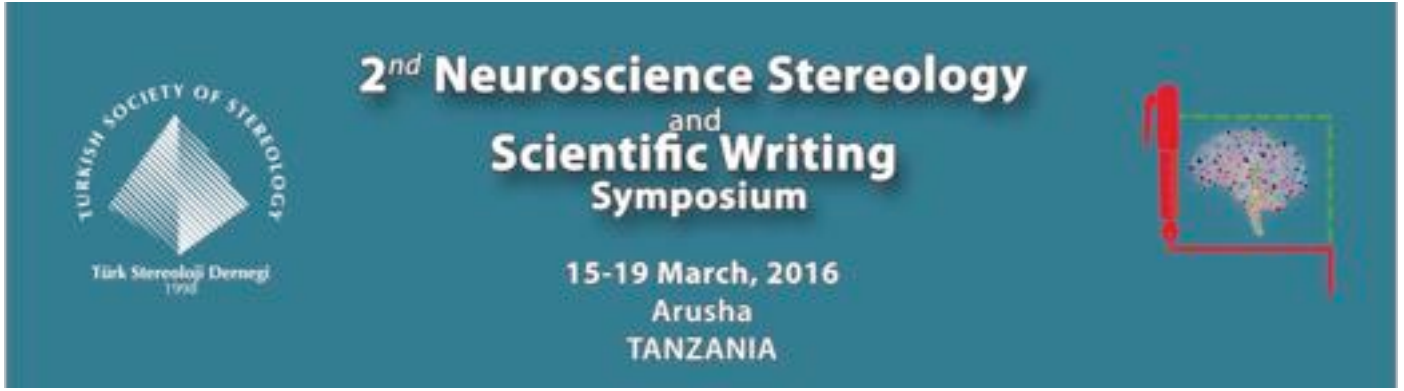
Specific absorption rate
Finite-Difference
Time-Domain
Magnetic resonance images

ABSTRACT

Finite-Difference, Time-Domain (FDTD) is a computational algorithm used for many decades to calculate complex interaction. It is the preferred algorithm of the Federal Communications Commission (FCC) which sets the exposure limit in the USA for calculating the absorbed radio frequency radiation (RFR) within the tissues of human beings. The input to this algorithm is Magnetic Resonance Images (MRI) of actual human beings that provides a 3-dimensional model including internal organs. Many models are available the most common set of these models is known as the “Virtual Family” which includes children of various ages, men, women and pregnant women at various terms of gestation. Also used for input to the FDTD algorithm is a library of absorption parameters (permittivity and conductivity) such that the output of this computation is the Specific Absorption Rate (SAR) is the absorbed power per weight of tissue in the organs (e.g., brain, eye, breast, etc.) in Watts per kilogram (W/kg). Results have shown that children absorb greater radiation than adults, and the younger the child the greater the absorption. Results also show the lower the tissue weight, the higher the SAR value. Typical results are shown below:

Brain SAR (W/kg) by Age and Averaged Tissue Weight					
	Age	1-year	6-years	8-years	10-years
10 g		2	2	2	2
1 g		3	3	3	3
100 mg		4	6	4	5
10 mg		6	10	5	6

It is important to understand the existing exposure limits. Tanzania uses the exposure limit defined by the International Commission on Non-Ionizing Radiation (ICNIRP), $SAR_{10g}=2.0$ W/kg. The USA’s exposure limit, $SAR_{1g}=1.6$ W/kg. Current computer capabilities allows FDTD algorithm to calculate masses as low as 0.01 g (10 mg), which if used as the exposure limit would result in a 6-year old child’s absorption 5-fold higher than the existing Tanzanian exposure limit.



Oral Presentation

In vitro techniques in neuroscience

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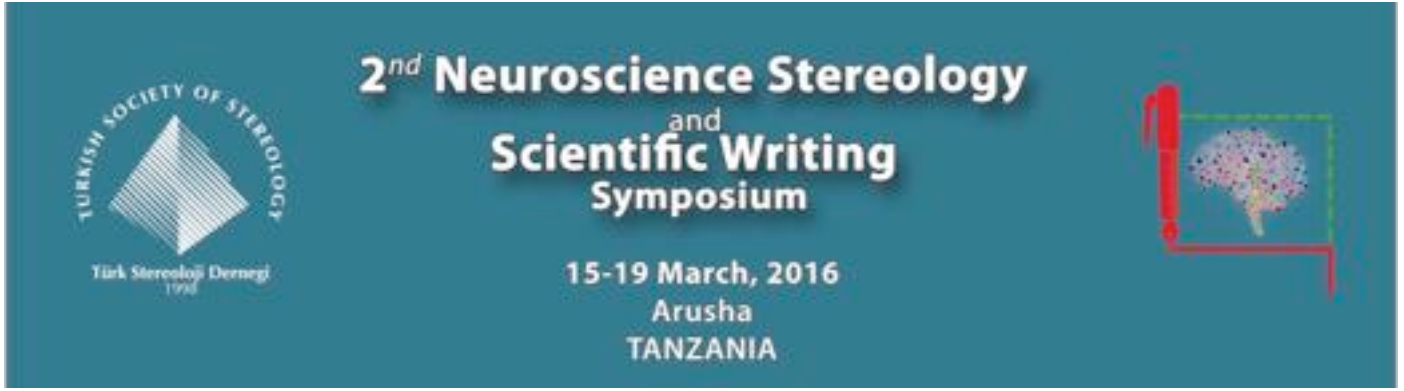
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Keywords:

Neuron culture
Dorsal root ganglion
Drug
Electrophysiology

ABSTRACT

Studies in molecular and cellular neuroscience involve the use of neural cells in controlled conditions of cell cultures. Successful culturing of all types of neural cells are challenging while it is even more tricky for neurons since they do not divide. There are usually two main options for neuron cultures: to use cell lines of tumoral origin that can be differentiated into neurons or to isolate neurons from nervous tissue. While the former offers the comfort of standardization and relatively easier manipulation, the latter provides a better physiological model in the expense of painstaking processes. Another critical challenge is to create a maximally controlled environment for the cells by using defined media without a boost from fetal animal sera. Once successfully kept alive a few days to weeks, neurons can be used for various types of research from drug discovery to electrophysiology. Neurons can extend axons and dendrites in culture, which opens up avenues for investigations regarding neuro- degenerative and regenerative processes. Exploitation of high technology for imaging and manipulation of neurons offers invaluable tools for neuroscience research. In this talk, the basic rules of successful neuron culture will be explained based on mouse dorsal root ganglion neuron culture protocol and examples will be presented.



Oral Presentation

Mechanisms of transneuronal degeneration in an *in vitro* model

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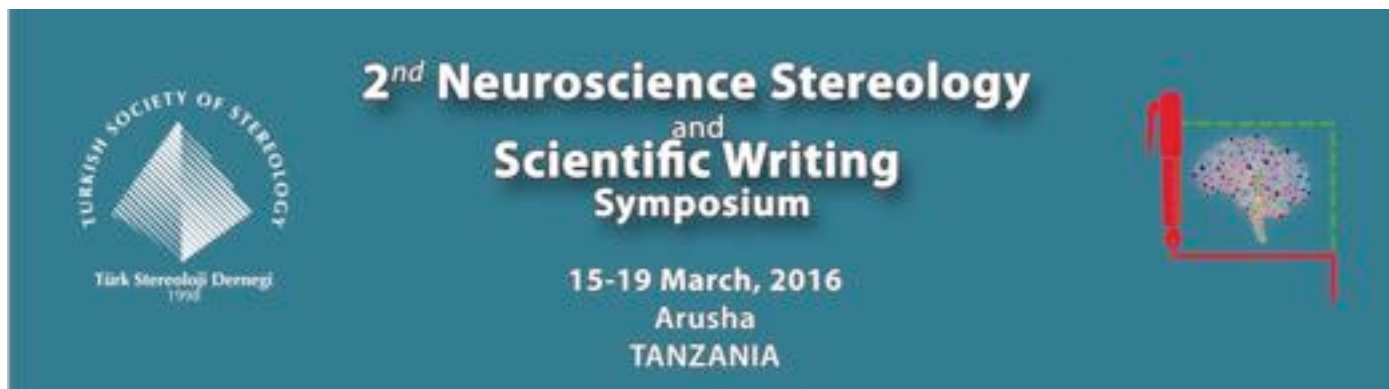
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Keywords:

Transneuronal degeneration
Cell culture
Dorsal root ganglion
NMDA receptor

ABSTRACT

Injury in some parts of the nervous system may result in damage and eventually death of the afferent and the efferent neurons as well as directly injured neuron itself. Investigation of this phenomenon called transneuronal degeneration could contribute to the understanding of the mechanisms of neuronal death which occurs with a delay after the traumatic and degenerative nervous system pathologies. Although there are many *in vivo* models of transneuronal degeneration only few *in vitro* models are present and its mechanisms have not fully been explained. In this study, to induce transneuronal degeneration *in vitro*, neurites of the dorsal root ganglion neurons cultured from young adult mouse were cut with a laser micro dissection device. The effect of this injury on the survival of the surrounding neurons in the culture was analyzed. Twenty-four hours after the injury the ratios of the dead neurons were determined within an area of 2000-micrometer diameter around the injury center. Axotomy of a few cells led to significantly higher number of uninjured neurons to die compared to sham processed cultures, indicating the presence of transneuronal degeneration. Axotomized neurons and nearby uninjured ones became more easily excitable. Apoptotic cell death occurred more prominently close to the injury site. When the neurons were injured in calcium-free cultures, in the presence of NMDA receptor antagonists, purine receptor antagonists or gap junction inhibitors the ratio of the dead cells significantly decreased. The results suggest that putative signals for transneuronal degeneration spread from injured neurons to others and involve NMDA receptor activation and gap junctions and require Ca^{2+} . The *in vitro* model employed here proved to be useful in studying the mechanisms of transneuronal degeneration.



Oral Presentation

Teaching neuroscience in medical schools: Controversy in course designing

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Keywords:

Neuroscience curriculum
Medical neuroscience
Studying neurosciences
Nervous system.

ABSTRACT

Studying the nervous system is best illustrated as different shapes linked together to design a complete circle. Integration of all disciplines is essential in having a mental model about the nervous system. The term neuroscience encompasses different branches of sciences related to the system. No consensus yet about the organization and sequential mapping of the neural sciences especially in medical curricula. Classical curricula studied neuroanatomy, neurophysiology and brain metabolism at the end of the basic medical sciences phase. In the other hand the curricula which adopt organ system modules designed the contents in different ways. Some curricula designed it into human nervous system, special senses and behavioral sciences modules run in parallel. Other curricula arranged the course as neuroscience I studied during the basic medical science semesters and neurosciences II studied at the clerkship semesters. This study aimed to compare the arrangement of human nervous system module in College of Medicine, Karary University – Sudan with some international and national medical curricula. Collection of national curricula designed by senior medical educators was obtained in a form of soft copies. Neuroscience curricula available in the web were also retrieved. The keywords used were *neuroscience curriculum*, *medical neuroscience*, *studying neurosciences*. The search was done in www.ask.com the curricula which were for medical colleges only were retrieved. These were considered as baseline for the national curricula for neuroscience. Nervous system in Karary University and the Nile College was studied as human nervous system, special senses and behavioral sciences at the end of organ – system modules phase. The content includes predominantly basic sciences. Clinical parts were considered at the clerkship semesters within medicine, surgery and pediatrics courses. Khartoum university, Aneelain university Kordufan University and Red sea university which are colleges applying traditional curricula have no defined neuroscience module. Clinical correlations were discussed during the preclinical semesters. Gazeera University, Africa international university and the National University designed the course to include anatomy of head and neck. It was at semester six just before clerkship rotation. There are different modalities and ways in the Sudanese medical schools to design and conduct the teaching of neuroscience based on the type of the curriculum adopted by the college. Studying neuroscience in a spiral manner is practically applicable to build an integrated basic science foundation completed by clinical interpretation. College of Medicine in Karary University applied curriculum organization which similar to international curricula organization.



Oral Presentation

Variations in cutaneous innervation of the hand vary with gender and sidedness

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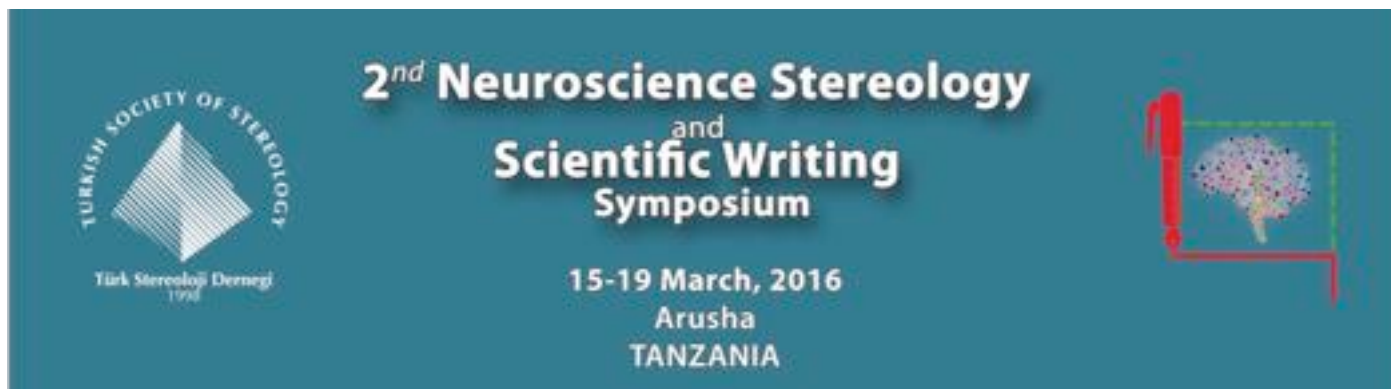
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Keywords:

Hand innervation
Median nerve
Medio-ulnar communication
Radial nerve
Radio-ulnar communication
Ulnar nerve

ABSTRACT

Application of nerve block for pain management had drawn the attention to study variation in hand innervation. Medio-ulnar communication had been widely reported as well as between the radial and ulnar nerves on the dorsum. This study aimed to shed a light on the pattern of variations in the nerves of the hand among cadavers in medical schools in Khartoum state. This is a cross sectional study. Manual tracing of the radial, median and ulnar nerves was done in formalin preserved cadavers. Tracing was from beneath the elbow to the distal phalanges. A special care was taken to investigate the communication between the nerves, pattern of distribution in the phalanges and presence of coexisting variation in the same specimen. Number of female cadavers was too small. In the dorsum variation were detected among females in both hands while it was more in left side among males. The variations were in a form of symmetrical distribution of the radial and ulnar nerves and communication between the nerves. Innervation in the palmer aspect was textbook picture in both hands regardless to gender. Dual supply of the ulnar half of the ring finger by radial and ulnar branches was detected in one case. Variations in pattern of nerve distribution and communication between nerves were detected to be more prevalent in the dorsum. Care should be taken during nerve block. Small sample size in female made the study in a need for support by further researches with larger sample.



Oral Presentation

Key performance indicators for quality measurement in medical schools

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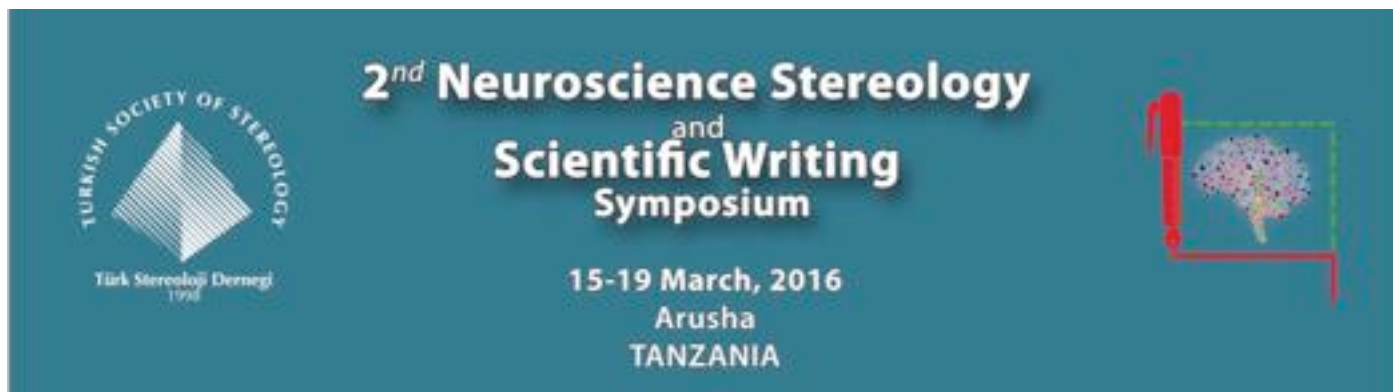
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Keywords:

Medical schools quality
Key performance indicators
Learning outcome
Educational progress

ABSTRACT

Key performance indicator is one of the tools that measure the performance of higher education institutions as numerical measures. Also Key performance indicators (KPIs) provide information and statistical data that allows medical schools to determining their educational progress towards a certain degree of goals stated by vision and mission of that school. In simple definition, the KPIs in quality are capable to answer a very important question; how to know what you have achieved? These quality tools help the medical schools to adopt an effective continuous improvement of quality system. For example, in action improvement plan first set the priorities and realize the size of the problems, to design and implement planning and also the vision of future expectations. All these led to quality improvement of the medical schools from traditional classical approach to problem based solving community service medical schools complying with local and international medical school standards. This further allows the school to compare its performance with other peer medical school by benchmarking selection for comparison in order to evaluate ourselves, which considered being one of the information data of KPIs that could be used effectively to implement improvement and development. KPIs quality measurement helps in the monitoring progress of performance and its development and contributes in the following up of these schools. Finally, the importance of employing KPIs can be summarized that it helps the medical schools to evaluate their performance in an accurate quantitative manner rather than from indefinite qualitative information. It also encouraged the units for accomplishment via the existence of certain mechanism to evaluate performance levels and to create competitiveness between all departments and units to achieve much better levels of performance in order to honor outstanding performance and reward outstanding personnel through adopting the system of incentives. All these allowed us to implement the KPIs Quality measurement in the University of Hail Medical School, Kingdom of Saudi Arabia which showed a clear quality map for a continuous improvement following the graduation of first batch of students in term of intended learning outcomes and goals.



Oral Presentation

Investigation of the carbapenem resistance in multi-drug resistant acinetobacter and pseudomonas isolates in intensive care units

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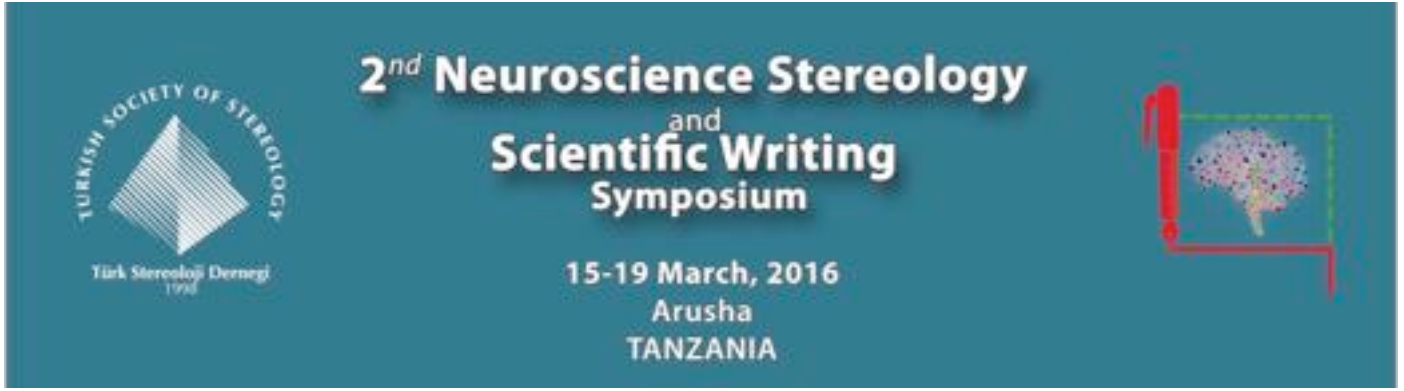
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Keywords:

A. baumannii
P. aeruginosa
Carbapenemase

ABSTRACT

Study strains included imipenem or meropenem resistant 51 *Acinetobacter baumannii* and 51 *Pseudomonas aeruginosa* isolates in Yüzüncü Yıl University Dursun Odabas Medical Center, Turkey. Antimicrobial susceptibility testing of the isolates were performed by Kirby-Bauer disk diffusion method and BD Phoenix automated system at intensive care units in our hospital. All strains that cause carbapenem resistance by IMP, VIM, GES, GIM, SPM, OXA-10, OXA-23 and OXA-51 gene regions was determined with Polymerase chain reaction (PCR). PFGE was used to investigate of the clonal relationship. IMP, VIM, GES, GIM gene regions have not been detected of PCR evaluation in any of totaly 102 isolates. The genes of OXA-51 (98%), OXA-51 (77%), OXA-23 (77%) and SPM (4%) were found in *A. baumannii* isolates. In these strains, we identified together with OXA-23&OXA-51 77% and OXA-23&OXA-51&SPM 4%genes. The genes of OXA-51 (18%) and OXA-10 (14 %) detected in *P. aeruginosa* isolates. According to PFGE clonal analysis results, cluster rate was found to be 80 % *A. baumannii* strains and 53% *P. aeruginosa* isolates.



Oral Presentation

Ethical issues in human research

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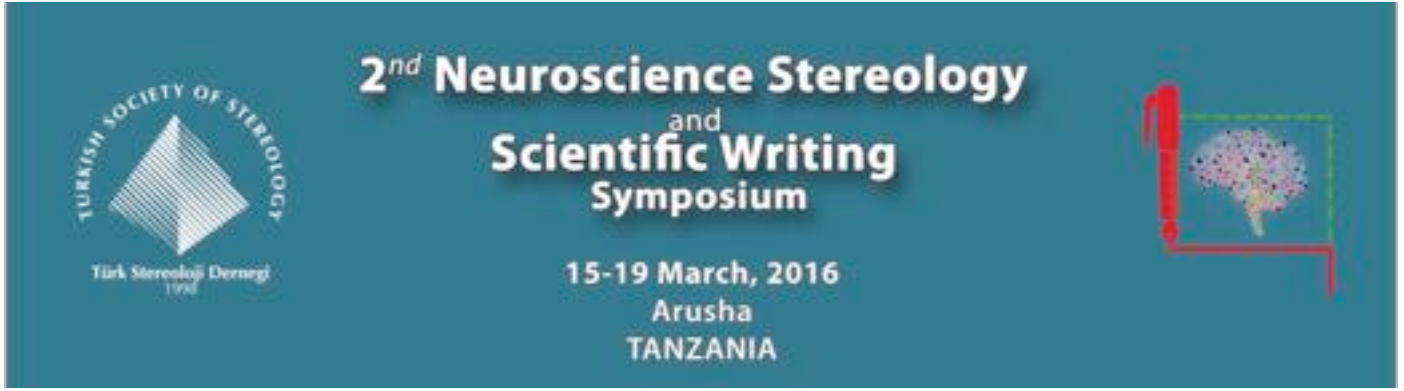
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Keywords:

Ethical issue
Human research
Clinical trial
Declaration of Helsinki

ABSTRACT

Medical research seeks a better understanding of human physiology and investigates a wide variety of other factors in human health, including patterns of disease, the organization, funding and delivery of healthcare, social and cultural aspects of health, law and ethics. The most common method of research for practicing physicians is the clinical trial. In clinical trials, there are potential problems that must be recognized and avoided. In the first place, the physician's role in the physician-patient relationship is different from the researcher's role in the researcher-research subject relationship, even if the physician and the researcher are the same person. Another potential problem in combining these two roles is conflict of interest. To solve such these problems basic principles of research ethics are established. In 1954, the World Medical Association adopted a set of Principles for Those in Research and Experimentation. This document was revised over the next ten years and eventually was adopted as the Declaration of Helsinki (DoH) in 1964. It was further revised for several times up to 2013. The DoH is a concise summary of research ethics and includes the following principles: Ethics Review Committee Approval, Scientific Merit, Social Value, Risks and Benefits, Informed Consent, Confidentiality, Conflict of Roles, Honest Reporting of Results and Whistle-blowing. Despite these principles there are still some unresolved issues. As medical science continues to advance, in areas such as genetics, the neurosciences and organ and tissue transplantation, new questions arise regarding the ethical acceptability of techniques, procedures and treatments for which there are no ready-made answers. All these issues will require much further analysis and discussion before general agreement is achieved. Despite all these potential problems, medical research is a valuable and rewarding activity for physicians and medical students as well as for the research subjects themselves. Indeed, physicians and medical students should consider serving as research subjects so that they can appreciate the other side of the researcher-research subject relationship.



Oral Presentation

Preparing figures for publication

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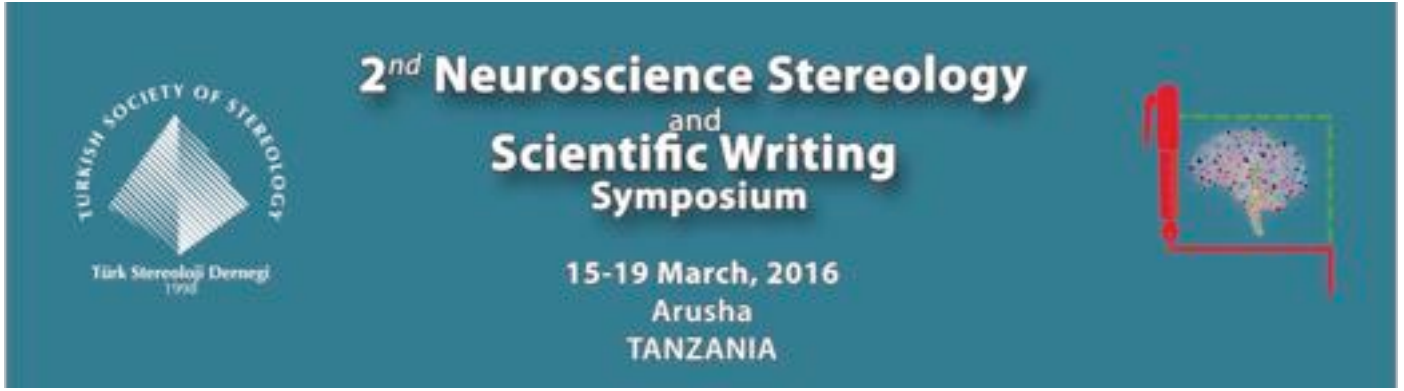
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ABSTRACT

High quality figures are essential for presenting findings of a study in a convincing and more comprehensible manner. Scientific journals may have some special requirements in this sense, while most of the requirements are quite common. Data charts are the most commonly used tools to summarize quantitative findings. Although there are some special software to create such charts, commonly used spreadsheet program Microsoft Excel is usually more than sufficient. However there are a few less - known issues like putting error bars and selecting appropriate font size and chart colors. Rendering the charts at desired resolution is another challenge which needs help from an image processing software like Adobe Photoshop. These and some other essential tips on data chart preparation will be discussed with live applications.

Keywords:

Data chart
Resolution
Excel
Photoshop



Oral Presentation

Writing discussion

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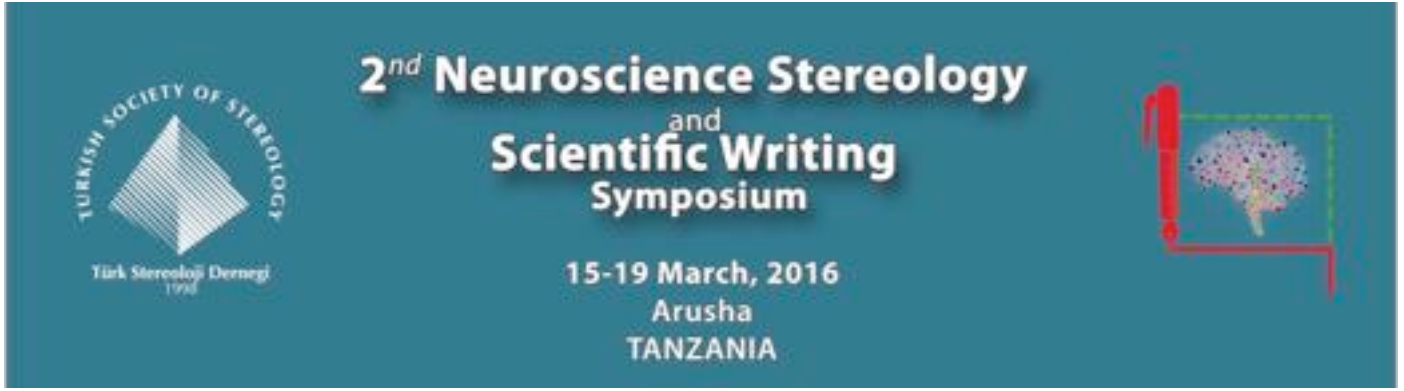
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Keywords:

Writing a manuscript
Discussion section
Academic writing
References

ABSTRACT

Sharing knowledge produced during academic life is achieved through writing manuscripts. Writing a good quality research paper and having it published is possibly the most important step in the research process. The major point to remember is that the research papers should be written complying with principles of simplicity, clarity, and effectiveness. The scientific paper is traditionally divided into four sections: introduction, materials and methods, results, and discussion. In this context, no single section can be written without consideration of another. At this point, the discussion part serves to answer the questions posed in the introduction, explain how the results support the answers and how the answers fit in with existing knowledge on the topic. This is the main section in which the author can express his/her interpretations and opinions also describe the virtues and limitations of the study. In order to make the message clear, the discussion should be kept as short as possible whilst still clearly and fully stating, supporting, explaining and defending the answers to the questions as well as discussing other important and directly relevant issues. So, when writing a discussion, scientists should carefully think about the subject under investigation, about the quality of work conducted and about what can be modified in the future studies. Every scientific paper should present a contribution to a scientific conversation. So, the discussion section is an important part of the research paper that allows the authors to showcase the study. This part is the most difficult section to write and define. A good discussion adds a strong finish to a scientific paper. It brings meaning to related study. At this point, many papers submitted for publication are rejected based on problems with the discussion. Therefore, it is necessary for the authors to plan especially the discussion part well, and write it in a focused manner describing the significance and importance of the study findings.



Oral Presentation

Impact factor and h-index

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Keywords:

Bibliometric measurements
h-index
Journal citation reports
Impact factor

ABSTRACT

Two important bibliometric measurements are the impact factor and the h-index that are used for journals and authors, respectively. For the first time, the impact factor was proposed by Eugene Garfield. The impact factor is a ratio between citations and recent citable items published in the last two years (recently five years) before current year. So, the impact factor of a journal is calculated by dividing the number of current year citations to the number of published articles in that journal during the previous two (or five) years. Journal Citation Reports calculates and publishes the annual impact factors for each journal. If a journal has high impact factor, it shows that this journal's articles have been cited more. On the other hand, Jorge Hirsch proposed the h-index in 2005. The h-index quantifies scientific productivity and the impact of a scientist based on the set of the researcher's most cited papers and the number of citations that they have received in other people's publications. So, a higher h-index indicates more publications that have been cited more often.



Oral Presentation

Microscopy, tissue and tissue processing

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Keywords:

Tissue processing
Light microscope
Electron microscope
Hematoxylin and eosin staining

ABSTRACT

Most biological materials are made up of a large number of cells and tissues of varying size and shape. These are connected to form continuous three-dimensional organs. The common question that arises in each student or researcher is how a two dimensional image of a histology slide or an electron micrograph relates to a three dimensional structure to which it represents. To understand this concept a basic understanding of tissue processing for light and electron microscopy and the fundamental principles of light microscopy is essential. Tissue processing: To appreciate the microstructure of any tissue under a light microscope, the tissue has to go through a process of fixation, processing, sectioning and staining. Tissue processing aims to embed tissue in a solid medium firm enough to support and make it rigid to cut thin sections using a microtome; which can be subsequently stained and viewed under the microscope. Most commonly used embedding medium is paraffin wax for light microscopic studies. Freezing tissues to obtain a solid block from which thin sections can be cut by a cryotome are in use for histochemistry and immunohistochemistry. Hematoxylin and eosin is commonly used to stain the basic tissue structure; where hematoxylin is a basic dye and stains the nucleus blue while eosin is an acidic dye and stains cytoplasm red. Light microscope is an optical device that uses visible light to magnify a tissue section for better visualization. The tissue is visualized against a bright back ground so it is also referred to as bright field microscopy and is best suited to view stained tissue sections. The word compound refers to the fact that two lenses, the objective lens and the eyepiece (or ocular), work together to produce the final magnified image that is projected onto the eye of the observer. Given sufficient light an unaided eye can distinguish 2 points lying 0.2 mm apart. This distance is called resolution of a normal eye. Light microscope has a resolution of 0.2microns. The other type of microscopes used in laboratories for clinical and research laboratories are a phase contrast microscope, polarizing microscope, fluorescent microscope, confocal microscope. The advent of modern semi-automated computer based stereology systems and the advances in microscopy have made stereology a practical laboratory method. Ultrastructural details are studied by an electron microscope, which has a resolution of 0.2nm. Small tissues are used and processed by primary and secondary fixation, dehydration and infiltrated with epoxy resin which polymerizes to form plastic blocks. Ultra thin sections are viewed when an electron beam passes through it and forms an image on a viewing screen.



Oral Presentation

Introduction to stereology and sampling strategies

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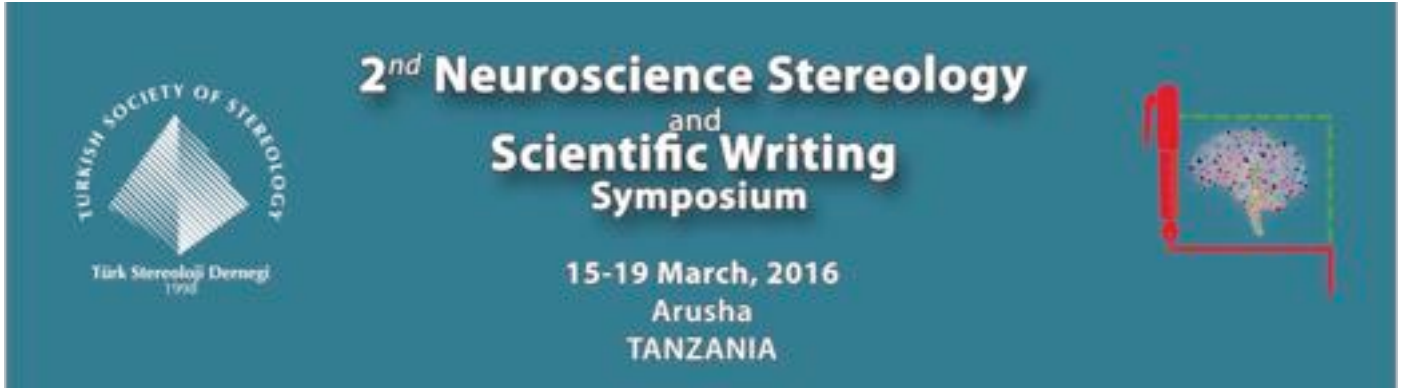
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Keywords:

Cavalieri Principle
Disector
Fractionator
Sampling
Stereology

ABSTRACT

Stereology is a methodological science that can predict the morphological properties of three-dimensional objects by quantitative analyzing of their two-dimensional images. Thanks to the stereology, the information obtained about the structures is independent from biases and reliable. The evaluation of the data obtained from the light microscopy (conventional and confocal), electron microscopy and other types of microscopy, and also MRI, computerize tomography constitute a main basis for the stereological analysis. An estimation of length, surface area, volume, and number of objects for 3-D tissue structures in an organ would be provided by stereological techniques. With the systematic random sampling approach, researchers can make accurate and reliable estimation of morphological features of organs and tissues using stereological techniques. At the beginning of the study, the sampling process for a subject is designed by the researcher to the desired degree of precision. Sampling strategies should be used in every step of the stereological estimation process, from the Cavalieri's estimation of volume to the optical fractionator.



Oral Presentation

Stereological estimation of peripheral nerve fibers

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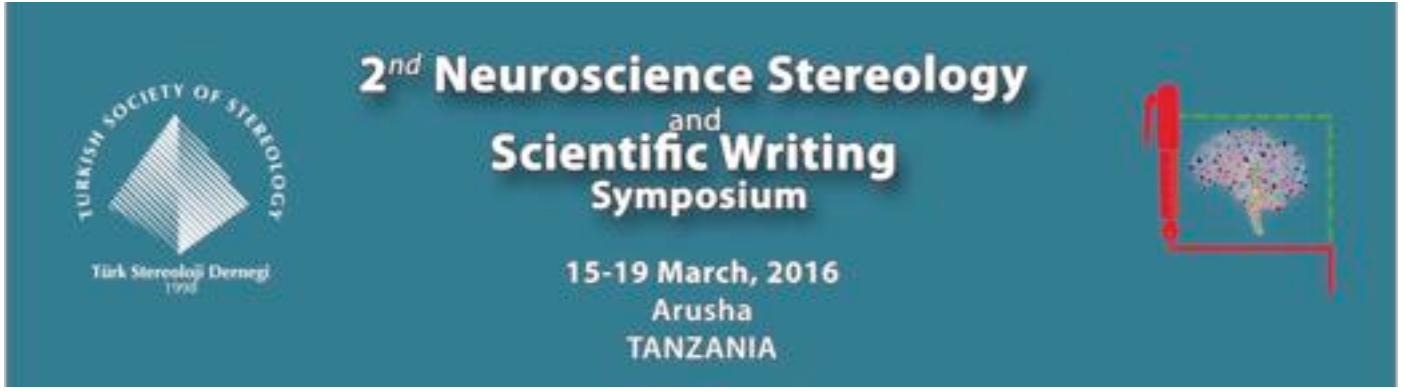
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Keywords:

Peripheral nerve
Stereology
Nucleator
Fractionator
Sampling

ABSTRACT

Stereology is a branch of science that interests in with inferring the three-dimensional properties of structures and it is dealing with the geometrical features of objects such as number, length, area and volume. The aim of the stereology is to understand the three dimensional arrangement based on the analysis of the structure slices which only shows two-dimensional information and to deal with the morphological bias in sampling, counting and measuring objects. Unbiased stereological techniques help investigators to make descriptions of the relationships between structure and function of the structure. It measures volume, surface, length, and object number of the structure that can be used to make quantitative analyses for comparative and experimental studies of the tissues. The term of unbiased refers to the measurements or estimations that approach the true value with increased number of repeated experiments for getting accurate results and bias occurs because of the faulty assumptions, wrong models, and incorrect correction factors. At this point, stereology is unbiased, reliable, and accurate method that includes sampling for approaching the true value after repeated measurements. For preventing bias depend on size; the unbiased counting frame is used. Counting frame is divided into two equal halves and lower half is called exclusion area and the other half is called inclusion area. The profiles must be counted which are trapped completely inside the frame and the profiles hit by the inclusion sides. On the other hand, any profile hitting the exclusion sides and their extensions must be excluded from counting even if a small touch. According to the stereological parameters or step size, sampling areas are choosen. For the area estimation and myelin thickness, the approximate centre of the axon profile is marked by using the analyse program, it shows four right-angled, isotropic directions on axon which we want to estimate area on it. Then edges are choosen which join to myelin sheat and axon area. After that, program estimates total length of both myelin thickness and axon diameter and eventually calculate axonal areas. This kind of method is called as nucleator in stereology.



Oral Presentation

Estimation of particle number on physical and optical sections: Physical and optical Disector

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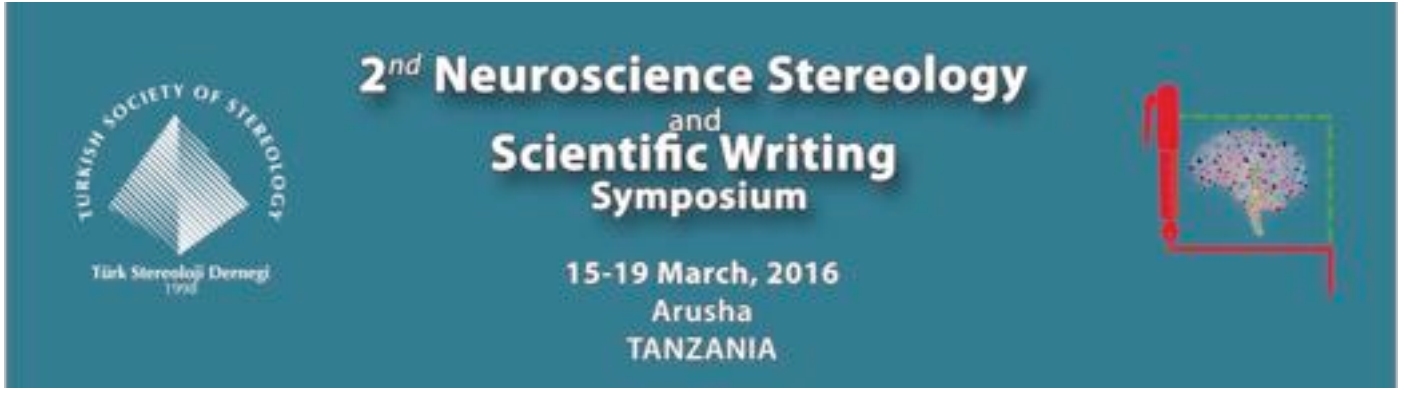
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Keywords:

Cell number
Counting
Disector
Fractionator
Stereology

ABSTRACT

Stereology is a combined mathematical and statistical method, which gives useful quantitative information about biological structure. Using the stereological method, it can be get some quantitative features of organs or tissues such as volume, surface area, numerical density, and numbers of particles. The disector method is mainly based on the principle of estimating the numerical density by using two adjacent sections or images of tissues that are taken from three-dimensional structure. This method is used to find the numerical density in consecutive thin sections (physical disector) with known distance between each other, and in thick optical sections (optical disector) with known depth between each other. In order to calculate the total number of particles in biological tissues, another type of stereological techniques that is named as fractionation method (optical fractionator) uses the disector method. This combined method, the optical or physical fractionator, is one of the most effective particle counting methods used in commonly in neuroscience since it is not affected by shrinkage or expansion of the structure during tissue processing and also the size and orientation of the particles in tissues.



Oral Presentation

Estimation of volume and volume fraction on macroscopic and radiological sections

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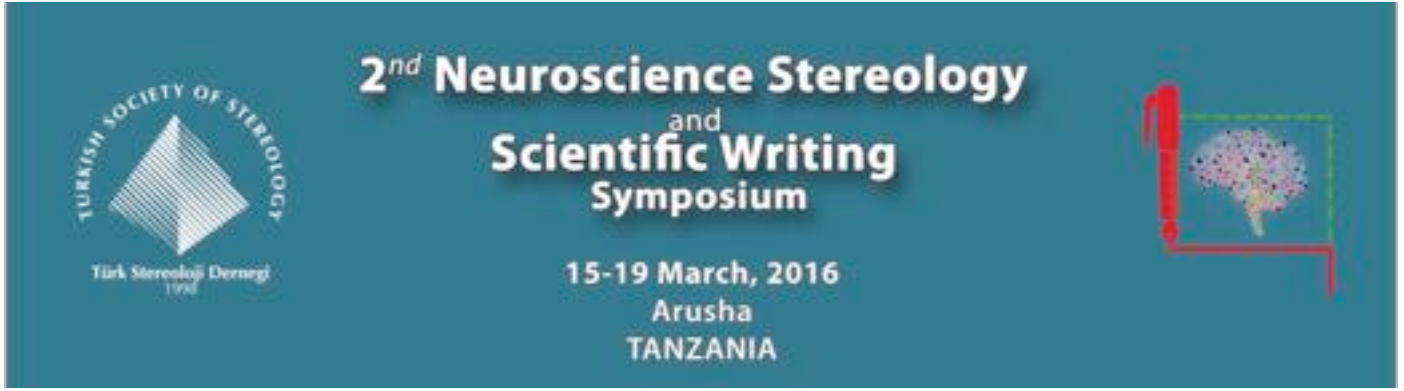
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Keywords:

Cavalieri Principle
Volume
Volume fraction
Microscopy
Stereology

ABSTRACT

The Cavalieri volume calculation method, which is one of the stereological methods used in the determination of the volume of an organ or its components, was introduced by the Italian mathematician Bonaventura Cavalieri in the 17th century. With this method, it is possible to calculate the volume of the organ and its components on routine histological sections as well as CT and MR images. According to this highly effective and reliable method, the structure whose volume (V) is to be calculated is divided into equal thickness (t) slices at equal intervals. The volume of organ or region, it would be done by measuring the surface areas (a) of the same direction and multiplied it by the mean slice thickness. In this method, the measurement of the surface area is provided by the area of the used point counting grid consisting of points (+) formed at equal intervals. The grid is placed on the image obtained from the histological section, CT or MR image, and the points superimposing on the surface area are counted. In this context, it is important to know the per point area that is covered by each point (+). The total volume is calculated by taking into account the sampling and magnification ratio (a / p) of the number of points obtained after this counting. The aim of this study is to explain the application of Cavalieri principle.



Oral Presentation

Quantitative morphology of the corpus callosum in ADHD using an atlas-based analysis: A diffusion tensor imaging study

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Keywords:

ADHD
Atlas based analysis
Corpus callosum
Diffusion tensor imaging
MriStudio

ABSTRACT

The white matter (WM) of the human brain has been attracting great attention of neuroscientists as an important area affected by various neurodegenerative diseases. When exploring the role of the corpus callosum (CC) in a psychiatric disorder, it is relevant to examine microstructural characteristics besides its macro anatomical features. To examine CC diffusion characteristics in pediatric patients with attention deficit hyperactivity disorder (ADHD) using diffusion tensor imaging (DTI) and an atlas based anatomical analysis. The institutional ethic board approved this study. Seventeen children with ADHD and ten control subjects (all age-matched) underwent MRI scans. The written informed consent was obtained from the parents of each patient. Morphometric analysis was performed using MriStudio software. The diffusion images were normalized using a linear transformation, followed by large deformation diffeomorphic metric mapping. For 189 CC regions, the volume, fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD), and radial diffusivity (RD) were measured. We found significantly higher MD values in the ADHD group relative to controls corpus callosum (Body of CC, Genu of CC) at the left side. Significant of increased FA were found in ADHD patients in the corpus callosum (Splenum of CC, Genu of CC, Body of CC). Reduced FA values may indicate a reduction in size, myelination, or number of axons passing through this sub region of the CC. Children with ADHD display abnormal diffusion characteristics and anatomical features compared to healthy controls. DTI can provide sensitive information on integrity of white matter (WM) and intra-WM structures in ADHD.



Oral Presentation

Sampling strategies in stereology, the coefficient of error (CE) and the coefficient of variation (CV)

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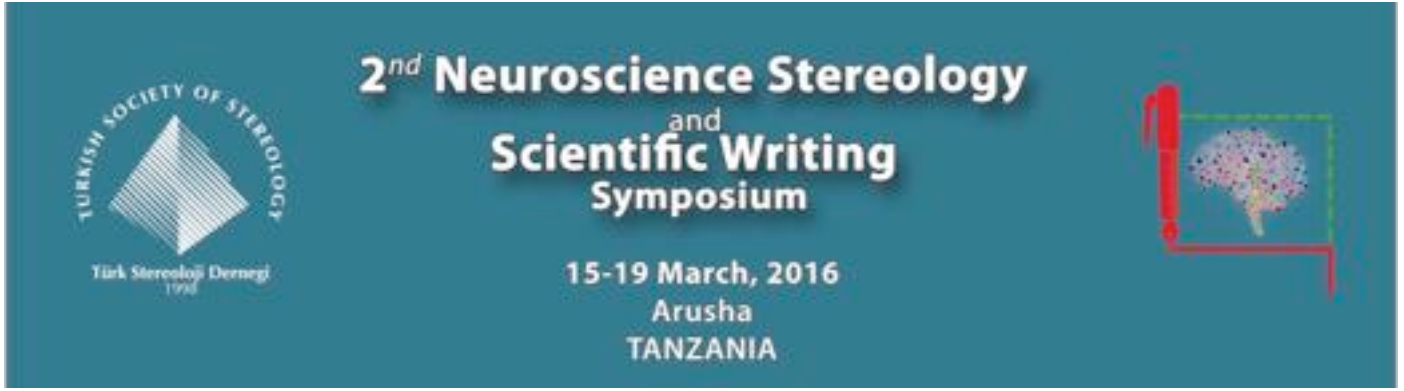
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Keywords:

Stereology
Stereological methods
Coefficient of error
Coefficient of variation
Systematic random sampling

ABSTRACT

Scientists are dealing with biological entities, plants, animals or humans, to derive quantitative data on different biological problems. Every individual cannot be taken for a study. Therefore, it is necessary to take samples from the whole population. The first step of stereological method is making a design for sectioning and sampling. Systematic-Random sampling method is used in stereological analysis; it is carried out with using a pre-defined sampling interval beginning with a random start. The method provides that every part of the structure has an equal chance of being a member of the final sample set. There are two important statistical parameters in stereology; the coefficient of error, or CE; and the coefficient of variation or CV. Coefficient of error shows the error arised from the methodology which is used in a single individual. CV, on the other hand, is a statistical measure of the variability and its magnitude between groups of individuals. The limit of CE is 5% and the limit of CV is also 15%. These parameters are important while analyzing and when they are above the limits, groups or methodology should be reconsidered.



Oral Presentation

Methods for section thickness estimation

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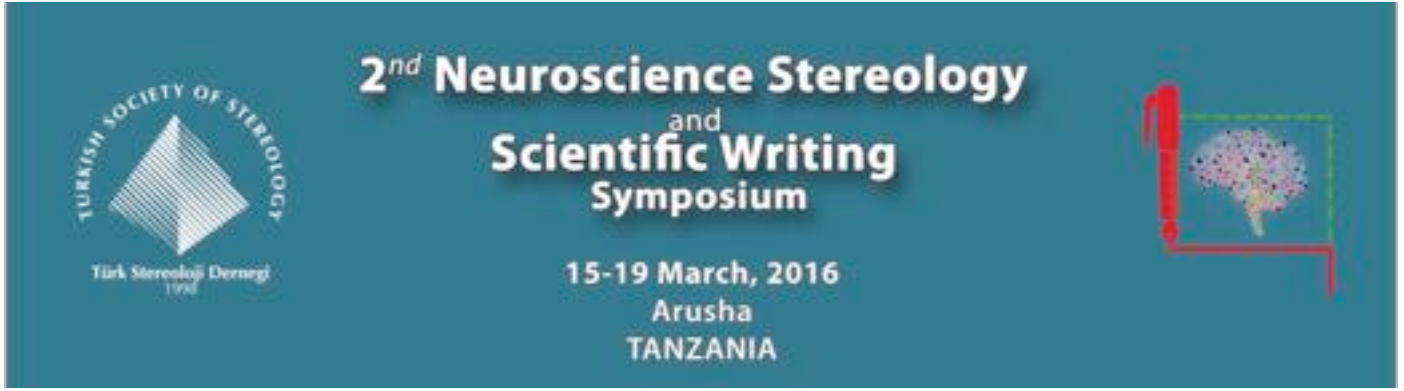
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Keywords:

Sectioning
Section thickness
Stereology
Microcator

ABSTRACT

Section thickness is an important parameter in most of the quantitative studies. In stereological methods, some applications that are volume estimation, disector counting, density estimating and more are carried out with using the section thickness. Thickness measurement apparatus that is a microcator measures the section thickness. The device shows the amount of vertical movements of the microscope table in microns. For microscopic analysis, microcator is generally attached to the stage over a special tracking mechanism so that it can read the vertical displacement of the microscope stage. Section thickness is an important point in stereological analysis; some laboratories do not have microcator. For this reason, some devices can be used instead of microcator such as mechanical microcator. It can adapt a microscope and use as a microcator. The stage movement in all direction including x, y and z-axis can be measured with using three different mechanical microcator. There are also some applications to determine section thickness in electron microscopy. Small Fold method, Re-embedding method, Interference Colour method are some examples of method in electron microscopy. In re-embedding method, section is generated for measurement, and then it embed horizontally into a new block and make a vertical section. Interference colour method is another method for determining of section thickness by using section surfaces, which reflect light in different colours according to their thicknesses. Section thickness is a crucial in stereological analysis; it requires obtaining scientific results.



Oral Presentation

Using reference software (EndNote)

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Keywords:

Reference management software
EndNote
References

ABSTRACT

Reference management software (RMS) is a software for authors and academicians to use for recording and utilising references. After recording citations, it can be used a lot of times for generating references, such as lists of references in articles, books and scientific papers. RMS is useful while struggling to format references and to insert the name of author for resubmit to a second journal. At this point, RMS is handle large amounts of data which are collected from previous publications and it saves a large amount of time during the manuscript drafting phase of a research project. Writing manuscript can became simple so that researchers can focus on other aspects of the research process and can reserve their times. RMS can be easily plugged in to the word process software and it can automatically create references according to journal style. Then, citations can be inserted manually or automatically from online search tools which is one of the most valuable uses of RMS. Also, according to the specifications of a journal's guidelines, formatting differences can be automatically adjusted by setting up specifications of the RMS. One of the famous and user friend commercial RMS program is EndNote that is produced by Thomson Reuters. By using EndNote, customized library of the references can be created. Also, EndNote can automatically create citations matching the requirements of selected journal. After searching and finding an article, it can attached as a PDF and then it can read and annotated. EndNote library can be organized by using groups to categorize references by project or subject and it can be synchronized with multiple computers for sharing references with others and accessing references from almost anywhere with any Internet browser.



Oral Presentation

Gadgets used in stereological analyses

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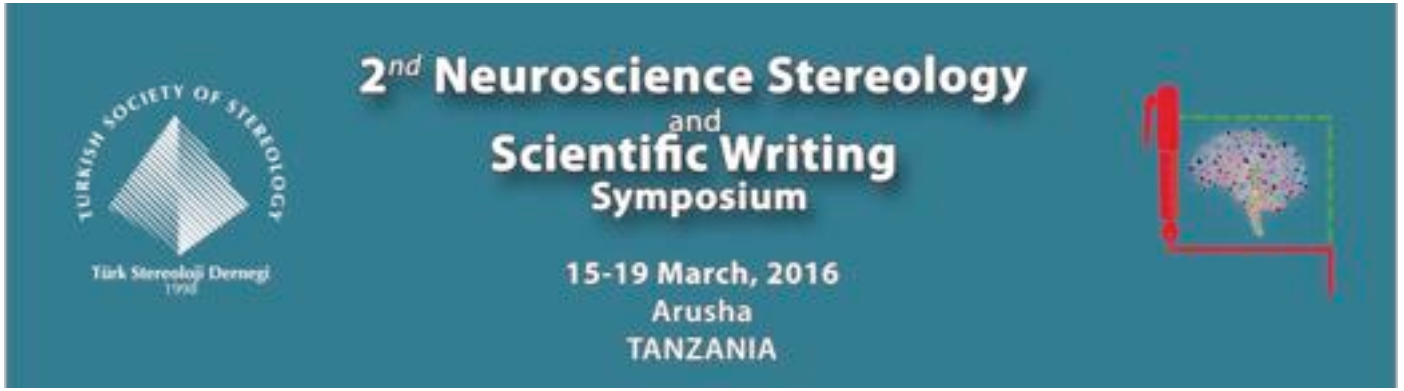
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Keywords:

Computer assisted stereology
Fractionator knife
Microscope for imaging
Microtome
Slabber
Tissue slice

ABSTRACT

Often, stereological design parts may become a problem which needs urgent and consistent solution. The solutions for this problem are slabber, tissue slicer, fractionator knife. The slabber consist of a movable base, a driver knob that controls the movements of the base and a set of knife guides. One can simply put an organ into this chamber, preferably embedded in soft agar or any other supporting medium, and starts cutting through a fixed knife guide while advancing the base in a desired amount between each cut. Tissue Slicer is used for generating uniform slices from a small organ or structure. It has the same principle with the previous slabber, but this one is almost a miniature of it. Fractionator Knife consist of ordinary steel microtome blades lined up between two steel rails. The distance between knives can be adjusted freely by adding or removing small steel rings between them, and once set, we just press it on the organ that we wish to divide into slabs from up to down. Another apparatus for sampling is microtome. A microtome is a tool used to cut extremely thin slices of material. Microtomes use steel, glass, or diamond blades depending upon the specimen being sliced and the desired thickness of the sections being cut. Focusing and imaging has become important in stereological methods. Therefore researchers use some system for stereological analysis. One of the system is microscope for imaging. Microscope for imaging consists of a microscope and an attached system of computer and camera. Another system is computer assisted stereology. Such a system typically consists of a high quality research microscope with different sets of optics and a high resolution camera; a computer; a software for stereology automatization; a computer-controlled motorized microscope stage and additional optinal software or hardware add-ons. There are three fundamental advatages of such systems; large sectional areas can be easily traced, scanned and delineated using the software and the motorized stage. Second, a large collection of stereological probes can be easily applied on live video images with a single click And finally, measurement results can be stored in digital spreadsheets in real-time for further calculations. It will allow time efficient. It is accelerated 6-10 times more compared to manuel methods. Result will get a very high sensitivity and precision in your measurements. Your result will display a low variability compared to manuel techniques. And the validity and reliability of results will be increased. The most prominent brands currently in the market are; The New Cast from Visiopharm, The Stereoinvestigator, The Kinetic's digital stereolog, The Stereologer and so on.



Oral Presentation

Stereological estimate of the total number of axons in optic nerve of the rats exposed different doses streptozotocin induced diabetes*

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Axon number
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Optic nerve
Rat
Stereology
Streptozotocin

ABSTRACT

This study aims to investigate the number of axons in optic nerve of the rats exposed different doses streptozotocin-induced diabetes, estimated by stereological methods. In the study, 25 male adult rats, about three or four months of age weighing 250g were used. Five groups were made which have five rats in each group. All groups of the rats were measured before and after the experiment their blood glucose values and weights were determination in week. Diabetes is made by intraperitoneal application of STZ 45mg/kg, 55mg/kg and 65mg/kg, and another sham (saline group) and control groups each having five male animals. After a week which was the period of the experiment, all rats were perfused following kethalar anesthesia. Optic nerve was prepared semithin sections for light microscopic investigations. Sections of the nerve were stained with toluidine blue with borax solution stain and photographed by light microscope. The axon number of the nerve tissue was calculated by physical disector for each group. All groups were compared to the control animals. Obtained values were evaluated by statistical methods which were Kruskal Wallis and Tukey's multiple tests. Our results that there were significant decreases in the optic nerve axon number in all groups. In light of the data we obtained, while a number decrease was observed in the axon number of optic nerve with adult rats, changed axon numbers among the different doses groups were found to be statistically significant. In this study was support the suggestion that doses of STZ is interferes with development of the optic nerve. Further doses studies were needed in optic nerve tissues.