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Postsynaptic Alpha 2-Adrenoceptors Mediate Melanosome Aggregation in Melanophores of the White-Spotted Rabbitfish (*Siganus canaliculatus*)

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The present investigation was undertaken to study the nature of neuro-melanophore junction in the white-spotted rabbit fish *Siganus canaliculatus*. *In vitro* experiments using split fin preparation indicated that melanophores of *S. canaliculatus* are highly responsive to potassium ions and adrenergic agonists. Potassium ions and the adrenergic agonists induced prompt melanosome aggregation that could be competitively blocked by yohimbine (alpha-2 specific adrenergic antagonist) and phentolamine (non-specific alpha adrenergic antagonist). The melanophore responses to repeated potassium stimulation (up to 20 stimuli) did not show any sign of fatigue. However, statistically significant enhancement was observed in responses to potassium that followed the first five stimulations. Adrenergic agonists acted in a time and concentration-dependent manner and their relative potency had the following rank order: clonidine (alpha-2 specific agonist) > norepinephrine (non-specific adrenergic agonist) > phenylephrine (alpha-1 specific agonist) > methoxamine (alpha-1-specific agonist). Yohimbine exerted a more potent inhibiting effect on norepinephrine induced melanosome aggregation compared to phentolamine. Prazosine (alpha-1 specific antagonist) had no effect on such aggregation. Chemically denervated melanophores displayed hypersensitivity to alpha-adrenergic agonists but were refractive to potassium ion stimulation. The refractivity of denervated melanophores to potassium indicates the effect of potassium ion is not direct on melanophores but it is rather through depolarization effect of potassium on the neuro-melanophore peripheral sympathetic fibers and hence release of norepinephrine. In denervated melanophores, similar to intact melanophores, only phentolamine and yohimbine but not prazosine, significantly inhibited melanosome aggregation effect of norepinephrine, indicating that norepinephrine effect is through postsynaptic alpha-2 adrenoceptors. The present data demonstrate that the nature of melanophore innervation in this teleost is adrenergic and neuro-melanophore signals mediating melanosome aggregation are transmitted through alpha-2 postsynaptic adrenoceptors. (*Pakistan Journal of Biological Sciences* 12 (1): 1-10, 2009; *doi*: 10.3923/pjbs.2009.1.10)

Morpho-Histological Study of Kidney in Farmed Juvenile Beluga, *Huso huso* (Linnaeus, 1758)

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In this study, structure, size and distribution of nephron cells on kidney in *Huso huso* were investigated. The head, body and caudal part of kidney in juvenile *Huso huso* were sampled. The kidney of *Huso huso* consisted of glomerulus, proximal, distal and collecting tubule cells. The average area in 1 and 2 year old sturgeon were 2718.07 ± 1387.51 and 2793.89 ± 1348 μm^2 in proximal cells, 2678.80 ± 1249.12 and 2599.98 ± 1428.13 μm^2 in distal cells, 2275.44 ± 1289.52 and 2312.23 ± 1629.58 μm^2 in collecting tubule cells, 4359.8 ± 1573.59 and 5071.04 ± 1916.87 μm^2 in glomerulus and 6019.68 ± 1800.55 and 8307.49 ± 2073.53 μm^2 in Bowman's capsule, respectively. Average long and small diameter in 1 and 2 year were 68.03 ± 17.82 and 49.94 ± 12.73 , 63.29 ± 16.15 and 45.58 ± 12.46 μm in proximal cells, 63.25 ± 16.01 and 44.3 ± 15.09 , 63.514 ± 15.25 and 45.46 ± 13.3 μm in distal cells, 51.9 ± 13.04 and 40.54 ± 12.21 , 57.08 ± 16.7 and 45.53 ± 15.28 μm in the collecting tubule cells, 91.18 ± 17.93 and 68.72 ± 16.22 , 98.7 ± 21.85 and 72.24 ± 17.48 μm in glomerulus and 99.32 ± 19.82 and 76.45 ± 1896 , 125.44 ± 24.93 and 93.85 ± 24.78 μm in Bowman's capsule, respectively. In all cases no statistically significant difference detected in the measured cells among 1 and 2 year old fishes. Morpho-histological pattern of kidney can be developed on the basis of size, feature and distribution of cells in farmed Sturgeon. (*Pakistan Journal of Biological Sciences* 12 (1): 11-18, 2009; doi: 10.3923/pjbs.2009.11.18)

Effects of Methyl-Beta-Cyclodextrin and Cholesterol on Cryosurvival of Spermatozoa from C57BL/6 Mouse

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MBCD and Cholesterol-Loaded-Cyclodextrin (CLC) were examined for their abilities to increase the cryosurvival of C57BL/6 mouse sperm, the main strain of genetically engineered mice. The intactness of acrosome and motility of frozen/thawed spermatozoa were used to monitor cryosurvival. In this experimental study, male mice were randomly divided in 6 groups: control 1, experimental 1, experimental 2, control 2, experimental 3 and experimental 4. In experimental groups 1 and 2 spermatozoa were exposed to 0.75 and 1 mM MBCD and in experimental groups 3 and 4 were exposed to two different concentrations of CLC (1 and 2 mg mL⁻¹) over a period of 1 h and were

subsequently cryopreserved. Spermatozoa in control 1 group were frozen without any exposure to CLC or MBCD and in control 2 (vehicle), sperms were incubated with 4 mM MBCD. The post-thaw sperms were evaluated for their motility and acrosomal status. The values of the intact acrosome and motility increased significantly with concentration of CLC compared to controls and MBCD experimental groups ($p < 0.05$). These results indicate that cryosurvival of C57BL/6 mouse spermatozoa is enhanced by exposure to MBCD which loaded with cholesterol (CLC) before freezing and MBCD alone can not protect sperm from freeze-thaw damage efficiently compare to CLC. (*Pakistan Journal of Biological Sciences* 12 (1): 19-25, 2009; **doi:** 10.3923/pjbs.2009.19.25)

Screening Plant Growth Promoting Rhizobacteria for Improving Seed Germination, Seedling Growth and Yield of Maize

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The effect of Plant Growth-Promoting Rhizobacteria (PGPR) on seed germination, seedling growth and yield of field grown maize were evaluated in three experiments. In these experiments six bacterial strains include *P. putida* strain R-168, *P. fluorescens* strain R-93, *P. fluorescens* DSM 50090, *P. putida* DSM291, *A. lipoferum* DSM 1691 and *A. brasilense* DSM 1690 were used. Results of first study showed seed inoculation significantly enhanced seed germination and seedling vigour of maize. In second experiment, leaf and shoot dry weight and also leaf surface area significantly were increased by bacterial inoculation in both sterile and non-sterile soil. The results showed that inoculation with bacterial treatments had a more stimulating effect on growth and development of plants in nonsterile than sterile soil. In the third experiment, Inoculation of maize seeds with all bacterial strains significantly increased plant height, 100 seed weight, number of seed per ear and leaf area. The results also showed significant increase in ear and shoot dry weight of maize. (*Pakistan Journal of Biological Sciences* 12 (1): 26-32, 2009; **doi:** 10.3923/pjbs.2009.26.32)

The Effects of Lamotrigine on the Acquisition and Expression of Morphine-Induced Place Preference in Mice

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The purpose of the present study is to determine the effects of the anticonvulsant drug, lamotrigine, on the acquisition and expression of morphine-induced place

preference in mice. Lamotrigine prevents the release of glutamate from presynaptic neurons and inhibits action potential in postsynaptic area by inhibiting presynaptic sodium and calcium channels. Because of such properties, lamotrigine is used for reducing craving for and use of cocaine, alcohol and abused inhalant. So, to determine the effects of lamotrigine on opiates; specifically morphine, 180 male Swiss-Webster mice (20-35 g) were used in this study. Conditioned place preference, was assessed using a biased place conditioning paradigm. In a pilot study the effects of various doses of morphine (2.5, 5 and 10 mg kg⁻¹), alone, or in combination with lamotrigine (1, 5 and 25 mg kg⁻¹) on the place conditioning paradigm were examined. Animals were injected with the aforementioned doses of lamotrigine 60 min either prior to each morphine injections (acquisition) or prior to the start of the expression on the test day (expression). Administration of different doses of morphine (2.5, 5 and 10 mg kg⁻¹) induced conditioned place preference whereas the administration of different doses of lamotrigine (1, 5 and 25 mg kg⁻¹) failed to induce place preference. Acquisition and expression of morphine-induced CPP were reduced by lamotrigine at doses of 1, 5 and 25 mg kg⁻¹ and 5 and 25 mg kg⁻¹, respectively. Physiological mechanisms of action of lamotrigine and its potential therapeutic use in the treatment of drug-dependence are discussed. (*Pakistan Journal of Biological Sciences* 12 (1): 33-39, 2009; doi: 10.3923/pjbs.2009.33.39)

Effect of Intrahippocampal Injection of Aluminum on Active Avoidance Learning in Adult Male Rats

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Aim of this research was to study the effect of intrahippocampal injection of different doses of AlCl₃ in adult male rats on active avoidance learning. Thirty five adult male Wistar rats (250-300 g) were used into five groups: (1) Control, (2) Test-I received daily 1 μL AlCl₃ 1%, pH = 7.2, 3); Test-II received daily 1 μL AlCl₃ 0.5%, pH = 3.4, 4); Sham-I received daily 1 μL aCSF, pH = 7.2, 5); Sham-II received daily 1 μL aCSF, pH = 3.4. All rats in test and sham groups treated 10 min before training. Animals were anaesthetized with ketamine HCl/xylazine (90/10 mg kg⁻¹ b.wt.⁻¹, i.p.) and underwent a stereotaxic surgery for implant of two stainless steel guide cannula into the hippocampus bilaterally. Every day 10 min after above treatments all rats were used to assess the spatial learning performing using Y-maze. Criterion Correct Response (CCR) was 90% in last session of training. There were no significant differences between training sessions to receiving CCR in control, Sham-I and Sham-II groups. Cognition in animals received AlCl₃ 1%, pH = 7.2 was impaired significantly with compare to

other groups (* $p < 0.0001$). Present results show that intrahippocampal injection of $AlCl_3$ 1%, causes active avoidance learning impairment significantly. The exact mechanism of Al_3 effect on brain and cognition is remains unknown. (*Pakistan Journal of Biological Sciences* 12 (1): 40-45, 2009; doi: 10.3923/pjbs.2009.40.45)

Role of Angiotensin Converting Enzyme, Paraoxonase 1 55, 192 Gene Polymorphisms in Syndrome X and Coronary Heart Disease

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Aim of this study was to investigate the possible relationship between ACE and/or PON1 M55L, Q192R genetic polymorphisms and subjects with Coronary Heart Disease (CHD) and/or syndrome X (SX) when compared to the control group. ACE I/D, PON1 M55L and Q192R genetic polymorphisms, Body Mass Index (BMI) and biochemical parameters were investigated in subjects with CHD (n = 19), SX (n = 34) and healthy subjects (n = 26). All of the subjects were nonsmokers. According to the unrelated group t-test results; BMI, HDL-C and TG values were found to be slightly different in SX and control subjects but there was no significant difference in LDL-C and TC values. According to the Mann Whitney U-test results, BMI, TC, HDL-C and LDL-C values were found to be significantly different among CHD and control group subjects, but there was no difference in TG values. The results of this study indicates that ACE, PON1 192 and PON1 55 gene polymorphisms are not related to genetic susceptibility to SX and/or CHD in non-smokers. Obviously, the interpretation of these finding is difficult due to the small sample size and larger group studies are needed for more definitive conclusions. (*Pakistan Journal of Biological Sciences* 12 (1): 46-51, 2009; doi: 10.3923/pjbs.2009.46.51)

Effect of Dietary Antibiotic, Probiotic and Prebiotic as Growth Promoters, on Growth Performance, Carcass Characteristics and Hematological Indices of Broiler Chickens

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This experiment was conducted for comparison the effects of antibiotic (flavomycin), probiotic (primalac), prebiotic (Biolex-MB) and mixture of probiotic and prebiotic (primalac plus Biolex-MB) as dietary growth promoter on growth

performance, carcass characteristics and hematological indices of broiler chickens. Three hundred day old Ross 308 broilers were equally distributed into 30 floor pens and reared for 42 day. A basal diet was formulated covering the recommendations of NRC (1994) for starter (0-21 days) and grower (22-42 days) periods and considered as control diet. Four tested diets were formulated by supplemented the basal control diet with antibiotic (flavomycin), probiotic (primalac), prebiotic (Biolex-MB) and mixture of primalac plus Biolex-MB, respectively. Six replicates were used for each treatment. The results of present study showed that all growth promoters used was improved growth indices of Ross 308 broilers. The highest significant ($p < 0.05$) values of carcass and thigh were recorded for broilers fed diet supplemented with flavomycin. The highest ($p > 0.05$) value of breast was recorded for broilers fed the diet supplemented with primalac, meanwhile the lower value were showed for birds fed either diet or diet supplemented with Biolex-MB. The percent of carcass and cuts followed the same trend. Hematological parameter including cholesterol was recorded the highest ($p > 0.05$) values groups fed the diets either control or supplemented with flavomycin, meanwhile the lower value was showed for bird fed diet supplemented primalac plus Biolex-MB. Triglycerides and very low density lipoprotein cholesterol (VLDL) were recorded the highest concentration for bird fed both control and diet supplemented with flavomycin groups while least concentration was found for bird fed diet supplemented with primalac. The results of present study revealed that probiotic and prebiotic as growth promoters can use as alternatives non-antibiotic feed additives to their free harmful side effects on the consumers and to improve broiler chickens growth indices. (*Pakistan Journal of Biological Sciences* 12 (1): 52-57, 2009; doi: 10.3923/pjbs.2009.52.57)

Antifungal Activity of Nettle (*Urtica dioica* L.), Colocynth (*Citrullus colocynthis* L. Schrad), Oleander (*Nerium oleander* L.) and Konar (*Ziziphus spina-christi* L.) Extracts on Plants Pathogenic Fungi

I. Hadizadeh, B. Peivastegan and M. Kolahi

Anti-mycotic activity of the ethanol extracts from Nettle (*Urtica dioica* L.), Colocynth (*Citrullus colocynthis* L. Schrad), Konar (*Ziziphus spina-christi* L.) and Oleander (*Nerium oleander* L.) floral parts were screened *in vitro* against four important plant pathogenic fungi viz., *Alternaria alternate*, *Fusarium oxysporum*, *Fusarium solani* and *Rizoctonia solani* using agar dilution bioassay. Extracts showed antifungal activity against all the tested fungi. Among the plants, Nettle and Colocynth were the most effective against *A. alternate* and *R. solani*

while Oleander possesses the best inhibition on *F. oxysporum* and *F. solani*. Konar was the most effective extract by reducing the growth of *Rizoctonia solani* than other fungi. These results showed that extracts could be considered suitable alternatives to chemical additives for the control of fungal diseases in plants. (*Pakistan Journal of Biological Sciences* 12 (1): 58-63, 2009; doi: 10.3923/pjbs.2009.58.63)

Evaluation of Vaginal Misoprostol Effect on Pregnancy Rate after Intrauterine Insemination

N. Moslemizadeh, T. Galini Moghadam and S. Peyvandi

The goal of this study was to evaluate the effect of misoprostol on pregnancy rate after intrauterine insemination. This randomized double blind clinical trial study was performed on 66 (33 cases and 33 controls) infertile women who referred to infertility center of Imam Khomeini Hospital Sari, Iran for intrauterine insemination during 2006-2007. The two groups were matched for age, infertility causes and BMI. After intrauterine insemination, 200 mcg misoprostol was placed in posterior fornix of case group and a similar placebo tablet in control group. Chemical and clinical pregnancies and complications were recorded. Results were analyzed by means of SPSS 11 software, paired t-test and student t-test. The p-values of less than 0.05 were considered to be statistically significant. Chemical pregnancy (positive BHCG) occurred in 6 patients (18.2%) in each group. Clinical pregnancy occurred in 5 patients (15.15%) in case and 6 patients (18.2%) in controls. There were no significant statistical differences in complications between the two groups. Vaginal misoprostol after intrauterine insemination does not improve pregnancy rate. (*Pakistan Journal of Biological Sciences* 12 (1): 64-68, 2009; doi: 10.3923/pjbs.2009.64.68)

Investigation on the Effect of Supplementing Rumen-Protected Forms of Methionine and Choline on Health Situation and Reproductive Performance of Holstein Dairy Cows

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Twenty Holstein dairy cows in their first and second lactation were used from 4-week prepartum through 20-week postpartum. The aim was to investigate the effect of feeding different levels of ruminally protected methionine and choline on

health situation and reproductive indices of Holstein dairy cows. Cows were randomly assigned to receive one of the following treatments: 18 g day⁻¹ of rumen protected methionine (RPM), 60 g day⁻¹ of rumen protected choline (RPC), 18 g day⁻¹ of RPM +60 g day⁻¹ of RPC and neither supplement (control). The treatments significantly affected services per conception and open days of lactating dairy cows, but did not significantly affect on days to first estrus and number of pregnant cows. RPM+RPC-fed cows had the lowest open days, days to first estrus and services per conception compared with other groups. Although no statistical differences were noted for any given health category, the overall incidence of health-related disorders was numerically lowest for cows fed RPM+RPC. Results indicate that the supplementation of RPM and RPC have been improved reproductive performance and health situation of dairy cows. (*Pakistan Journal of Biological Sciences* 12 (1): 69-73, 2009; doi: 10.3923/pjbs.2009.69.73)

Use of Leisure Time in Cardiovascular Patients in Gorgan (South East of Caspian Sea)

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The aim of this study was to compare activity patterns and leisure time between matched groups of patients with cardiovascular disease and individuals without a heart disease. The study included 100 patients recruited from those referred to cardiology department of 5th Azar General Hospital of Golestan University of Medical Sciences in Gorgan (South East of Caspian Sea) and 100 matched control subjects during the period 2007-2008. Odds ratios (OR), together with 95% confidence intervals (95% CI), were calculated using logistic regression, as estimates of relative risks. Listening to music OR = 8.800 (95% CI: 2.717-28.499, p<0.05), meditation OR = 6.111 (95% CI; 2.616-14.274, p<0.05) were independent risk factors. Subjects who performed 2 h per week and 2-4 h per week physical activity, the odds ratios were 0.038 (95% CI: 0.012-0.124, p<0.05) and 0.079, (95% CI: 0.024-0.260, p<0.05), respectively. Low physical activity and use of long time relaxation are associated with cardiovascular disease in these patients. Regular participation in physical activity such as walking 2 h per week and 2-4 h per week, are associated with reduced risk of cardiovascular disease. This study suggests the importance of both leisure-time physical activity and sedentary behaviors in the prevention of CVD. (*Pakistan Journal of Biological Sciences* 12 (1): 74-78, 2009; doi: 10.3923/pjbs.2009.74.78)

A Breeding Program for Balanced Improvement of Performance and Health in Broilers

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To illustrate the consequences of including health related traits in a sustainable broiler breeding program, two scenarios were simulated using the SelAction program. In the first scenario (economic), selection was only for production traits and Gait Score (GS) and Heart Failure (HF) were ignored in the breeding goal. In the second scenario (sustainable), GS and HF as well as production traits were included in the breeding goal. Economic values of GS and HF were determined using desired-gain approach to obtain a zero response in GS and HF. The results indicate that, despite improved responses for production traits in the economic scenario, there was an unfavorable reduction in GS of about 0.13 points and an unfavorable increase in HF of about 0.025 points. In the sustainable scenario, the deterioration of GS and HF was stopped. In the economic scenario with zero economic values for GS and HF, the total monetary response was higher (0.104 €) than sustainable scenario (0.097 €). Due to negative correlations between health and production traits, increased emphasis on health traits in the sustainable scenario resulted in a reduction in the total monetary response. In conclusion to stop the increased incidence of diseases, health traits should be included in the breeding goal and assigned appropriate values. (*Pakistan Journal of Biological Sciences* 12 (1): 79-82, 2009; **doi**: 10.3923/pjbs.2009.79.82)

Survey of Factors Effective on Outcome of Weaning from Mechanical Ventilation

N. Bilan, Sh. Shva and Sh. Ghaffari

This study was aimed to recognize factors effective on weaning from mechanical ventilation and determine the reasons of unsuccessful Spontaneous Breathing Trial (SBT) and reintubation. The study population consisted of 202 critically ill pediatric patients who received mechanical. When the patient was enrolled in the study, mechanical ventilation support was stopped and the patient underwent a 2 h trial of Spontaneous Breathing Trial (SBT), at the end of the trial if PaCO₂ was in normal range was extubated. Of the 202 patients who underwent SBT, 141 attempts had successful trial. The remaining 61 patients had sign of poor tolerance during the trial of spontaneous breathing and were reconnected to the ventilator. One hundred and forty one patients (69.8%) successfully passed the trial. 17 (12%) of above mentioned group required reintubation within 48-72 h. The overall

success and failure rate was 61.3 and 38.7%, respectively. Mortality rate in patients who did not tolerate SBT or were extubated, or required reintubation were 13% (8 patients), 11.3% (14 patients) and 23.5% (4 patients), respectively. The most common reasons for reintubation were neuromuscular disease (58.8%) congenital cardiac disease (23.5%) and aspirative pneumonia (17.6%). The finding indicates that two third of intubated patients, respond successfully to SBT and could be extubated and the neuromuscular diseases is the main cause of reintubation. (*Pakistan Journal of Biological Sciences* 12 (1): 83-86, 2009; doi: 10.3923/pjbs.2009.83.86)

In vitro* Antimicrobial and Cytotoxic Activities of Leaves and Flowers Extracts from *Lippia alba

N. Ara, M.H. Nur, M.S. Amran, M.I.I. Wahid and M. Ahmed

The research was conducted to investigate the *in vitro* antimicrobial and cytotoxic activities of leaves and flowers extract extracted from *Lippia alba*. Disc diffusion technique was used for *in vitro* antibacterial and antifungal screening. Zones of inhibition were observed in disc diffusion for antibacterial screening against 4 Gram-positive pathogenic and 6 Gram-negative pathogenic bacteria. Among crude extracts chloroform extract showed good activity against all test organisms. A Large zone of inhibition was observed (18 mm) against *Vibrio parahaemolyticus*. In antifungal screening, the compound showed mild to moderate zones of inhibition against four tested organisms. A Large zone of inhibition was observed against *Aspergillus niger* (13 mm). Cytotoxic activities of crude extracts were determined using Brine shrimp lethality Bioassay and LC₅₀ values of standard Vincristin sulphate as positive control, n-hexane and crude ethanol extracts were found to be 5, 15 and 20 $\mu\text{g mL}^{-1}$, respectively. (*Pakistan Journal of Biological Sciences* 12 (1): 87-90, 2009; doi: 10.3923/pjbs.2009.87.90)

Effect of Lactoferrin and Iron on the Growth of Human Pathogenic *Candida* Species

Hashem Al-Sheikh

Effect of lactoferrin and iron have been studied on the multiplication and pseudohyphae production by three pathogenic *Candida* species viz., *C. albicans*, *C. krusei* and *C. tropicalis*. Results showed that lactoferrin showed significant antifungal effect on the three species tested, while the addition of iron enhance the

multiplication of *Candida* species. (*Pakistan Journal of Biological Sciences* 12 (1): 91-94, 2009; doi: 10.3923/pjbs.2009.91.94)

Ultrasound Findings in Biliary Atresia: The Role of Triangular Cord Sign

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In this prospective study, 49 infants with prolonged jaundice, were studied between January 2005 to April 2007 in Tabriz Children's Hospital. All of these infants were evaluated with ultrasonography and isotopscan and finally biopsy was done in all of them under guide of sonography. In their sonographic evaluation, absence or presence of gall bladder, its size and also its evacuation after feeding was checked and beside this triangular cord sign was controlled. The PPV and specificity of triangular cord sign in diagnosis of extrahepatic biliary atresia (EHBA) was 100% but its NPV was only 78.5%. The overall accuracy, PPV, NPV, specificity and sensitivity of ultrasonographic findings in diagnosis of EHBA was about 94, 92, 94, 97 and 86%. Ultrasonography is a reliable screening method in early diagnosis of EHBA and triangular cord sign increases its accuracy especially its specificity. (*Pakistan Journal of Biological Sciences* 12 (1): 95-97, 2009; doi: 10.3923/pjbs.2009.95.97)

Correlation of Cyclooxygenase 2 Expression and Inflammatory Cells Infiltration in Colorectal Cancer

F. Naghshvar, Zh. Torabizadeh, O. Emadian, K. Enami and M. Ghahremani

This study want to determine correlation of cyclooxygenans 2 (Cox-2) expression and inflammatory reaction in colorectal carcinoma. Archival H and E slides of 150 patients with primary colorectal carcinoma were reviewed to confirm pathological feature and to select suitable tissue blocks for immunohistochemical staining with mouse monoclonal antibody against human Cox-2 and various inflammatory cells. After scoring, statistical analysis were carried out with SPSS software, χ^2 methods and bivariate pearson correlation analysis. The expression of Cox-2 (grade 3 to 7) in 71.3% of patients associated with mast cells, neutrophils, eosinophils, macrophages, CD³⁺ lymphocytes infiltration was significant (p = 0.001). Correlation of Cox-2 expression associated with CD⁸⁺ lymphocytes infiltration was not significant (p = 0.569). Also CD³⁺ lymphocytes show severe infiltration when the expression of Cox-2 is negative (p<0.05). The main purpose of this study was to evaluate the interaction between the Cox-2 expression and

inflammatory cells infiltration. This study showed that there is a close relationship of Cox-2 expression and mast cells, neutrophils, eosinophils, macrophages and CD³⁺ lymphocytes. The only exception was CD⁸⁺ lymphocytes. It may be due to independent role of anti tumoral effect of this inflammatory cells. (*Pakistan Journal of Biological Sciences* 12 (1): 98-100, 2009; doi: 10.3923/pjbs.2009.98.100)

Genetic Transformation of Nepalese Spring Wheat (*Triticum aestivum* L.) Cultivars with *ipt* Gene under the Regulation of a Senescence Enhanced Promoter from Maize

D.R. Pant, T. Bhattarai, E. Beck and S. Fettig

Two Nepalese spring wheat cultivars were transformed with an *ipt* gene from *Agrobacterium tumefaciens* under the control of the senescence inducible promoter pSEE1 from maize using biolistic method. The resulting transgenic lines, one from Pasang Lahmu and seven from Annapurna-1, were studied for the expression of the transgene and the phenotype characters like chlorophyll content, chlorophyll a/b ratio, PS II quantum yield and other parameters of agronomic importance. Analysis of transgene expression by RT-PCR revealed very weak or no signal at all, indicating either partial or complete silencing of the transgene in the lines tested. None of the plants exhibited a phenotype that was significantly different from the respective azygous controls. (*Pakistan Journal of Biological Sciences* 12 (2): 101-109, 2009; doi: 10.3923/pjbs.2009.101.109)

Blue Light Signaling Inactivates the Mating Type Genes-Mediated Repression of Asexual Spore Production in the Higher Basidiomycete *Coprinopsis cinerea*

Prayook Srivilai, Panida Loutchanwoot and Junpen Sukha

Monokaryotic mycelia of several wild-type strains of the homobasidiomycete *Coprinopsis cinerea* form abundant numbers of oidia both in the light and dark due to the regulation of oidia production by the *A* and *B* mating type genes. Nevertheless, little is known about whether and how the mating type loci and light signal regulate the oidiation in *C. cinerea*. Herein, the experimental results demonstrated that the self-compatible homokaryon AmutBmut strain, the mycelia whose nuclei carry mutations in both the *A* and *B* loci, can produce only a few oidia in the dark, whereas the formation of numerous numbers of oidia is induced

by the light. The semi-compatible homokaryon AmutB, but not ABmut, has the production and behavior of oidia formation similar to those of AmutBmut. These findings indicated that in AmutBmut strain the mutation at the *A* locus results in repression of oidiation in the dark and the blue light alleviates this effect, whereas the mutated *B* genes function has no effects. Since, the oidia production relies on both *A* and light signal, it is possible that *A* locus might be linked to the blue light receptor genes. The present results demonstrated for the first time that the secondary hyphal knot formation (*skn1*), fruiting body maturation (*mat*) and basidiospore formation (*bad*) genes which are essential in the *C. cinerea* fruiting pathway are not involved in the regulation of asexual sporulation. In addition, the positive light effect on oidiation could also occur in *C. cinerea* dikaryons. (*Pakistan Journal of Biological Sciences* 12 (2): 110-118, 2009; doi: 10.3923/pjbs.2009.110.118)

Difference in Leptin Hormone Response to Nutritional Status in Normal Adult Male Albino Rats

Noorah S. AL-Sowyan

The present study investigated the effect of 14 days diet, enriched in butter, vitamin E (vit. E) and green tea, on the major regulators of energy expenditure. Leptin is the product *OB* gene. This 16 KDa protein is produced by mature adipocytes and is secreted in plasma. Its plasma levels are strongly correlated with adipose mass in rodents as well as in humans. Leptin inhibit food intake, reduces body weight and stimulates energy expenditure. In order to evaluate the effect of diet enriched in butter, vit. E and green tea on body weight, adipose tissue weight and organs weight, serum lipids, lipoproteins content and serum leptin levels in male albino rats supplemented for 14 days on the previous diet. This study showed that high fat diet significantly increased body weight and adipose tissue weight, while vit. E and green tea enriched diet significantly lowered body weight and adipose tissue weight, kidney and spleen weights didn't show significant changes in all the experimental groups. While liver weight decreased in diet supplemented with high fat diet. Also, the results showed that high fat diet and vit. E supplemented diet induced significant increase in total cholesterol, LDLc., triglyceride level with significant decrease in HDLc. level as compared to normal control rats. Finally green tea supplemented diet induced significant decrease in total cholesterol, LDLc., triglyceride level with insignificant increase in HDLc. level in control rats. On the other hand, high fat supplemented diet significantly increased serum leptin levels in rats compared to control group, while vit. E and green tea enriched diet significantly lowered serum leptin levels at the end of experimental period. In

conclusion, improving the biological activity of leptin by diet modification may exist as a practical strategy for the treatment of obesity and related disorders and a diet rich in green tea to reduce the risk of cardiovascular disease (CVD) obesity and also protect the liver against free radicals. (*Pakistan Journal of Biological Sciences* 12 (2): 119-126, 2009; doi: 10.3923/pjbs.2009.119.126)

Enhancement of Growth and Nutrient Uptake of Rapeseed (*Brassica napus* L.) by Applying Mineral Nutrients and Biofertilizers

Esmail Yasari, M.A. Esmaili Azadgoleh, Saedeh Mozafari and Mahsa Rafati Alashti

For investigating the effect of chemical fertilizer as well as biofertilizers on seed yield and quality i.e. oil, protein and nutrients concentration of rapeseed (*Brassica napus* L.), a split-plot fertilizers application experimental design in 4 replications was carried out during the 2005-2006 growing season, at the Gharakheil Agricultural Research Station in the Mazandaran province of Iran. Rapeseed was grown as a second crop in rotation after rice. Biofertilizers treatments were two different levels: control (no seed inoculation) and seeds inoculation with a combination of *Azotobacter chroococcum* and *Azosprillum brasilense* and *Azosprillum lipoferum*, as main plot and chemical fertilizers comprised N, P, K and their combinations, NPKS and NPK Zn as sub plots. The maximum value of seed yield obtained at (BF+NPK Zn) 3421.2 kg h⁻¹ corresponding to 244.5 pods per plant and maximum concentration of Zn in leaves as well as seeds. The highest weight of 1000 seeds (4.45 g) happened to obtain at (BF+NPK S) which coinciding with the maximum K levels in leaves. The highest number of branches was obtained at (BF+NPK Zn) with 4.43 branches per plant i.e., 46.2% increase over the control. The maximum value of rapeseed oil content 47.73% obtained at T₁₆ (BF+NK) but maximum protein concentration of seed obtained at T₁₂ (BF+N). Overall the results indicated that inoculation resulted in increase in seeds yield (21.17%), number of pods per plant (16.05%), number of branches (11.78%), weight of 1000 grain (2.92%), oil content of seeds (1.73%) and protein (3.91%) but decrease (-0.24%) in number of seeds per pods comparing to non-Biofertilizers treatments. Irrespective to the treatments, results showed that application of Biofertilizers coincided with 3.86, 0.82, 2.25, 0.75 and 0.91% increase in concentrations of N, P, K, S and Zn in the seeds over the non-Biofertilizers treatments. (*Pakistan Journal of Biological Sciences* 12 (2): 127-133, 2009; doi: 10.3923/pjbs.2009.127.133)

Effects of the Seminal Plasma Zinc Content and Catalase Activity on the Semen Quality of Water Buffalo (*Bubalus bubalis*) Bulls

S.M. Alavi-Shoushtari, S. Asri Rezai, M.H. Kh. Ansari and A. Khaki

In order to determine zinc and catalase content of seminal plasma in the buffalo and to study their associations with the semen characteristics, 54 semen samples were collected from 10 buffalo bulls; semen volume and sperm concentration, gross and progressive motility and viability were evaluated, seminal plasma was then harvested by centrifugation and its zinc content was estimated by atomic absorption spectrophotometer and its catalase activity determined by using a commercial kit. The zinc content of the seminal plasma (Mean \pm SEM) was recorded as 154.40 \pm 1.74 mg L⁻¹, while, the mean catalase value was 32.00 \pm 0.42 U mL⁻¹. The mean zinc values was highly correlated with sperm progressive motility and viability and with catalase values ($p = 0.000$ for all) and also was associated with gross motility ($p = 0.020$) and negatively with abnormal morphology ($p = 0.049$). The catalase values were highly associated with sperm progressive motility, viability and zinc content ($p = 0.000$ for all) and was associated with sperm gross motility ($p = 0.024$). For further clarification of these correlations, the samples were categorized in three groups of excellent (Ex, >90% motile, $n = 33$), good (Go, 80-89% motile, $n = 15$) and moderate (Mo, <79% motile, $n = 6$) according to their percentage of sperm motility. The mean progressive motility in Ex group was 92.54 \pm 0.51%, in Go group was 81.66 \pm 0.62% and in Mo group was 71.66 \pm 1.05%. The mean zinc and catalase values were recorded as 161.07 \pm 1.63 mg L⁻¹ and 33.41 \pm 0.34 U mL⁻¹ in Ex, 146.70 \pm 1.91 mg L⁻¹ and 31.01 \pm 0.67 in Go and 136.42 \pm 4.97 mg L⁻¹ and 26.51 \pm 0.87 U mL⁻¹ in Mo groups. The mean zinc value in Ex group was highly associated with sperm motility, viability and catalase values, in Go group was associated with catalase values and highly associated with sperm abnormal morphology and in Mo group it was highly associations with catalase values only. The mean catalase value in Ex group, was highly associated with sperm motility and viability, in Go group was associated with zinc content and in Mo groups was highly associated with the zinc content. These results show that seminal plasma zinc and catalase content are correlated with semen characteristics and synergistically act to preserve motility and viability of the spermatozoa after ejaculation. (*Pakistan Journal of Biological Sciences* 12 (2): 134-139, 2009; doi: 10.3923/pjbs.2009.134.139)

Plasma Glucose Lowering Effect of the Wild *Satureja khuzestanica* Jamzad Essential Oil in Diabetic Rats: Role of Decreased Gluconeogenesis

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This study was to evaluate the effect of the wild SKEO on activities and genes expression of hepatic Glycogen Phosphorylase (GP) and phosphoenolpyruvate carboxykinase (PEPCK) in normal and diabetic rats. The wild SKEO was orally administered at different doses (50 and 100 mg/kg/day) to normal as well as diabetic rats for 21 days. The levels of mRNA were determined using the quantitative real-time RT-PCR technique. The plasma glucose concentrations of diabetic rats receiving SKEO (100 mg kg⁻¹) compared with diabetic control were significantly decreased. Hepatic GP activity and its mRNA levels of diabetic rats treated with SKEO moderately increased. The activity of hepatic PEPCK and its mRNA levels were significantly decreased in normal rats treated with SKEO (100 mg kg⁻¹). The enhancement of PEPCK activity and its mRNA levels of diabetic treated rats with SEKO (100 mg kg⁻¹) was significantly decreased compared with diabetic control. In conclusion, an excessive inhibition of PEPCK in liver of diabetic rats treated with the wild SKEO may contribute to the plasma glucose lowering action of SKEO that seems to be in relation with antioxidant properties of SKEO. (*Pakistan Journal of Biological Sciences* 12 (2): 140-145, 2009; *doi*: 10.3923/pjbs.2009.140.145)

Gene Effects and Combining Ability in Some Bread Wheat Genotypes to Yellow Rust Disease

A.R. Razavi, M. Taeb, F. Afshari, S. Khavari and M. Abbaspoor

Ten wheat lines were studied to determine gene effects and combining ability in some bread wheat genotypes to yellow rust disease. Ten parental lines and F₁ were evaluated in a randomized complete block design with three replications in Agricultural and Natural Resources Research Center, Mashhad, Iran. Two races (134E134A⁺ and 4E0A⁺) were used for this study. Latent Period (LP) and Infection Type (IT) were measured in the field and greenhouse. Results showed significant differences between races in their pathogenicity and between genotypes in their resistance to the pathogen. Diallel cross carried out between the parents and progenies and thereafter were analyzed by the method of Griffing and Haymans. The General Combining Ability (GCA) and Special Combining Ability

(SCA) for all traits were significant and showed additive variance was more important. Test for validity of diallel hypothesis proved epistasis effect for all traits. P_1 , P_2 and F_1 showed significant difference between all traits in generations mean analysis. Average degree of dominance ranged from partial to over dominance for resistance or susceptibility. Dominance, additive and epistatic types of gene action were responsible for the genetic control of the traits. However, except for additive-additive component, non-additive effect of genes could not be fixed by self-fertilization. (*Pakistan Journal of Biological Sciences* 12 (2): 146-151, 2009; doi: 10.3923/pjbs.2009.146.151)

Genetic Diversity of Grapevine Accessions from Iran, Russia and USA Using Microsatellite Markers

A. Ramezani, R. Haddad and M. Dorostkar

To discover marker information content and differentiation among grapevine accessions from Iran, USA and Russia, nine microsatellite markers were used. A total of 75 alleles were detected, giving a mean of 8.3 alleles per 9 loci. The total number of alleles per locus varied between 6 to 11 and the polymorphism information content ranged from 0.65 to 0.88, indicating that these loci were highly informative. A positive correlation ($r = 0.870$) was observed between the number of alleles and the level of polymorphism. Two SSRs loci including SSRVrZAG47 and VVMD27 were found to be probably synonymous. Gene diversities were high in all populations with values ranging from 0.709 to 0.784. In all populations, the mean number (averaged over loci) of heterozygous individuals was higher than expected. PCO analysis could not be so clearly differentiated accessions from Iran and Russia. The pattern of clustering of the *Vitis vinifera* populations was according to their geographic distribution. It is suggested that accessions could possibly be assigned to their regions of origin according to their genotypes. (*Pakistan Journal of Biological Sciences* 12 (2): 152-157, 2009; doi: 10.3923/pjbs.2009.152.157)

Effect of Salinity on Organic Solutes Contents in Barley

F. Khosravinejad, R. Heydari and T. Farboodnia

Salinity (NaCl Stress) was applied with 50, 100, 200, 300 and 400 mM NaCl. The shoot and root water content and organic solutes contents of two barley varieties (*Hordeum vulgare* L. var. Afzal and var. EMB82-12) were determined in various concentrations of NaCl. Soluble sugar and proline contents were

increased in two barley varieties in response to increased salt concentration, but this increase in Afzal var. were higher than EMB82-12. Soluble protein content was decreased in two barley varieties in response to different salt regimes and this decrease in Afzal var. was lower than EMB82-12 var. RWC decreased with increasing NaCl concentrations. Decrease of water content in EMB82-12 plants was higher than Afzal plants. (*Pakistan Journal of Biological Sciences* 12 (2): 158-162, 2009; **doi**: 10.3923/pjbs.2009.158.162)

Molecular Analysis for Genetic Diversity and Distance of Introduced *Grus antigone sharpii* L. to Thailand

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The genetic relationship was examined in a population of *Grus antigone sharpii* L. using DNA markers from the ISSR technique for applying towards breeding purposes for conservation of species. Since their extinction from Thailand, sixteen eastern sarus cranes: *Grus antigone sharpii* L. provided from Cambodia were fed and bred to sixty individuals at Nakhonratchasima Zoo, Northeastern Thailand to re-exist in Thai natural sites. Their genetic diversity and distance were examined to test their possibility to adapt to environmental variation. Blood samples from 27 individuals of *Grus antigone sharpii* L. were collected and DNA was extracted. These DNA samples were amplified using the successful fifteen from twenty four primers inter simple sequences repeat markers. A dendrogram was constructed and shows distance values of the species between 12.1 and 53.5. The samples produced 63.96% polymorphic banding profiles. The genetic diversity (H') in this population was estimated using Shannon's index. The high H' value of 0.501 reflected the somewhat wide range of distribution sites, which would adapt to environmental variations. Genetic evenness is 0.152. This value supports that all the studied samples have a small equal genetic abundance. (*Pakistan Journal of Biological Sciences* 12 (2): 163-167, 2009; **doi**: 10.3923/pjbs.2009.163.167)

Growth and Inorganic Solute Accumulation of Two Barley Varieties in Salinity

F. Khosravinejad, R. Heydari and T. Farboodnia

Salinity (NaCl stress) was applied with 50, 100, 200, 300 and 400 mM NaCl. The shoot and root length, fresh and dry weight, sodium and potassium content of two barley varieties (*Hordeum vulgare* L. var. Afzal and var. EMB82-12) were

determined in various concentrations of NaCl. Root and shoot length, fresh and dry weight were decreased in two barley varieties in response to increased salt concentration, but the decrease was more significant in the root. Sodium content was increased and potassium content was decreased in two barley varieties in response to different salt regimes, but in general, these changes were more significant in the root. (*Pakistan Journal of Biological Sciences* 12 (2): 168-172, 2009; *doi*: 10.3923/pjbs.2009.168.172)

Impact of Lead Sub-Chronic Toxicity on Recognition Memory and Motor Activity of Wistar Rat

F.Z. Azzaoui, A.O.T. Ahami and A. Khadmaoui

The aim of this research was to investigate the impact of lead nitrate administered in drinking water during 90 days (sub-chronic toxicity), on body weight gain, motor activity, brain lead accumulation and especially on recognition memory of Wistar rats. Two groups of young female Wistar rats were used. Treated rats received 20 mg L⁻¹ of lead nitrate diluted in drinking water, while control rats received drinking water only, for 3 months. An evolution of body weight, motor activity, object recognition memory and measure of brain lead levels has been evaluated. The body weight was taken weekly, whereas the memory abilities and the motor activity are measured once every fortnight alternatively, by submitting rats to the Open Field (OF) test and to the Novel Object Recognizing (NOR) memory test. The results have shown a non significant effect in gain of body weight. However, a high significance was shown for horizontal activity ($p < 0.01$), long memory term ($p < 0.01$), at the end of testing period and for brain lead levels ($p < 0.05$) between studied groups. (*Pakistan Journal of Biological Sciences* 12 (2): 173-177, 2009; *doi*: 10.3923/pjbs.2009.173.177)

Application of Rye Green Manure in Wheat Rotation System Alters Soil Water Content and Chemical Characteristics under Dryland Condition in Maragheh

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This study was carried out with or without rye green manure along with 4 nitrogen fertilization treatments (0, 26, 103 and 337 (kg N ha⁻¹) in 3 rotation system (green manure-wheat). Results showed that, although treatment effects on dryland wheat grain yield was not significant, but maximum grain yield (2484 kg ha⁻¹) was obtained from application of rye green manure along with 26 kg N ha⁻¹, which is

22% more than check (without rye green manure) treatment. Green manure application with or without nitrogen increased EC (dS m^{-1}), but decreased OC, P (av.), Cu (av.), Mn (av.), Zn (av.) and sand in the soil. In contrast to green manure, application of nitrogen along with green manure increased saturation and clay. In the stage of stem appearance, soil moisture content decreased 8% in green-manure application but with nitrogen application the moisture increased 6% compared with check in 0-20 cm depth. It can be concluded that, green manure application is useful along with nitrogen fertilizer application in long term. This treatment could increase soil moisture content, which leads to higher wheat grain yield in dryland areas. In addition, green manure application could change some soil characteristics such as soil TNV%, which decreases availability of some essential nutrients for dryland wheat. (*Pakistan Journal of Biological Sciences* 12 (2): 178-182, 2009; doi: 10.3923/pjbs.2009.178.182)

Antibacterial Effects of Iranian *Mentha pulegium* Essential Oil on Isolates of *Klebsiella* sp.

N.H. Jazani, H. Ghasemnejad-Berenji and S. Sadegpoor

The aim of the present study was the evaluation of the antibacterial activity of *Mentha pulegium* essential oil on isolates of *Klebsiella*. Thirty nine isolates were collected from urine specimens submitted to two educational hospitals in Urmia, Iran. The susceptibility of isolates was determined using a broth microdilution method. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of isolates to *Mentha pulegium* essential oil were determined. The susceptibilities of isolates to different antibiotics were tested using agar disk diffusion method. The rates of resistance were determined to antibiotics as follows: gentamicin 46.1%, tobramycin 48.7%, ceftizoxime 41%, cotrimoxazole 46.1%, amikacin 33.3%, cephtazidime 51.3%, ciprofloxacin 30.8%, kanamycin 53.8%, nalidixic acid 30.8% ampicillin 79.5% and nitrofurantoin 41%. *Mentha pulegium* essential oil possessed antibacterial effect against all isolates of *Klebsiella* sp. with MIC and MBC values in the range of 1.9×10^{-3} to 4.9×10^{-4} $\text{mm}^3 \text{mm}^{-3}$. In this study clinical isolates of *Klebsiella* sp. showed very high resistance to tested antibiotics. These results suggest the potential use of the *Mentha pulegium* essential oil for the control of multi-drug resistant *Klebsiella* sp. infections. However, more adequate toxicological study must be carried out to verify the possibility of using it for fighting microorganisms in human. (*Pakistan Journal of Biological Sciences* 12 (2): 183-185, 2009; doi: 10.3923/pjbs.2009.183.185)

Localized Seborrhoeic Dermatitis with Hyperhidrosis Due to Mite Infestation in an Iranian Cross-Breed Ram

A.A. Mozaffari and A. Derakhshanfar

A 3 years old Iranian cross-breed ram with history of repeated local sweating, severe pruritus of body surface was referred to the veterinary clinic. On clinical examination wetness, warmth, pruritus and thickness of affected area were observed. In affected area, hair coat was staring and draggy. Body temperature, heart and respiratory rates were 40.4°C, 120 beat min⁻¹ and 40 min⁻¹, respectively. Hematologic indices including packed cell volume, total and differential white blood cell (WBC) and total red blood cell (RBC) were normal. Laboratory examinations of skin scrapings confirmed infestation with *Psoroptes ovis*. Histopathologic findings included dilation of sweat glands, hyperplasia of sebaceous glands, hyperkeratosis, ulcer and scab formation and eosinophilic dermatitis. History and clinical findings association with the skin scraping and histopathologic findings indicated localized seborrhoeic dermatitis with hyperhidrosis. After treatment with ivermectin at the dose rate of 0.2 mg kg⁻¹, all clinical signs subsided. This confirmed that the cause of seborrhic dermatitis and hyperhidrosis was mite infestation and other possible causes were ruled out. So this is the first report of localized seborrhoeic dermatitis with hyperhidrosis due to mite infestation in animals. (*Pakistan Journal of Biological Sciences* 12 (2): 186-188, 2009; doi: 10.3923/pjbs.2009.186.188)

Detection of a Histidine Kinase mRNA in Extraradical Mycelium of *Pisolithus tinctorius* Induced by the Plant Metabolites

Aseneth Herrera-Martínez, Roberto Ruiz-Medrano, María Valdés and Beatriz Xoconostle-Cázares

The aim of this study was to test the effect of acetosyringone (AS) on the accumulation of the histidine kinase coding mRNA, using *in vitro* propagated *Pisolithus tinctorius*. In the precontact phase of the ectomycorrhizal symbiosis, it is hypothesized that the plants releases chemicals, which are sensed by the fungal mycelium and in turn trigger the start of the symbiosis. The nature of such molecules is largely unknown; however, plant metabolite and their structural analogues have been widely used to induce infection in different microbe-plant interactions. A histidine kinase in *Agrobacterium tumefaciens* was activated by AS in the first step during the infection of dicotyledonous plants. A conserved gene

fragment from the ectomycorrhizal fungus *Pisolithus tinctorius* was cloned using degenerate primers of conserved regions characteristic of the histidine kinase gene family. Then, the accumulation of this transcript in fungi incubated with AS was analyzed. RT-PCR and *in situ* hybridization suggest that this mRNA is synthesized in the presence of this plant analog in AS-treated mycelia. The findings presented here suggest a role of a histidine kinase involved in the early stages of ectomycorrhizal differentiation. (*Pakistan Journal of Biological Sciences* 12 (2): 189-191, 2009; doi: 10.3923/pjbs.2009.189.191)

Investigation on Effect of *Populus alba* Stands Distance on Density of Pests and Their Natural Enemies Population under Poplar/Alfalfa Agroforestry System

Z.H. Khabir, S.E. Sadeghi, S. Hanifeh and A. Eivazi

This study was carried out in order to distinguish the effect of agroforestry system (combination of agriculture and forestry) on pests and natural enemy's population in poplar research station. Wood is one of the first substances that naturally was used for a long period of time. Forage is an important production of natural resources too. Some factors such as proper lands deficit, lack of economy, pest and disease attacks and faced production of these materials with serious challenges. Agroforestry is a method for decrease of the mentioned problems. The stands of poplar had have planted by complete randomized design with 4 treatments (stand distance) of poplar/alfalfa include 3×4, 3×6.7, 3×8, 3×10 m and 2 control treatments, alfalfa and poplar. The results showed that *Chaitophorus populeti* had the highest density in poplar and 3×10 m treatments. *Monosteira unicostata* is another insect pest that had most density in 3×10 m treatment. And alfalfa had high density of *Chrysoperla carnea*. The density of *Coccinella septempunctata*, were almost equal in all treatments. (*Pakistan Journal of Biological Sciences* 12 (2): 192-194, 2009; doi: 10.3923/pjbs.2009.192.194)

Comparison of the Effectiveness of Weekly and Daily Iron Supplementation in 6 to 24 Months Old Babies in Urban Health Centers of Sari, Iran

M. Khademloo, H. Karami, A. Ajami and M. Yasari

The aim of this study was to compare the effectiveness of weekly and daily iron supplementation in 6 to 24 months infants. One-hundred Infants enrolled into this randomized controlled field trail. Fifteen drops was prescribed for the group who

received daily supplementation of iron and 30 drops was prescribed for the group who was set up to receive weekly supplementation of iron. Hemoglobin and serum ferritin was measured after 12 weeks. After 12 weeks results showed that both weekly and daily supplementation significantly increased hemoglobin but for serum ferritin daily supplementation was only significant. However, there was no significant difference between two groups, so the weekly supplementation is recommended. According to the results and more tendencies to the weekly regimen, we recommended weekly regimen versus daily Iron supplementation. (*Pakistan Journal of Biological Sciences* 12 (2): 195-197, 2009; **doi:** 10.3923/pjbs.2009.195.197)

Priapism Associated with Olanzapine

S.H. Hosseini and A.K. Polonowita

Priapism is a rare but serious adverse effect of psychotropic drugs where antipsychotic agents were implicated in 15 to 26% of priapism associated with medications. Among atypical antipsychotic, clozapine, risperidone and olanzapine have been reported to be associated with the condition. The patient was a 24 years old male referred to the OPD Clinic at Zare Psychiatry Hospital in 2007 with symptoms of delusion of control, delusion of persecution, delusion of somatic and auditory hallucination, for the last year. He had priapism following the use of olanzapine. Serotonin-Dopamine Antagonist (SDA) should be proscribed with care because of this rare yet serious complication, especially in cases with previous history of priapism following the use of psychotropic drugs. (*Pakistan Journal of Biological Sciences* 12 (2): 198-200, 2009; **doi:** 10.3923/pjbs.2009.198.200)

Neuroprotective Evaluation of Extract of Ginger (*Zingiber officinale*) Root in Monosodium Glutamate-Induced Toxicity in Different Brain Areas Male Albino Rats

Abeer M. Waggas

In this study, the neuroprotective effect of the extract of ginger (*Zingiber officinale*) was investigated against MSG-induced neurotoxicity of male albino rat. The daily dose (4 mg kg⁻¹ b.wt.) i.p. injection of pure monosodium glutamate (MSG) for 30 days and subsequent withdrawal caused a significant decrease in epinephrine (E), norepinephrine (NE), dopamine (DA) and serotonin (5-HT) content all tested areas (cerebellum, brainstem, striatum, cerebral cortex, hypothalamus and hippocampus) at most of the time intervals studied. This is may

be due to activation of glutamate receptors, which led to increased the intracellular concentration of Ca^{+2} ions, so the release of neurotransmitters is increased and the content of monoamines is decreased. After the withdrawal, the decrease in monoamines levels remained in striatum, cerebral cortex and hypothalamus, this may be due to the region specific effect of monosodium glutamate. whereas, daily dose ($100 \text{ mg kg}^{-1} \text{ b.wt.}$) i.p., injection of Ginger (*Zingiber officinale*) root extract for 30 days and subsequent withdrawal caused a significant increased in epinephrine (E), norepinephrine (NE), dopamine (DA) and serotonin (5-HT) content all tested areas at most of the time intervals studied. This is may be due to inhibition of 5HT-3-receptor effects at the same time the extract blockade of Ca^{+2} channel, as result the release of neurotransmitter is decreased and the content is increased. After the extract withdrawal, the increase in monoamine levels remained in brainstem, striatum and hippocampus, this may be due to the region specific effect of the extract. The coadministration of monosodium glutamate and ginger root extract caused increased in monoamine content in most of the tested brain areas at different time intervals. This is may be due to partly attributable to an antagonistic action of ginger root extracts on monosodium glutamate effect, so the monoamines content was increased. From these results, we can say that the ginger extract has a neuroprotective role against monosodium glutamate toxicity effect. (*Pakistan Journal of Biological Sciences* 12 (3): 201-212, 2009; doi: 10.3923/pjbs.2009.201.212)

Induce Systemic Resistance in Lupine Against Root Rot Diseases

Abeer A. Ali, K.M. Ghoneem, M.A. El-Metwally and K.M. Abd El-Hai

Root rot caused by soil borne pathogenic fungi is the most sever disease attacks lupine plants. Isolation trials from diseased plants in some areas of Dakahlia Province (Egypt) was carried out. *Rhizoctonia solani* and *Fusarium solani* proved to be the most dominant isolates. Meanwhile, *Fusarium oxysporum* and *Sclerotium rolfsii* were less frequent. Efficacies of some plant resistance elicitors viz.: chitosan (CHI), Salicylic Acid (SA) and hydroquinone (HQ) in comparing to the fungicide Rhizolex T-50 as seed treatments showed significant reduction in the fungal growth *in vitro*. Chitosan at 8 g L^{-1} and fungicide completely inhibited the growth of all isolated fungi, while SA at 1.4 g L^{-1} and HQ at 1.2 g L^{-1} inhibited the growth of *Fusarium solani* and *F. oxysporum*, respectively. The greenhouse experiments showed that *S. rolfsii* (No. 6) and *R. solani* (No. 2) followed by *F. solani* (No. 5) and *F. oxysporum* (No. 9) were the most aggressive root rot fungi. Soaking susceptible lupine seeds (Giza 1) in each one of the three selected

elicitors showed a significant reduction in seedlings mortality. CHI at 8 g L⁻¹ was superior in increasing the percentage of healthy plants to record 72.5, 80.9, 62.7 and 64.3%, when seeds were grown in soil infested with of *F. solani*, *F. oxysporum*, *R. solani* and *S. rolfesii*, respectively. These results were confirmed under field conditions in two different locations i.e., Tag El-Ezz and El-Serow Research Stations. CHI 8 g L⁻¹ proved to be the best elicitor after fungicide, in reducing lupine root rot disease. It showed 41 and 60% reduction in the plants mortality comparing to 56.37 and 69.13% in case of Rhizolex-T in Tag El-Ezz and El-Serow locations, respectively. The treatments were accompanied with a significant increase in lupine growth parameters, yield components and physiological aspects. Application of CHI at 8 g L⁻¹ or HQ at 1.2 g L⁻¹ was the most potent in this respect as compared to check treatment. (*Pakistan Journal of Biological Sciences* 12 (3): 213-221, 2009; doi: 10.3923/pjbs.2009.213.221)

Describing Variation in Carcass Quality Traits of Crossbred Cattle

H.R. Mirzaei, A.P. Verbyla, M.P.B. Deland and W.S. Pitchford

In order to investigate variation in carcass quality traits, during a four-year period, mature Hereford cows (637) were mated to 97 sires from seven breeds (Jersey, Wagyu, Angus, Hereford, South Devon, Limousin and Belgian Blue), resulting in 1144 calves. Carcass production traits (carcass weight = HCWt, fat depth = P8, eye muscle area = EMA, intramuscular fat = IMF) were obtained from these cattle that constitute the Australia's Southern Crossbreeding Project. Data were analysed using multi-variate sire model containing fixed effects of sex, sire breed, slaughter age nested within sexes. Random effects were sire, dam, management (location-year-post-weaning groups) and environmental effects. HCWt of South Devon, Belgian Blue, Limousin and unexpectedly, Angus were the heaviest on the average. Hereford calves were intermediate and Jersey and Wagyu were lighter on the average than others. Carcasses of the Belgian Blue and Limousin had low P8 and IMF, carcasses of Hereford and South Devon were intermediate and Angus, Jersey and Wagyu had high P8 and IMF. Management group effects were greatest especially for EMA and IMF. The sire variation was about 6, 6, 4 and 2% of total variation for HCWt, P8, EMA and IMF. Heritability ranged from 0.20 to 0.37 (carcass weight). The genetic correlation between the two fat depots was not as high (0.18) as expected. Results from this study suggest that strategies to increase genetic potential for HCWt would increase the genetic potential for EMA but may reduce marbling and tend to slightly increase P8. All phenotypic

correlations were positive, although not large. (*Pakistan Journal of Biological Sciences* 12 (3): 222-230, 2009; doi: 10.3923/pjbs.2009.222.230)

Variation of Ca, Sr, Ba and Mg in the Otolith of Mudskipper in West Coast of Peninsular Malaysia

A.S. Sarimin, M.A. Ghaffar and C.A.R. Mohamed

A study on elemental composition in the otolith of giant mudskipper, *Periophthalmodon schlosseri*, was done from June to October 2003. Specimens were obtained from the mangrove areas of Kuala Selangor, Sepang and Melaka in the west coast of Peninsular Malaysia. A total of 70 sagitta otoliths were analyzed to detect variation of Sr, Ba and Mg, replacing the natural chemical composition of the otolith, which is the calcium carbonate (CaCO₃). The average ratio of Sr:Ca was 0.11×10^{-4} , Ba:Ca was 5.7×10^{-3} and Mg:Ca was 0.2×10^{-3} . Strong correlation ($R > 0.8$) between fish body size and otolith weight of mudskipper ($p < 0.01$) also found during this study. (*Pakistan Journal of Biological Sciences* 12 (3): 231-238, 2009; doi: 10.3923/pjbs.2009.231.238)

The Effect of Different Concentrations of Glycerol and DMSO on Viability of Markhoz Goat Spermatozoa During Different Freezing Temperatures Steps

A. Farshad, B. Khalili and P. Fazeli

The present study was conducted to determine the following; (1) the influence of different concentrations of glycerol (1, 3, 5 or 7%, v/v) in experiment 1 and DMSO (1, 1.25, 1.5 or 1.75% v/v) in experiment 2 added either at 37 or 5°C and (2) the comparing of best concentration of glycerol with the best of DMSO, obtained in this study, on post-thaw motility, progressive motility, viability and normal acrosome of Markhoz goat sperm. In experiment 1, motility, progressive motility and viability of sperm were improved significantly ($p < 0.05$) by increasing of glycerol concentrations in the extenders, with the best results obtained with glycerol at 7% added at 37°C. However, the rate of normal acrosome showed an opposite trend, i.e., the extender containing 1% glycerol added at 5°C showed better results ($p < 0.05$). In experiment 2, the observed results showed similar tendencies to experiment 1. The data showed that the extender containing 1.75% DMSO concentration (the highest level) added at 37°C was significantly ($p < 0.05$) better than others. The percentage of intact acrosomes decreased significantly ($p < 0.05$) by increasing of DMSO concentrations, when added at 37°C. Further, the results of 1 % DMSO added at 5°C was ($p < 0.05$) better than other groups.

In regard to all evaluated parameters, the observed results in experiment 3 showed that extender containing 7% glycerol added at 37°C was significantly ($p < 0.05$) better than 7% glycerol added at 5°C and extender containing 1.75% DMSO added at both temperatures. In conclusion, the results of presented study indicated that glycerol is still the cryoprotectant of choice for freezing of Markhoz goat sperm. (*Pakistan Journal of Biological Sciences* 12 (3): 239-245, 2009; *doi*: 10.3923/pjbs.2009.239.245)

Sugar Regulation of Plastid Reversion in Citrus Epicarp is Mediated through Organic Acid Metabolism

Omer Khidir Ahmed

The inhibition by sucrose of chromoplast reversion to chloroplast in citrus epicarp was studied by observing the effects of several sugars, sugar metabolites and 1-iodoacetate on chlorophyll reaccumulation in cultured *Citrus paradisi* Macf. pericarp segments. Pericarp segments of 1 cm in diameter were cut from yellow fruits and cultured on modified medium plus the indicated metabolites and kept under continuous fluorescent light. Accumulation of chlorophyll in the segments was measured with a spectrophotometer fitted with sphere reflectometer. Respiration was determined via., an infrared gas analyzer. Inhibition of regreening was not specific to a particular sugar. The organic acids malate, citrate, succinate, 2-oxoglutarate and especially malonate elicited effects similar to sucrose, but at much lower concentrations. However, malonate inhibition of chlorophyll accumulation was overcome by increased concentrations of glutamine. At concentrations that usually inhibited chlorophyll, malonate did not reduce CO₂ production in the presence of glutamine or KNO₃. Sucrose effects on regreening were reduced by 1-iodoacetate. These results indicate that sugar regulation of plastid reversion during regreening in citrus epicarp is not directly due to sugars, but is instead mediated through metabolism of sugars to organic acids, especially malonic acid. (*Pakistan Journal of Biological Sciences* 12 (3): 246-251, 2009; *doi*: 10.3923/pjbs.2009.246.251)

The Impact of Blood Glucose and Cholesterol Levels on the Manifestation of Psychiatric Disorders

W.K.B.A. Owiredu, J. Appiah-Poku, F. Adusei-Poku, N. Amidu and Y. Osei

This study examined possible association of fasting glucose and lipid abnormalities in psychiatric patients on conventional antipsychotic medications. A total of 305 subjects were used for the study, comprising 203 clinically diagnosed psychiatric patients and 102 non-psychiatric subjects used as control at the psychiatric clinic

at Komfo Anokye Teaching Hospital (KATH). Questionnaires were administered, blood pressure and anthropometric measurements undertaken. Fasting blood samples were taken for glucose and total cholesterol. The patients included those treated with conventional antipsychotic agents. It was noted, that there were higher rates of diabetes (22.17%) and lipid abnormalities (42.43%) with lower rate of hypertension (5.91%) and obesity (5.91%) across the sample as compared to control. This finding suggests that the high prevalence of diabetes and lipid abnormalities, in a young, psychiatrically ill population makes the case for aggressive screening. (*Pakistan Journal of Biological Sciences* 12 (3): 252-257, 2009; doi: 10.3923/pjbs.2009.252.257)

Aetiology of Acute Gastro-Enteritis in Children at Saint Camille Medical Centre, Ouagadougou, Burkina Faso

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The present study aims at identifying the infectious agents responsible for child Acute Gastro-Enteritis (AGE) in Ouagadougou. From May 5 2006 to June 22 2008, 648 children aged from 2 to 41 months, with at least an average of 3 loose stools per day have been enrolled for coproculture, parasitology and virology test. Among them, 34 (5.25%) were HIV seropositive. A single sample of faeces from each child was used to identify enteropathogens. An infectious aetiology was identified in 41.20% of cases. The pathogenic agents detected as responsible for the AGE are: Rotavirus 21.1%; Adenovirus 1.9%; Giardia 7.6% *Entamoeba*; 1.08%; entero-pathogenic *E. coli* 41.7%; Salmonella 3.40%; Shigella 1.85% and Yersinia 1.70%. Conclusion: Therefore, these AGE etiologic agents constitute a problem of public health in Burkina Faso. Their control for the child would require: (1) a regular paediatric and clinical follow up; (2) health education of the population for food hygiene and (3) in case of absence of HIV infection in the mother, a promotion of exclusive breast-feeding up to the age of 4 months. (*Pakistan Journal of Biological Sciences* 12 (3): 258-263, 2009; doi: 10.3923/pjbs.2009.258.263)

Antioxidant and Antibacterial Activities of *Combretum niroense* Aubrév. Ex Keay (Combretaceae)

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In this study, the antioxidant and antibacterial activities of acetone extract, ethyl acetate, n-butanol and n-hexane fractions of acetone extract from leaves of

Combretum niroense Aubrév. ex Keay were investigated. The total phenolics and total flavonoids contents in the fractions and acetone extract were determined by spectrophotometric methods using Folin-Ciocalteu and $AlCl_3$, respectively. Two methods were adopted to assess the antioxidant activities: the Ferric Reducing Antioxidant Power (FRAP) and the radical scavenging activity of 2, 2'-azino-bis (3-ethylbenzothiazoline-6-sulfonate) radical cation (ABTS). The Minimum Inhibitory Concentrations (MICs) of the extract and fractions against pathogenic bacteria (4) and serotyped bacteria (4) from American Type Culture Collection (ATCC) were also determined using the agar-well diffusion method. The results showed that the butanol fraction, with the highest phenolic content, exhibited the best antioxidant and antibacterial activities as compared to the ethyl acetate fraction which contains more flavonoids. (*Pakistan Journal of Biological Sciences* 12 (3): 264-269, 2009; doi: 10.3923/pjbs.2009.264.269)

Molecular Analysis of Utility of a Retrotransposon, p-SINE1-r2 in the Asian Wild Rice and Weedy Rice Populations

Preecha Prathepha

The distribution of a retrotransposon, p-SINE1-r2 located at the waxy locus was analyzed by the PCR assay in the perennial wild rice (*Oryza rufipogon*) which inhabited in four isolated and six disturbed populations and in the weedy rice population. The level of clonality of the wild rice species was determined in populations subject to level of water supply and another disturbance. The results showed that all four isolated populations carried the genotype (-/-) and (-/+), while three genotypes (-/-), (-/+) and (+/+) was found on the six populations which grown near by rice fields. This finding was strongly supported the idea that the original wild rice populations of *O. rufipogon* exhibited prominent genotype (-/-) and (-/+) and mainly propagated by vegetative reproduction and the allele (+) which found in the wild rice plant with the genotype (+/+) may originated from gene flow from cultivated rice to wild rice. Weedy rice accessions used in this study showed the three genotypes based on this DNA locus. The distribution of this DNA locus in wild rice and weedy rice populations were deviated from the Hardy-Weinberg equilibrium. The perennial wild rice populations were annually under season drought (March to May of the year in Thailand, Laos and Cambodia), they tended to have small size clones with relatively high clonal diversity (i.e., number of genotypes), except for the population from Cambodia, which carried only the genotype (-/+). Although DNA maker used to detect genetic variation at population levels is too small, but this locus is very sensitive

enough to be a useful indicator for genetic variation at the population level. (*Pakistan Journal of Biological Sciences* 12 (3): 270-275, 2009; doi: 10.3923/pjbs.2009.270.275)

Oxygen Saturation Improvement after Adenotonsillectomy in Children

A. Kargoshaie, M. Akhlaghi and M. Najafi

The goal of this study was to establish whether adenotonsillectomy is effective on the severity of oxygen desaturation or improve oxygen saturation in children with sleep breathing disorders. Thirty-two children, aged 4-7 years, with clinical indication for adenotonsillectomy were enrolled in a non-controlled clinical trial. Pre- and postoperative nocturnal oxygen saturation monitoring was done and oxygen desaturation index as well as desaturation events were analyzed using Wilcoxon and paired Student's t-tests. Snoring was the most prevalent (87.5%) complaint before operation. The study revealed a significant improvement in the postoperative oxygen desaturation index (1.60 ± 3.22) compared with the preoperative oxygen desaturation index (3.98 ± 4.93) ($p < 0.01$). Oxygen desaturation events at the level of oxygen saturation 85-89% was significantly improved after operation ($p < 0.01$). No significant differences were seen in the desaturation events at the levels of oxygen saturation lower than 85%. Nocturnal oxygen saturation improves mildly after adenotonsillectomy in children with sleep breathing disorders. (*Pakistan Journal of Biological Sciences* 12 (3): 276-280, 2009; doi: 10.3923/pjbs.2009.276.280)

Identification of *Panulirus homarus* Puerulus Larvae by Restriction Fragment Length Polymorphism of Mitochondrial Cytochrome Oxidase I Gene

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Molecular identification of puerulus larvae of *Panulirus homarus* of the genus *Panulirus* from Indian coast was studied by employing Polymerase Chain Reaction, Restriction Fragment Length Polymorphism (PCR-RFLP) analysis of the mitochondrial DNA (mtDNA) Cytochrome Oxidase I (COI) gene by agarose gel electrophoresis and Denaturing Gradient Gel Electrophoresis (DGGE). The size of amplified fragment of COI gene was estimated to be approximately 1300 bp. Single fragment amplification was recorded during different stages of the life cycle.

The RFLP digestion was carried out using five different restriction enzymes (BspII, HhaI, RsaI, TaqI and AluI). The RFLP profile of the different endonucleases, varied between 1-5 restriction types. RFLP analysis using endonuclease TaqI enabled identification of *P. homarus* during different stages of its life history. (*Pakistan Journal of Biological Sciences* 12 (3): 281-285, 2009; *doi*: 10.3923/pjbs.2009.281.285)

Some Morphological Structural Studies of Cucurbitaceous Tendrils under Arid Conditions

Omar Abdul Hakim Al-Maghrabi

This study was carried out at Khulis, Khulis Governorate, Makkah region, on the first of April during the growing season of 2007, to study the morphology and anatomy of tendrils in different eight of cucurbit genera. The results showed a great variation among the most tested cucurbit genera concerning the twisting, branching, number of tendrils per node and presence of tendril trunk. Also, shape of transverse sections were ovate, sinuate-rhombic, sinuate-emarginate oblong, emarginate-ovate, spherical, notched-ovate and reniform. Furthermore, presence of collenchymatous, sclerenchymatous tissues, number of vascular bundles in Transverse Section (TV) and arrangement of vascular bundles varied according to the studied species. It could be conclude from this research that there are a numerous of qualitative traits of tendrils which plays an important role in identification of cucurbitaceous plants for examples; the twisting, branching, transverse section shape, collenchymatous tissue, sclerenchymatous tissue, tylosis and arrangement of vascular bundles. (*Pakistan Journal of Biological Sciences* 12 (3): 286-290, 2009; *doi*: 10.3923/pjbs.2009.286.290)

Dietary Betaine Affect Duodenal Histology of Broilers Challenged with a Mixed Coccidial Infection

H. Hamidi, J. Pourreza and H. Rahimi

The purpose of this research was to investigate effect of dietary betaine on intestinal morphology after an experimental coccidiosis. Hence a total of 189 male and female broiler chicks were randomly assigned to 9 floor cages. Chicks were fed a basal diet supplemented with 0, 0.6 or 1.2 g kg⁻¹ betaine. All birds were inoculated orally with *Eimeria* oocysts on day 28. Duodenal morphology parameters and lesions were scored by microscopic observation on intestine samples which were taken at day 42 of age. Adding 1.2 g kg⁻¹ betaine to diet

diminished intestinal lesions ($p < 0.05$). Dietary supplementation with 0.6 or 1.2 g kg⁻¹ betaine significantly ($p < 0.01$) increased intraepithelial lymphocytes as well. Level of additive betaine had no effect on the ratio of villus height/crypt depth or villus surface area. Lamina propria of duodenum became thicker in the intestine of chickens which received more supplemental betaine via their diet. In conclusion, since the number of intraepithelial lymphocytes and thickness of lamina propria represent the condition of gut immune response, it seems that dietary betaine may immunomodulate the gastrointestinal tract of broilers. In addition, betaine effect on villus morphology measured later in life differed from what had been measured already earlier in life of the chicks. (*Pakistan Journal of Biological Sciences* 12 (3): 291-295, 2009; doi: 10.3923/pjbs.2009.291.295)

Length-Weight Relationship and Spawning Season of *Sphyraena jello* C., from Persian Gulf

A. Hosseini, P. Kochanian, J. Marammazi, V. Yavari, A. Savari and M.A. Salari-Aliabadi

Length-weight relationship and spawning season of *Pickhandle barracuda*, *Sphyraena jello* (C.) were studied for one year in Boushehr waters of the Persian Gulf. In the present study, 311 specimens were collected during November 2006 to October 2007. The samples composed of 151 (48.55%) male, 160 (51.45%) female; the sex ratio was M: F = 1: 1.06. The b value ranged between 2.77 to 2.87 for male and female fishes, respectively. The relationship between body weight and length in total specimens was 2.82, indicating that this species show negative allometric growth. The peak spawning season of these fishes occur around spring, from April to June. The lowest Gonadosomatic Index recorded in August. The present study is the first record on length-weight relationship and spawning season of this species in the Persian Gulf region. (*Pakistan Journal of Biological Sciences* 12 (3): 296-300, 2009; doi: 10.3923/pjbs.2009.296.300)

Histological and Electron Microscopic Studies of the Effect of β -Carotene on the Pancreas of Streptozotocin (STZ)-Induced Diabetic Rats

Azza A. Attia

To evaluate the protective effect of β -carotene on induction of diabetes by streptozotocin (STZ), 45 albino rats, weighed about 110-130 g were used. They were divided randomly into six groups. GI rats used as control; GII rats were

injected i.p. with a single dose of 40 mg streptozotocin (STZ) to become diabetic; GIII and GIV, the diabetic rats were injected i.p. with 0.3 and 0.1 mg β -carotene, respectively; GV and GVI rats were injected i.p. only with 0.3 and 0.1 mg β -carotene respectively. At the end of the experiment, the final body weights, blood glucose and insulin levels were determined and the values were statistically analyzed. Histological, semithin and ultrathin sections were prepared for pancreatic tissues. In the diabetic rats (GII), there was significant loss in body weight accompanied by significant increase in blood glucose levels. In addition, many light and electron microscopic changes were observed in the acinar and endocrine β -cells of islets of pancreas. These changes were summarized as disturbance of acini arrangement, shrinkage and pyknotic nuclei, vacuolation and dissolution of mitochondria and Golgi elements, degranulation of β -cells. In addition to the significant decrease in blood glucose levels, 0.3 mg β -carotene (GIII) had decreased most of these changes than 0.1 mg of it (GIV). So, GIII provides more protection for the pancreatic tissue more than GIV. Also, the results revealed that injection of rats only with 0.3 and 0.1 mg β -carotene (GV and GVI) had no observable changes in the pancreatic tissues, except that there was an increase in number of the vacuolized mitochondria in most acinar and β -cells of islets. In conclusions, 0.3 mg β -carotene could normalize the biochemical disorders of diabetes and provides more protection for the pancreatic tissues than 0.1 mg from the damaging effect of STZ to a greater extent. (*Pakistan Journal of Biological Sciences* 12 (4): 301-314, 2009; doi: 10.3923/pjbs.2009.301.314)

Erosivity Index of Urban Storms: Case Study of Two Stations of Kermanshah

R. Beedle, M. Hadidi and E. Parsaeitabar

Present research examine the erosivity index of precipitation Kermanshah Province, two stations belonged to west Region Water Company named old Kermanshah and new Kermanshah were used, the duration of statistical period being 13 and 19 years. Data on stations was prepared graphically and the extraction of storms was performed visually with 15 min temporal step. After descriptive data on storm was adjusted and arranged tabularly, their kinetic energies were calculated with Wischmier and Smith formula considering maximum intensity of 30 min. Next, they were placed in continuous 1-72 h rainfall groups. Resulting conclusions indicated that about 85% of storm were in 1-6 h continuations and 6 h continuations had the highest values of kinetic energy as well

as of erosion index (R), but remained in very low erosion class; and old and new Kermanshah stations were placed in very low erosion class, with annual average of erosion index less than $500 \text{ MJ mm ha}^{-1} \text{ h}^{-1}$. (*Pakistan Journal of Biological Sciences* 12 (4): 315-323, 2009; doi: 10.3923/pjbs.2009.315.323)

Kinetics of Gene Expression During Exposure of Mouse Stem Cells to Activin A

Mahmoud Hashemi-Tabar, Mahmoud Orazizadeh, Ali Ghanbari and Fereshteh Negad Dehbashi

This study aimed to evaluate the pattern of gene expression induced by activin A in mouse Embryonic Stem Cells (ESCs). Mouse ES cells cultured in undifferentiated state by leukemia inhibitory factor and feeder layer cells. Following removing these two anti differentiation factors for 5 days and forming Embryoid Bodies (EBs), the cells divided to 8 equal cells per groups. Differentiation procedure was performed in a two staged protocol; Formed EBs for 4 days (Stage one); expanded differentiated ESCs on gelatin coated dishes for one week (stage two). In the stage one, the media of groups 2-7 contained 10, 30 and 100 ng mL^{-1} Activin A. The media in stage two was the same for all groups and contained only Fetal Bovine Serum (FBS). The expression of undifferentiated, ectoderm, mesoderm and endoderm markers were compared with relative RT-PCR method and statistically analyzed. The expression of an undifferentiating marker; Nanog was increased in the Activin A treated groups of stage one. The expression of OCT4 reduced in Activin A treated groups in stage two. In the stage one, the expression of Nodal increased by Activin A. expression of sonic hedgehog (Shh) was suppressed in Activin A treated groups of both stages. In stage two, there were significant decrease for the expression of mesoderm (Brachyury) and Nodal and visceral endoderm (GATA4) markers ($p < 0.01$). The expression of definitive endoderm markers (PDX1, TAT) showed significantly increased in Activin A treated groups ($p < 0.01$). Activin A induced differentiation in high concentration by imbalance in undifferentiating markers. Nodal has a dual role, undifferentiating effect and regulation of visceral endoderm towards definitive endoderm. Overexpression of Nanog, alteration in the expression of Nodal and Shh inhibition are three mechanisms for explanation of differentiation induced by activin A in ES cells. These mechanisms induces cascade of gene expression that commits ESCs towards definitive endodermal cells. (*Pakistan Journal of Biological Sciences* 12 (4): 324-331, 2009; doi: 10.3923/pjbs.2009.324.331)

Serum Lipid Profile of Breast Cancer Patients

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The purpose of this study was to carry out a comparative study to investigate the effect of lipid profile, oestradiol and obesity on the risk of a woman developing breast cancer. This study was carried out at the Komfo Anokye Teaching Hospital (KATH), Peace and Love Hospital, Oduom, Kumasi and Redeemed Clinic, Nima, Accra between May 2002 and March 2003. In this study, 200 consented women comprising 100 breast cancer patients (43 pre- and 57 post-menopausal) and 100 controls (45 pre- and 55 post-menopausal) with similar age range (25 to 80 years) were assessed for lipid profile, oestradiol and BMI. There was a significant increase in Body Mass Index (BMI) ($p = 0.011$), Total Cholesterol (TC) ($p < 0.001$), triglyceride ($p = 0.026$) and low density lipoprotein (LDL-cholesterol) ($p = 0.001$) of the breast cancer patients compared to the controls. With the exception of oestradiol (EST) that decreased, the lipid profile generally increased with age in both subjects and controls with the subjects having a much higher value than the corresponding control. There was also a significant positive correlation between BMI and TC ($r^2 = 0.022$; $p = 0.002$) and also between BMI and LDL-cholesterol ($r^2 = 0.031$; $p = 0.0003$). Apart from EST and LDL-cholesterol that were increased significantly only in the postmenopausal phase in comparison to the controls, BMI, TC and TG were increased in both pre-menopausal and post menopausal phases with HDL-cholesterol remaining unchanged. This study confirms the association between dyslipidaemia, BMI and increased breast cancer risk. (*Pakistan Journal of Biological Sciences* 12 (4): 332-338, 2009; *doi*: 10.3923/pjbs.2009.332.338)

The Efficacy of Disease Modifying Anti-Rheumatic Drugs in Rheumatoid Arthritis in Local Patients of Karachi

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The primary objective of the study is to assess the efficacy of the 'Disease Modifying Anti-Rheumatic Drugs (DMARDs) on the disease activity in Rheumatoid Arthritis (RA) in the local patients of Karachi. The secondary objective is to evaluate whether the combination of two concurrent DMARDs (Combination Therapy) is superior to a single DMARD (Mono-therapy). This is an open labeled retrospective case series. One hundred and five consecutive patients fulfilling 1987 ACR criteria for the diagnosis of RA were initially selected

from the case notes of out patients department. Sixty nine patients fulfilled the inclusion criteria and were finally recruited for analysis. Details of the Tender Joint Count (TJC), Swolen Joint Count (SJC), Patient Global Assessment (PGA) and ESR were obtained at six weeks, three months, six months and one year. Out of the 69 patients studied 48 were in the mono-therapy group and 21 in the combination therapy group. Methotrexate (MTX) was the most commonly used single DMARD (75%) as well as the most frequent component of the combination groups (85%). The TJC, SJC and PGA analyses of all patients show that DMARDs are effective agents for clinically controlling RA activity. The speed of their beneficial effect is slow and unlike analgesics and NSAIDS, may take up to six weeks to start working. The 6 week responses showed 32.49% improvement in TJC, 33.19% improvement in SJC and 59% better responses in PGA. This response continued to show further improvement and at six months when TJC improved by 63.41%, SJC by 53.21% and PGA with 81% better responses. After 6 months the response reached a plateau but nevertheless maintained until 1 year with improvements in TJC by 66.23%, SJC by 56.48% and PGA with 88.23% better responses. The changes in ESR did not go parallel with the other three outcome measures. The mean baseline ESR of 56 reduced to 44 at 6 weeks but rose again gradually to 54 at 1 year. The sub-group analysis did not show the overall superiority of combination therapy over mono-therapy. DMARDs are effective in controlling disease activity in RA. Their effect starts slowly over 6 week and may take up to 6 months to show full benefits. The beneficial effect was maintained for at least 1 year. Sub-group analysis did not show any advantage of combination therapy over mono-therapy in this series of patients. Methotrexate being the most frequently used DMARDs in both groups and being most cost effective agent seems to be the most useful drug in RA in the developing world. (*Pakistan Journal of Biological Sciences* 12 (4): 339-345, 2009; doi: 10.3923/pjbs.2009.339.345)

Contributions to the Moss Flora of Gümüşhane Province (Torul and Kürtün Districts, Turkey)

Turan Özdemir and Nevzat Batan

Some moss specimens were collected from Gümüşhane Province between September and October 2008. As a result of field and laboratory studies, 92 taxa belonging to 22 families were identified. These taxa are presented in a list. All taxa are new to the study area (Gümüşhane Province). Eight taxa are (*Ditrichum flexicaule* (Schwaegr.) Hampe, *Ditrichum pusillum* (Hedw.) Hampe, *Grimmia lisae* De Not., *Grimmia montana* Bruch and Schimp., *Herzogiella seligeri*

(Brid.) Z. Iwats., *Leskea polycarpa* Hedw., *Pohlia melanodon* (Brid.) J. Shaw, *Trichostomum tenuirostre* (Hook and Taylor) Lindb. var. *tenuirostre*) new records for A4 Square (40-42° N, 38-42° E) were determined. The aim of the study was to determine the moss taxa growing in Gümüşhane Province (Torul and Kürtün districts) and to make a contribution to the moss flora of Turkey. (*Pakistan Journal of Biological Sciences* 12 (4): 346-352, 2009; doi: 10.3923/pjbs.2009.346.352)

Effects of *Brucella abortus* Biotype 1 Infection on the Reproductive Performance of Sprague-Dawley Rats

Md. Ariful Islam, Mst. Minara Khatun, Byeong Kirl Baek and Sung Il Lee

The aim of this study was to assess the impact of *Brucella abortus* biotype 1 infection on the reproductive performance using Sprague-Dawley (SD) rat model. Virgin female SD rats (n = 24) were infected intraperitoneally with 0.1 mL of saline containing 1×10^{11} Colony Forming Unit (CFU) of pathogenic *B. abortus* biotype 1 Korean bovine isolate. Control rats (n = 24) were inoculated with 0.1 mL of apyrogenic saline. Both inoculated and control rats were divided into six subgroups. Four rats in each subgroup were consistently bred at 3, 7, 14, 21, 28 and 60 days after infection. *B. abortus* infection induced 41.67% infertility in the infected rats. The mean number of offspring/litter was 8.71 ± 2.01 for infected rats and 12.87 ± 1.42 for control rats ($p < 0.001$). The mean weight of the viable offspring was 6.10 ± 0.36 g for infected rats and 7.15 ± 0.40 g for control rats ($p < 0.001$). The rate of stillbirth was 12.30% in the infected rats. *B. abortus* biotype 1 was isolated from the uteri of the infected rats. The data of this study indicate that *B. abortus* biotype 1 infections in SD rat model affect reproduction adversely by causing infertility, stillbirth and loss of number and weight of offspring. (*Pakistan Journal of Biological Sciences* 12 (4): 353-359, 2009; doi: 10.3923/pjbs.2009.353.359)

An Immunohistochemical Study of Beta1 Integrin Molecules (VLA-4, VLA-5, VLA-6) in All Endometrial Compartments of Fertile and Infertile Women in Ahwaz-Iran

M. Ghafourian Boroujerdnia, F. Ghalambor Dezfuly and N. Emad Mosthophy

In some cases of infertility, implantation failure is due to a lack of expression of specific critical participating proteins such as cell adhesion molecules. The expression of beta 1 ($\beta 1$) integrin molecules within endometrial tissue has been

proposed as a marker of uterine receptivity during the implantation window. Present study was conducted to assess uterine receptivity in women with unexplained infertility using $\beta 1$ integrin molecules within endometrial tissue in comparison with fertile women. This retrospective study was performed using a semiquantitative analysis on the immunohistochemical staining of $\beta 1$ integrins (VLA-4, VLA-5, VLA-6) in the mid-secretory phase of endometrium. Specimens were obtained from 30 fertile women and 28 infertile patients with a history of unexplained infertility. Chi-Square test was used to compare the expression and defect of $\beta 1$ integrin molecules between two groups. The results showed $\beta 1$ integrin molecules were present in fertile and infertile endometrial uterine tissues with different reactivity in different compartments. VLA-5 and VLA-6 expression on endometrial compartments showed an unrelated pattern of staining in either fertile or infertile women. The majority of glandular epithelial cells and stromal cells expressed VLA-4 integrin molecules in fertile endometrium. However, the reactivity with VLA-4 reduced significantly in both glandular epithelial cells and stromal cells in infertile women ($p = 0.001$). In conclusion differences may explain causes of unexplained infertility and suggests that VLA-4 integrin molecule may contribute in uterine endometrial receptivity at the time of the implantation window which requires more investigations in benign gynecologic diseases. (*Pakistan Journal of Biological Sciences* 12 (4): 360-366, 2009; *doi*: 10.3923/pjbs.2009.360.366)

Iron Bioavailability of Rats Fed Liver, Lentil, Spinach and their Mixtures

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To study the effects of dietary iron source (basal diet- $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, liver, lentil, spinach, liver + lentil, liver+spinach and lentil+spinach) on iron bioavailability, fifty-six Albino Sprague Dawley derived male 21 days old rats were fed on iron-deficient diet ($7.8 \text{ mg Fe kg}^{-1}$ diet) and the mentioned seven iron containing diets (40 mg Fe kg^{-1} diet) for 10 days. Rats fed liver diet showed higher iron apparent absorption (52.1%), hemoglobin (Hb) gain ($0.94 \text{ g}/100 \text{ mL}$), Hb-iron gain (1.2 mg), Hb-regeneration efficiency (HRE%) (50.8%), relative efficiency of HRE% (106.5%), packed cell volume gain (2.22%) and mean corpuscular hemoglobin concentration (0.64 g dL^{-1}). Liver resulted in an increase in these parameters when mixed with lentil and spinach diets. However, rats fed iron free diet showed the higher dry matter absorption. (*Pakistan Journal of Biological Sciences* 12 (4): 367-372, 2009; *doi*: 10.3923/pjbs.2009.367.372)

PCR and Elisa Methods (IgG and IgM): Their Comparison with Conventional Techniques for Diagnosis of Mycobacterium Tuberculosis

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In order to establish a rapid and stable method for diagnosis of Mycobacterium tuberculosis infection and minimize the side effects of delayed diagnosis on patients and health system, a cross sectional study was carried out. Since, the infection rate with this bacteria increasing and one of the reasons for this increase is long process of laboratory identification, therefore establishing new diagnosis methods could decrease disease rate. To achieve this aim, collected sputum and blood specimens from 50 patients with clinical suspicion of pulmonary tuberculosis were studied with both traditional, acid-fast stain (AFB) and culture method compare to Enzyme-linked immunosorbent assay (Elisa) (IgG and IgM) and Polymerase Chain Reaction (PCR) methods. The sensitivity and specificity of all methods were determined by using the PCR results as the gold standard. The overall sensitivity, specificity, positive predictive value and negative predictive value of AFB were 17.64, 100, 100 and 70.12%. These values for culture method was 29.41, 100, 100 and 73.33% and for IgG antibody were 66.7, 81.81, 64.7 and 81.81% and IgM antibody were 70.58, 90.9, 80 and 85.71%, respectively. It was concluded that maximum sensitivity and specificity can be achieved by PCR method. (*Pakistan Journal of Biological Sciences* 12 (4): 373-377, 2009; *doi*: 10.3923/pjbs.2009.373.377)

The Effects of Nitrogen Starter Fertilizer and Plant Density on Yield, Yield Components and Oil and Protein Content of Soybean (*Glycine max* L. Merr)

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Effects of nitrogen starter fertilizer and plant density on yield and oil and protein content of soybean (*Glycine max* L. Merr) are not well understood, because nitrogen starter fertilizer and plant density has been tested separately. Two years field experiment was conducted to evaluate effects of these factors on yield, yield components, oil and protein content in 2006 and 2007 in Kermanshah, Iran. The experiment was conducted on soybean (var. Williams) as a split-plot based on randomized complete blocks design with three replications. Nitrogen starter

fertilizer treatments were arranged in three rates (0, 40, 80 kg ha⁻¹) as main plots and plant density as sub plots arranged with three levels (15, 30, 45 plant m⁻²). Based on similarity treatments and experimental designs, the results of analysis of combined variance and mean comparisons showed significant (528.4 kg ha⁻¹) yield increase as density increased from 30 to 45 plant m⁻² and nitrogen starter fertilizer increased from 0 to 40 kg ha⁻¹ in two years. Analysis of correlation showed a positive significant correlation between yield and number of seed per plant ($r = 0.724$), number of pods and yield ($r = 0.463$), thousand seed weight and yield ($r = 0.437$). A linear regression was found between yield and number of seed per plant, number of pods and thousand seed weight (yield = $37.58 + 0.73x_1 - 0.14x_2 + 0.7x_3$; $r^2 = 0.56$); $p < 0.01$). Seed protein was unaffected by plant densities, but nitrogen application changed it. Dissimilarly, oil content has a diverse respond to treatments. This experiment showed density of 45 plant m⁻² and application of nitrogen starter fertilizer 40 kg ha⁻¹ are optimum and increase grain yield under condition of our experiment. We suggest to conduct some experiments for understanding of linear relationship for number of pod for understanding of linear relationship for number of pod for levels of nitrogen starter and quadratic relationship for number of seed for levels of density. (*Pakistan Journal of Biological Sciences* 12 (4): 378-382, 2009; doi: 10.3923/pjbs.2009.378.382)

Cytological and Toxicological Properties of a Decoction Used for Managing Tumors in Southwestern Nigeria

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The cytological and toxicological potentials of an ethanol extract of a decoction used in South Western Nigeria for the management of breast tumors were evaluated using mice and *Allium cepa* models. The oral administration of the extract to the mice within the range of 400-1600 mg kg⁻¹ b. wt., dosage did not result in any mortality until 2000 mg kg⁻¹ body weight (b. wt.), when 60% mortality occurred. The LD₅₀ of the extract administered intraperitoneally, was 400 mg kg⁻¹ b. wt. Furthermore, the extract induced macroscopic and microscopic changes causing a dose-related root growth inhibition and chromosomal aberrations in *Allium cepa*. The effect of the extract was more pronounced at 1600 mg kg⁻¹, dose while the EC₅₀ was at 380 mg after 72 h. This decoction may present cytological and toxicological potential for managing breast tumors and corroborates its use in ethno medicine. (*Pakistan Journal of Biological Sciences* 12 (4): 383-387, 2009; doi: 10.3923/pjbs.2009.383.387)

Study on the Effect of Sulphur, Glucose, Nitrogen and Plant Residues on the Immobilization of Sulphate-S in Soil

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In order to evaluate the relationship between sulphur (S), glucose (G), nitrogen (N) and plant residues (st), on sulphur immobilization and microbial transformation. Five soil samples from 0-30 cm of Bastam farmer's fields of Shahrood area were collected. Eleven treatments with different levels of S, G, N and plant residues (wheat straw) were applied in a randomized block design with three replications and incubated over 20, 45 and 60 days. The immobilization of SO_4^{-2} -S presented as a percentage of that added, was inversely related to its addition rate. Additions of glucose and plant residues increased with the C-to-S ratio of the added amendments, irrespective of their origins (glucose and plant residues). In the presence of C sources (glucose or plant residues), N significantly increased the immobilization of SO_4^{-2} -S, whilst the effect of N was insignificant in the absence of a C amendment. In first few days the amounts of added SO_4^{-2} -S immobilized were linearly correlated with the amounts of added S recovered in the soil microbial biomass. With further incubation the proportions of immobilized SO_4^{-2} -S remaining as biomass-S decreased. Decrease in biomass-S was thought to be due to the conversion of biomass-S into soil organic-S. Glucose addition increased the immobilization (microbial utilization and incorporation into the soil organic matter) of native soil SO_4^{-2} -S. However, N addition enhance the mineralization of soil organic-S, increasing the concentration of SO_4^{-2} -S in soil and the extent to which available-S can be immobilized is determined by both the amount of available-S and the availability of an utilizable C source. (*Pakistan Journal of Biological Sciences* 12 (4): 388-392, 2009; *doi*: 10.3923/pjbs.2009.388.392)

Procalcitonin Role in Differential Diagnosis of Infection Stages and Non Infection Inflammation

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The aim of this study is evaluation of procalcitonin role in the diagnosis of infectious and non infectious inflammation. This cross-sectional study was conducted in one hundred patients in Baqiyatallah Hospital of Iran in 2008. Patients suspected to infection were recruited to study. They were divided to four groups as: systemic inflammatory response syndrome, sepsis, sepsis syndrome and septic shock.

Procalcitonin quantitative was assayed by immunoluminometric kit manufactured in Germany. Procalcitonin level was divided to four groups in $<0.5 \text{ ng mL}^{-1}$ compatible for SIRS, $0.5\text{-}2 \text{ ng mL}^{-1}$ for sepsis and $2\text{-}10 \text{ ng mL}^{-1}$ for sepsis syndrome and $>10 \text{ ng mL}^{-1}$ for septic shock. Data was analyzed by SPSS 13 for window software; T student test, ANOVA and Chi-square were used. In this study 53(53%) of subjects were men with mean age of 56.16 ± 19.5 years old. The diagnosis was SIRS in 36%, sepsis in 38%, sepsis syndrome in 14% and septic shock in 12% of cases. Procalcitonin level was less than 0.5 ng mL^{-1} in 61% and more than 10 ng mL^{-1} in 10% of patients. Procalcitonin level showed significant association with septic shock, positive blood culture and mental dysfunction. Ultimately this study showed that high level of procalcitonin can differentiate septic shock from SIRS and other stages of infection. Dysfunction of mental status and high level of procalcitonin can determine septic shock. (*Pakistan Journal of Biological Sciences* 12 (4): 393-396, 2009; doi: 10.3923/pjbs.2009.393.396)

Circulation Free Leptin in Diabetic Patients and its Correlation to Insulin Level

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Present researchers studied the relation between insulin with free and total leptin in type 2 diabetic patients. Thirty non insulin dependent diabetic obese patients (age: 50 ± 12 year and $\text{BMI}>30 \text{ kg m}^{-2}$) and thirty non insulin dependent diabetic non obese patients (age: 49 ± 25 year and $\text{BMI}<25 \text{ kg m}^{-2}$) were studied. Free leptin was purified by Gel filtration Chromatography and the fractions were collected and then their free leptin was measured by a high sensitive ELISA Kit. Circulation total leptin and insulin were measured by ELISA. Circulation free and total leptin were significantly correlated to insulin ($p<0.005$). Free leptin concentrations were higher in women than in men ($p<0.001$). Ratio of free leptin to total in obese subjects is more than non-obese subjects (0.27 ± 0.1 vs. 0.03 ± 0.04 , $p<0.001$). Ratio of free to total leptin showed a positive correlations with insulin ($r = 0.58$, $p<0.001$) insulin resistance ($r = 31$, $p<0.015$) and BMI ($r = 0.86$, $p<0.001$). The majority of leptin which circulates in obese individuals was free form. Presumably it is bioactive portion of hormone and thus obese subjects are resistant to free leptin. These observations are consistent with the view that free leptin levels in diabetes patients attributed to changes in serum insulin level and insulin resistant. (*Pakistan Journal of Biological Sciences* 12 (4): 397-400, 2009; doi: 10.3923/pjbs.2009.397.400)

Evaluation of Bacteriological and Sanitary Quality of Drinking Water Stations and Water Tankers in Makkah Al-Mokarama

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The present study was conducted to evaluate the bacteriological and sanitary quality of drinking water produced in Makkah Al-Mokarama during the high season in the month of Ramadan. Water samples were collected both from the drinking water stations and the water tankers (in Arabic language called whitats) used to transport and distribute water in different places in the Holy city. Water samples were analyzed to determine the densities of HPC at 22 and 37°C, total coliforms, *E. coli* and *S. aureus*. The bacteriological analysis of drinking water samples at 37°C proved that 6.7-33.3, 20-46.7, 0-20 and 0-6.7% of total water samples contained HPC, total coliforms, *E. coli* and *S. aureus*, respectively which were higher than the safe limits for drinking water. The bacterial analysis of drinking water varied from one water station to another. On the other hand, drinking water transported by tankers appeared to be in the lowest category of water quality. Because out of total water samples 40-59%, 60-68.8%, 31.2-37.5%, 10-25% contained HPC, total coliforms, *E. coli* and *S. aureus*, respectively, which were higher than the established safe limits of drinking water. One possible reason for poor quality of drinking water could be attributed to the application of inadequate water disinfection treatments and also the absence of sanitary aspects as supported by the bacteriological analysis which holds true especially for water supplied by tankers. In conclusion, it is important to apply proper water disinfection measures and provide sanitary monitoring programs during the production of drinking water as a whole and for the water tanker in particular. (*Pakistan Journal of Biological Sciences* 12 (4): 401-405, 2009; **doi:** 10.3923/pjbs.2009.401.405)