

POSTER PRESENTATIONS

P-1

Signaling Through β_2 -AR and its Activators During Thyroid Hormone Induced Morphological Differentiation of Astrocytes

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The β -adrenergic system plays a profound role as a downstream regulator of thyroid hormone (TH) mediated maturation of astrocytes. The progressive maturation of astrocytes by TH in culture, involving two distinct stages of morphological differentiation (from radial glia to flat polygonal cells with epithelioid morphology and then to mature process bearing cells with stellate morphology), is impaired in presence of β -adrenergic receptor (β -AR) blockers. We studied the effect of TH on the β -AR subtypes in primary astrocyte cultures. Cells were grown in both TH-deficient and euthyroid conditions. Radioligand binding studies using ^{125}I -pindolol (^{125}I -PIN) in absence and presence of specific β_1 - and β_2 -AR antagonists, (Atenolol and ICI-118551 respectively) had shown a gradual increase in the specific binding of β_2 -AR when observed at 5 days, 10 days, 15 days and 20 days under both cultural conditions. At all ages of astrocyte culture, TH caused an increase in binding of ^{125}I -PIN to β_2 -AR compared to TH-deficient controls. Saturation studies using ^{125}I -PIN in astrocyte membranes prepared from 20 day-old cultures showed a significant increase in the affinity of the receptors (K_d) in the TH-treated cells without any change in receptor number (B_{\max}). 10-day-old astrocyte cultures were treated with TH and β_2 -AR mRNA levels were measured by real-time PCR at various times starting from 2h to 24h. Result showed no significant changes when compared with untreated control and confirmed that increased binding of ^{125}I -PIN to β_2 -AR is not due to increase in receptor number. This prompted us to investigate the role of other regulators of β -AR system. We measured β -Arrestin mRNA levels in 10-day-old astrocyte cultures from 2h till 24h after TH administration and compared with the untreated control. Gradual and significant increases in the β -Arrestin mRNA levels were observed. The results suggest a possible involvement of β -Arrestin in modulating the increased affinity of β_2 -AR during TH-induced differentiation and maturation of astrocytes.

P-2

Role of 5HT-1A receptors in regulation of food intake and obesity

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It has been previously shown that serotonin is involved in many behaviors, which includes food intake. The present study concerns the involvement of 5-HT_{1A} receptors in regulation of food intake and obesity. For this purpose two group of rats were treated with sugar (5gms of sugar dissolved in 10ml of water) and water, orally, daily for three weeks as a test and control group, respectively. The treatment caused a significant increase in food intake than controls and a significant increase in growth rate after second and third week than their first week. At the end of the three week treatment the groups were sub-divided as drug treated and saline treated, intra peritoneally administering 8-hydroxy-2-(di-n-propylamino) tetraline (8-OH-DPAT), a 5HT-1A receptor agonist, and saline respectively. Behavioral effects of serotonin syndrome (forepaw treading, food intake and hyperlocomotion) were observed after 10 minutes. There was not only an increase in the behavioral response of postsynaptic 5-HT_{1A} receptor (forepaw treading and hyperlocomotion) but also an increase in the effectiveness of hyperphagic somatodendritic 5-HT_{1A} receptors after sugar treatment. The results may lead to suggestion that the 5-HT_{1A} receptors may be involved in the food intake and development of obesity and it can be related to the developing obesity observed in children taking high sugar diet.

P-3

Descriptive Study of TCD use in Neurology

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Objective: this study is conducted to describe the common TCD (Transcranial Doppler) finding in various neuro-medical Diseases. Patients & methods: 12 patients with various clinical presentation have been chosen, TCD done and the finding where analyzed and evaluated depending on systolic velocity and waveform by using 2 MHz pulse TCD device. Results: pulse TCD is useful in various neuro-medical disorder in which the cerebral blood flow (CBF) changes is important for diagnosis, management and prognosis as Subarachnoid hemorrhage (SAH), stroke syndromes, brain death, increase intracranial pressure ICP, head injury, vertigo, and prior to cardiac surgery. Conclusion: the TCD is useful simple noninvasive test in different neuro-medical diseases but it is still in its infancy further study is needed to evaluate all finding in various neuro-medical diseases separately.

P-4

Pneumocephalus

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Pneumocephalus is the presence of air within the intracranial cavity. There is not much available data in West Africa. Twelve patients managed by our unit between May 2003 and June 2006 were used in the study. There were 11 males and 1 female aged between 22 and 45 years. All male cases were due to trauma except one following cerebral abscess, while the only female case occurred spontaneously. The commonest symptoms were headache and rhinorrhoea. Pneumocephalus was located in the frontal region in 10 cases, temporoparietal in 1, and occipital in 1. Skull radiograph and CT brain scan were used to confirm the diagnosis in all patients. 4 patients were conservatively managed, out of which 2 died from septicemia. 7 had extradural repair with pericranial patch via anterior cranial approach with no mortality. Only 1 patient had residual neurologic deficit. 1 patient signed against medical advice. Pneumocephalus is commonly due to trauma and surgical repair is safe and effective.

P-5

Exploration of signal transduction mechanism of therapeutic action of *Solanum nigrum*

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In the modern world the recognition, understanding and treatment with phytomedicine have been increased during the last few decades. However, in spite of the progress in the field of research the mechanism of therapeutic action of most of the phytomedicine remains unknown. Because of special interest, with reference to previous work, further in depth study was carried out on *Solanum nigrum* leaves and fruits (red and black varieties). The crude extracts of *Solanum nigrum* (black fruits has highest activity) was selected along with the ethyl-acetate, chloroform, *n*-butanol and aqueous fractions of both varieties leaves and seeds. The effect was observed with acetylcholine, atropine, adrenaline and histamine in the 1×10^{-2} , 1×10^{-4} and 1×10^{-6} molar concentration. Remarkable results observed showed the involvement of muscarinic receptors to produce the therapeutic effects and it could be assumed that the present finding support the effect like acetylcholine through muscarinic receptors in *Solanum nigrum*. Acetylcholine is the neurotransmitter present at neuromuscular junction, brain and gastrointestinal tract etc., therefore, the drugs having acetylcholine like effects have vital role in many diseases as the parasympathomimetic drugs thus the invention of new drugs with minimum side effects provides a great benefit to mankind.

P-6

Effect of halothane anesthesia on memory and role of Piracetam in preventing of its amnesic effects

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Halothane is one of the most extensively used anesthetics. Although it is well established that halothane anesthesia produces amnesia, there is ambiguity about the causes of the memory loss. Investigations have been showed that memory can be impaired by anesthetics. Effect of exposure to halothane anesthesia was studied using single trial passive avoidance learning in shuttle box apparatus. The purposes of this study were to investigate the retrograde and Anterograde effects of halothane anesthesia on memory, and role of piracetam in preventing its amnesic effects. Rats were divided into four groups. Each group contains ten numbers. The control group did not anesthetize. The other groups were anesthetized with halothane (one hour, 3%), either before training (group 2), immediately after training (group 3), or before training using piracetam (500 mg/kg, orally) before anesthesia (group 4). Results showed that memory was not impaired by post training halothane exposure, indicating that anesthetics do not cause retrograde amnesia. Rats trained after recovery from halothane anesthesia showed a memory loss 24h later, indicating that anesthetics cause anterograde amnesia ($p < 0.005$). This deficit could be cleared by using piracetam (500 mg/kg, po) before pretraining halothane anesthesia. These findings indicate that memory impairment following halothane anesthesia is the result of a retrieval failure.

P-7

Preclinical Study of Delphinium denudatum Wall. in Morphine De-Addiction

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Objective: To explore the de-addiction properties of *Delphinium denudatum* Wall. (D.d.) in morphine dependent rats. **Methods:** Charles foster male albino rats (100-150 gm) were made morphine dependent by intra peritoneal injection of morphine sulphate in increasing doses twice a day for 7 days. The spontaneous withdrawal signs observed 12 hrs after the last dose were quantified by the 'counted' signs (chewing, head shakes, exploring, digging, yawning, teeth chattering, writhing, wet dog shakes, jumping) and 'checked' signs (squeaking on touch, hostility on handling, eye twitching, lacrimation). The drug (alcoholic extract of D.d.) was administered per oral in different regimens: a) single dose (700 mg/kg) 10 hrs before the first dose of morphine, b) single dose (700 mg/kg) 10 hrs after the last dose of morphine, c) multiple doses (350 mg/kg) along with morphine twice a day for 7 days. **Results:** Administration of D.d. extract caused significant reduction in the frequency of counted signs as well as the presence of checked signs of morphine withdrawal. The maximum reduction was observed in regimen 'b' (when drug was given 10 hrs after the last dose of morphine or 2 hrs before the time of observation) followed by regimen 'c' and 'a'. **Conclusion:** *Delphinium denudatum* Wall. significantly reduces the aggregate scores for all parameters in morphine withdrawal syndrome by central action and thus may prove to be an alternative remedy in morphine de-addiction.

P-8

Age Changes in the Human Abducens Nerve: A Morphometric Study

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With ageing there is a decrease in accommodation for vision due to development of a condition known as presbyopia. Although it is accepted that hardening of lens is responsible for this condition, but weakness of extraocular muscles and age changes in the nerves supplying them may also contribute to the pathology of this condition. Therefore, a morphometric study was conducted on the human abducens nerve (AN) to evaluate the morphological changes occurring with aging. The AN collected from the bodies of the victims who died due to road traffic accidents were of the following ages: 5 months, 20, 22, 32, 40, 52 and 60 years old respectively. The AN specimens were processed for resin embedding. Semithin (1 μ m) cross-sections of the nerves were cut by glass knives on an ultramicrotome and stained with toluidine blue (1% solution in 1% borax). Design based stereology was used to estimate the number and area of nerve and its fibers. The cross-sectional area of the nerve was 0.245mm² at 5 months, which increased up to 2.5 times at 32 years then decreased to 2.7 times, at 60 years when it was 0.470 mm². The total number of fibers in the human AN ranged from 2,736 to 8,064 (average 5,988). This study provides novel light microscopic morphometric data on the age related changes of the human AN using unbiased stereological techniques. The results may be used as a baseline data for comparison with abnormal or diseased condition to explain various clinical conditions. It is suggested that the morphological changes noted in the ageing nerves may contribute to presbyopia, which needs further investigation.

P-9

Comparative Fourier Transform Infrared (FT-IR) analysis of Several Malaysian *Stichopodidae* sp.

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Introduction: Sea cucumber is a unique marine invertebrate organism. Our understanding of the complexity and integrity of its body tissue remains incomplete. The synergistic effects of trace elements, active principles & possible growth factors found in *Stichopodidae* sp. could contributed to its potential role in interfering with central nervous system. In present study, detection of functional groups of compounds present in the body tissue extract of *Stichopodidae* sp. was undertaken using FT-IR. Information gathered may provide some clues as to the possible therapeutic value of the extracts of *Stichopodidae* sp. specifically in the central nervous system which was noted by our previous study (Zury *et al.*, 2003)
Methodology: The samples were harvested at the Perhentian Island & Langkawi Island, with prior permission of the Marine Park Ministry of Malaysia. Four species of sea cucumber (3 species from Perhentian Island; 1 species from Langkawi Island) from the *Stichopodidae* family were identified. Samples were dried, grinded and weighed. Fourier Transform Infrared (FT-IR) analysis was performed at frequencies between 400cm⁻¹ and 4000cm⁻¹. Samples were compared and analyzed. Results: The FT-IR analysis revealed that spectrum from most of the species exhibit similar pattern between the frequencies of 400cm⁻¹ and 2000cm⁻¹. Between 600cm⁻¹ and 1700cm⁻¹ there were slight differences in relation to the functional groups presence between Perhentian Island *Stichopodidae* sp. and that of Langkawi Island's. Functional groups were detected within the range 1.6% to 95.3% at infrared transmission. Discussion: This result indicated the presence of alcoholic moiety at 1800cm⁻¹ and percentage of transmission of 23.1%. This finding correspond to the extract which show analgesic properties found by our previous data (Zury *et al.*, 2003). The present data add to our knowledge towards identification of the active principles present within the body tissues of the *Stichopodidae* family.

Conclusion: Recognizing the possible active principles within the *Stichopodidae sp.* would add to our previous data on the analgesic properties of Sea cucumber extract. A complete characterization of active principles from *Stichopodidae sp* could help to provide answers for analgesia effects and possible effects on Central Nervous System.

P-10

Screening of antimicrobial activity in chemotherapeutic agents, *Terminalia arjuna*, *Tephrosia purpurea* and *Thuja occidentalis*

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Terminalia arjuna is reported as cardiogenic, hypolipidemic, hypocholesterolemic, antilipoperoxidative, antimutagenic, anticancer, antiulcer, and antidiarrhoeal medicine. *Tephrosia purpurea* is used as hepatoprotective, diuretic and anti-tumor (present in abdomen) agent. *Thuja occidentalis* is employed in benign skin tumor, cancer, condylomata, neoplasms, papillomas, polyps, warts etc. This research work was carried out with the aim to investigate the hidden antimicrobial activity associated with anticancer activities in these plants. The antibacterial and antifungal activities of different plant extracts were investigated against the standard drugs which are presently available in the market as Gentamycin, Velosef, Augmentin and Noroxin by using the well method and the zone of inhibitions were measured in millimeters. The antibacterial activity was observed in three gram negative bacteria i.e. *Escherichia coli*, *Klebsiella pneumonia* and *Pseudomonas aeruginosa* and one gram positive bacteria i.e. *Staphylococcus aureus*. The antifungal activity was investigated against *Candida albicans* and *Aspergillus niger*. The cytotoxic effects (LD₅₀) of the crude extracts were also observed in brine shrimps (*Artemia salina*) using Etoposide as internal standard. The crude extract of *T. arjuna* bark exhibited less potent antimicrobial activity as compared to crude extract of *T. arjuna* heart wood. Bark extract of *T. arjuna* was found effective against gram positive bacteria and *Candida albicans* while its heart wood extract showed potent antibacterial and antifungal activity. Bark extract of *T. arjuna* showed no cytotoxic activity but heart wood extract showed this activity in Brine Shrimp Bioassay technique. The crude extract of *T. purpurea* showed potent antibacterial activity but no antifungal activity. It showed positive cytotoxic activity in Brine Shrimp Bioassay. The crude extract of *T. occidentalis* showed good antibacterial activity and antifungal activity against *Aspergillus niger* only. But low cytotoxic activity was observed against brine shrimp in 1000µg/mL dose.

P-11

**Neuroprotective Effects of Triptolide on 6-Hydroxydopamine -induced
Damage in Dopaminergic MN9D Cells**

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Triptolide is one of the major active components of Chinese herb *Tripterygium wilfordii* Hook F, which possesses a wide variety of biological activities including potent anti-inflammatory, immunosuppressive and anti-oxidative effects. Mounting lines of evidence have suggested that oxidative stress and brain inflammation participate in the pathogenesis of Parkinson's disease. Our previous data suggest the effectiveness of triptolide in protecting dopaminergic neurons from inflammation-mediated damage induced by lipopolysaccharide *in vitro* and *in vivo*. We investigate if triptolide can protect dopaminergic neurons from cell death associated with 6-hydroxydopamine (6-OHDA)-induced oxidative stress in MN9D cells. It was found that triptolide significantly improved the vitality of MN9D cells against damage induced by 6-OHDA at concentrations of as low as 10^{-14} to 10^{-8} M. Moreover, similar results were got by flow cytometry. Underlying mechanism about the neuroprotective effects of triptolide on 6-OHDA-treated MN9D cells, especially about oxidative stress, apoptosis and its related signaling transduction, will be detected in future.

P-12

**The Role of GABA_A Receptor Inhibitor on Morphine Antinociception Action
in Cuneiformis Nucleus**

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It is established for long that midbrain region is the core point of modulation of pain. In this regard, rostral ventromedial medulla, along with its belongings deserves special attention in the field of pain management. It's well documented that periaqueductal gray (PAG) matter is having an overriding effect on pain modulating action of RVM, and from there it exerts its effects as of an antinociceptive controlling point. It's been said that there are two sets of cells in RVM which mostly control pain outputs to dorsal horn of spine. These are on and Off-cells. But, the type of cell that best describes antinociceptive action of RVM, is off-cell. On the other hand, we do know that RVM has some connections with the cuneiformis nucleus (CnF), thus we, in this research project, explored the role of CnF in pain modulation and, existing connections between this nucleus and RVM. In addition, we wanted to know the possible effect of opioid antinociceptive roles. To get the role of CnF be demonstrated, GABA_A antagonist (bicuculline), and morphine have mainly been microinjected into the CnF. From the results, it has been cleared that CnF is having a significant role in antinociception. In addition, GABAergic system and opioid analogs have been marked as having important shares in antinociception.

P-13

Investigation of Anti-Parkinson Activity in *Withania somnifera*, *Acorus calamus* and Related Medicinal Plants of Pakistan

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Medicinal plants are known to have played an important role in the discovery of new therapeutic agents since long time. Therefore, we investigated medicinal plants of Pakistan for anti-Parkinson activity, if any, with focus on *Withania somnifera* (WS) and *Acorus calamus* (AC). 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) is one of the most widely used toxins to generate mouse model for Parkinson's disease. The anti-Parkinson activity of WS and AC were evaluated in MPTP-treated mice with attention to different behavioral paradigms such as spontaneous motor activity in open-field, exploratory behavior, bradykinesia in pole test, akinesia, catalepsy in block test and acute neurotoxicity on inverted screen. Subcutaneous injections of methanolic extract of WS (whole plant except root) and n-hexane fraction of AC (rhizome) significantly reversed the behavioral deficits in the mouse model of Parkinson's disease (PD) at 100 mg/kg dose. The anti-Parkinson effect of WS was stronger in MPTP model, while AC showed a partial anti-Parkinson activity. These results indicate that WS and AC may possess active principles with potential to show anti-Parkinson activity. We conclude that these plants may serve as leads for the development of better and safer anti-Parkinson drugs.

P-14

The Study of Dopaminergic Neuronal Differentiation of Rat Myoblasts *in vitro*

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There are some different kinds of immature progenitors residing in the skeletal muscle, such as pluripotent stem cells (PPSCs), side population (SP) cells and satellite cells. They function in the maintenance and repair of adult skeletal muscle. It has been demonstrated that human and rat muscle-derived stem cells and mice myogenic cell lineage C2C12 can differentiate into neurogenic lineage. Myoblasts persist in mature muscle as satellite cells, continue to fuse to adjacent myofibers during postnatal growth, and provide a source of cells for new muscle formation during muscle regeneration after injury. In our study, myoblasts were isolated from six-months old rat gastrocnemius and then they were cultured them in medium optimised for growth of neural stem cells. We found that these myoblasts can form neurospheres after 7-10 days *in vitro*. Further, we will induce these neurospheres to differentiate into tyrosine hydroxylase positive (TH+) dopaminergic neurons. Our study shows that myoblasts present in adult rat muscle can overcome germ lineage restrictions and express the molecular characteristics of brain cells. Therefore, myoblasts may provide a novel source for autologous cell replacement in neurodegenerative diseases, especially Parkinson's disease.

P-15

Effect of aqueous extract of flaxseed on behavioural indices of anxiety in ovariectomized rats

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Estrogen deficiency has been shown to lead to psychological disturbances such as depression, anxiety, irritability and cognition dysfunction. In this study, we investigate the anxiolytic effects of water extract of flaxseed "*Linum usitatissimum*" on adult ovariectomized Wistar rats. The water extract of flaxseed were administered orally to the rats. Two behavioural paradigms (Light / Dark transition test (LDT) and Elevated plus-maze (EPM)) were used to determine the level of anxiety. In both tests, the extract water of flaxseed was not able to increase the percentage of time spent and the percentage of arm entries into open arms of EPM, as well as to increase the time spent at light side of LDT, however in the same test, an increase in the number of transition into the light compartment was marked. In conclusion, the aqueous extract of flaxseed didn't show any anxiolytic effect in the ovariectomized rats.

P-16

**Identification of fractions having EGFR antagonizing activity from
indigenous medicinal plants**

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There are different types of malignant brain tumors. Almost all of these tumors are associated with poor prognosis. Glioblastoma is an example of primary brain tumor, which has fatal outcome. There are various factors which are responsible for the development of glioblastomas. Some glioblastomas develop due to mutation in PTEN while sometimes there is over-expression of EGFR. Over-expressing EGFR in glioblastoma can serve as target for therapeutic intervention. Compound which can cross blood brain barrier and antagonize EGFR can be promising compound for clinical use in glioblastoma. The objective of this study is to identify phytocompounds that can serve as EGFR inhibitor, which either inhibit its ligand to bind and activate receptor or block receptor activation by intracellular mechanism. 45 Plants selected in this project have folkloric use as anticancer. Quasi-purified fractions will be prepared from plant extracts for screening. Cell based assays are very handy tools for initial screening of compounds libraries. Two sensitive cell based assays will be used for screening of the fractions (phytocompounds) library. These assays are MTT assay and reporter assay for monitoring inhibition/activation of EGFR. After identifying fractions having potential activity, these will be further investigated and will be further characterized.

P-17

**Linkage Analysis of Limb-Girdle Muscular Dystrophies 2I type (LGMD2I)
in two Moroccan families**

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Limb-girdle muscular dystrophies (LGMD) represent a group of diseases characterized mainly by muscle wasting of the upper and lower limbs, with a wide range of clinical severity. The clinical heterogeneity is paralleled by molecular heterogeneity; each of the 10 forms of autosomal-recessive LGMD recognized to date is caused by mutations in a distinct gene. Two families of the north of Morocco are received at the Hospital of the Specialities of Rabat, the consanguinity characteristic of the parents of the affected individuals and the clinical signs showed that the hereditary disease carried by the two families is a Limb-girdle muscular dystrophy. However, other symptoms allowed suspecting a LGMD2I. This type of muscular dystrophies is due to changes concerning the FKRP (Fukutin-related-protein) gene which are in question of the LGMD2I and congenital muscular dystrophies 1C (MDC1C). The goal of our research task is to make a Linkage Analysis of LGMD2I for these two families. This study is carried out on 20 individuals whose 9 individuals are affected of the whole of the two families. The ADN of these 20 individuals are extracted starting from total blood by the method of extraction phenol/chloroform. Then, the PCR allowed the amplification of an area of 1,7kb containing FKRP gene by using microsatellites D19S570, D19S219, D19S606 and D19S907 to amplify this area. In the literature the FKRP gene is located on the long arm of chromosome 19 (19q13,3) between markers D19S219 and D19S606. This last marker is closest to gene by a distance of 500kb down-stream from FKRP gene. The amplified area is analyzed by the sequencer in order to establish the haplotype for each individual. Starting from the haplotypes established one could say that there is a genetic linkage between the markers used and FKRP gene, because one found a zone of homozygote distinct in

each family and at the individuals affected. These results are not final and the sequencing of the area amplified an old individual affected of each family will enable us to confirm or exclude this genetic linkage and this part of work will be to supplement to this next month of September.

P-18

**The effect of sesame oil injection (i.p.) on fear conditioning
in female mice**

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Sesame oil contains unsaturated fatty acids such as linoleic acid, oleic acid and sesamol, sesamin and lecithin. Lecithin and specially unsaturated fatty acids have important role in several physiological functions. We studied the effect of sesame oil injection (i.p.) on fear conditioning. Method: female mice (25±3 g) were used. Animals divided to four groups: control and three test groups that injected 0.1 ml sesame oil (i.p.) for 1, 2 and 4 days respectively. Fear conditioning test carried out in three steps. 1- Animals take place in test compartment for 5 min in first day. 2- in second day, each animal exposed to noise for 3 min and finally received foot shock (5 sec, 1mA). 3-After 1 hour and 24 hour (in the last day) each animal exposed to noise in that compartment for 1 min and freezing time measured. All data was analyzed by one way ANOVA. Results: 1: There was not any significant difference between control and other groups in Fear conditioning test after 1 hour. 2: There was not any significant difference in Fear conditioning test after 24 hour between control animals and animals that sesame oil was injected for once time. 3: There were significant difference in freezing time after 24 hour between control group and groups that sesame oil was injected for 3 and 4 days (P<0.03). Conclusion: Sesame oil had not effects on memory recall one hour after foot shock. It seems that sesame oil stimulates mechanisms that affected memory in long period. It is possible that lecithin of sesame oil acts as a source for acetylcholine and potentates cholinergic system in brain specially hippocampus. More studies are required to determine exact mechanisms.

P-19

Extracellular Cold-active Alkaline Protease from *Stenotrophomonas maltophilia* and its Feasibility as a Laundry Detergent Additive

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A research was carried out on production of cold-active extracellular alkaline protease secreted by *Stenotrophomonas maltophilia* MTCC 7528 using the submerged fermentation and its application as a detergent additive for cold washing. Maximum enzyme activity was produced when cells were grown under the submerged fermentation conditions at 20°C and pH 9.0 for 120 hours with an agitation rate of 120 rpm in a protease production medium. The alkaline protease was found to be highly compatible and stable against commercial detergents at low temperature (20°C). Wash performance analysis revealed that protease produced by *Stenotrophomonas maltophilia* exhibited high efficiency in removal of protein stains with commercial detergents. These results suggest that the cold-active alkaline protease produced from *Stenotrophomonas maltophilia* which showed high stability against detergents has significance for an industrial perspective, especially, detergent additive.

P-20

Light deprivation related changes of strategy selection in the radial arm maze

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During the early postnatal age environmental signals underlie development of sensory systems. The visual system is considered as an appropriate system to evaluate role of sensory experience in postnatal development of sensory systems. This study was made to assess the effect of visual deprivation on strategy of arm selection in navigation of radial arm maze. Six weeks old light (LR, control) and dark reared (DR) rats were trained for correct choices and adjacent arms tasks. Our results showed that both the LR and DR animals equally selected correct arms. In the adjacent arms task, however, the control group significantly outperformed the DR animals. Also, while the LR males and females displayed some differences in performing the tasks the DR group represented no sex dependency in their performance. These findings indicate that the lack of visual experience is likely to influence the strategy selection as well as sex differences. Also, the difference between performances of the LR and DR animals seems to be due to the males rather than females behaviour.