

Antispasmodic effect of *Ephedra major* extract on adrenergic and calcium channels receptors in the rat jejunum

Mehrzad-Gilmalec, F.¹, Panahi, N.^{2*}, Sadeghi- Hashjin, G.³

1. Student Of Veterinary, Science and Research Branch, Islamic Azad University, Tehran, Iran
2. * Department of Physiology and Pharmacology, Science and Research Branch, Islamic Azad University, Tehran, Iran (Panahi1380@yahoo.com)
3. Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

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Tendency to utilize Ephedra containing products is increasing due to their favorable properties such as weight loss, antibacterial, antisensetive etc. Due to the presence of gastro-intestinal system agonism α and β adrenergic compound and lack of systematic research on this issue, we conducted to determine effects of the hydroethanolic extract of *Ephedra major* (*E. Major*) host on jejunum. Isolated jejunum from male Wistar rat were tested in the organ bath. Rats were anesthetized and the jejunum was isolated and placed in Krebs solution. Then, it was cut into segment of 1.5-2 cm and mounted in 25 ml chambers of organ bath. *E. Major* extract had a relaxation effect on rat jejunum. According to the results, the cumulative concentration of *E. Major* (0.00625 - 3 mg/ml) relaxed the KCl (80 Mm) - and acetylcholine (0.1 Mm) - induced contraction dose-dependently ($P \leq 0.05$). The inhibitory effect of extract on contraction induced by KCl was unaffected by phenoxybenzamine (0.001 Mm). But verapamil (0.001 Mm) and propranolol (0.001 Mm) inhibited the relaxant effect ($P \leq 0.05$). The inhibitory effect of extract on contraction induced by acetylcholine had synergism effect by verapamil, phenoxybenzamine and propranolol ($P \leq 0.05$). These findings revealed that β -adrenergic receptors and presumably other channels such as Ca^{2+} channels involves in inhibitory effect of *E. Major* extract. The results support the possible beneficiary effects of this plant in traditional medicine.

Key words: *Ephedra major* Herb, Jejunum, Organ bath, Rat.

Study on the protective effects of *Quercetin* on Methotrexate-induced small intestinal damage in the rat

Mohajeri, D.^{1*}, Monadi A.¹, Kaffashi Elahi, R.², Neshat Gharamaleki, M.²

1.* Department of Pathobiology, Tabriz Branch, Islamic Azad University, Tabriz, Iran
(daryoushmohajeri@yahoo.com)

2. Department of Clinical Sciences, Tabriz Branch, Islamic Azad University, Tabriz, Iran

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Intestinal damage is one of the major toxic effects of methotrexate (MTX). The aim of this study was to evaluate the protective effects of quercetin on MTX-induced small intestine damage in rats. Thirty-six male Wistar rats were randomly allocated into four equal groups. The first group was the control. The second group, only quercetin (15 mg/kg) was administered intraperitoneally for 15 consecutive days. The third group, MTX was applied as a single dose (20 mg/kg) intraperitoneally at fifteenth day. The fourth group, quercetin was given intraperitoneally in addition to MTX application until the rats were killed. All animals were sacrificed 4 days after the MTX injection for histopathological examination and the assay for serum total antioxidant activity (TAA), tissue reduced glutathione (GSH), malondialdehyde (MDA), superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione reductase (GR) levels. Microscopically, jejunal tissues of the MTX treated group showed severe villus shortening and blunting, inflammatory cell infiltration and hemorrhage in lamina propria, as well as epithelial cell necrosis, however, administration of quercetin alleviated the jejunal damage. Levels of TAA, GSH, SOD, CAT, GPx and GR decreased in the MTX received group, but increased significantly ($P=0.00$) in the quercetin+MTX groups. Quercetin significantly ($P=0.00$) decreased MDA levels which was increased by MTX treatment. The results showed that quercetin due to its antioxidant properties may protect the small intestine of rats from MTX-induced damage.

Key words: Methotrexate, Intestine, Quercetin, Rat.

Effect of folic acid in cholestatic hepatic fibrosis induced by bile duct ligation Model in rat

Mohammadian, Z.¹, Eidi, A.^{1*}, Mortazavid, P.², Tavangar, SM.³, Asghari, A.⁴

1.* Department of Biology, Science and Research Branch, Islamic Azad University, Tehran, Iran
(eidi@srbiau.ac.ir, akram_eidi@yahoo.com)

2. Department of Pathobiology, Science and Research Branch, Islamic Azad University, Tehran, Iran

3. Department of Pathology, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran

4. Department of Veterinary Clinical Science, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Cholestasis is a liver disease that, if untreated and not prevented, will cause hepatic fibrosis and cirrhosis, and eventually death. As a result of bile duct ligation (BDL), toxic bile acids accumulate in liver. Accumulation of these toxins and subsequent events, such as oxidative stress and inflammatory response leads to cell death and hepatic fibrosis. The liver is the main organ for folate storage and metabolism and folate deficiency is a common occurrence in many liver diseases. The present study investigated the protective effect of folic acid in experimental hepatic fibrosis. 81 male Wistar rats were classified into the nine groups: Control, Sham-operated control, Folic acid, Bile duct-ligated (BDL) control, and BDL+ folic acid groups. Folic acid treated groups were given oral folic acid (1, 5 and 10 mg/kg b.w) for 28 days. The severity of hepatic injury was determined by measures biochemical indicators like's activities of AST, ALT, ALP, concentrations of bilirubin and albumin in the serum and activities of superoxide dismutase in the hepatic samples. To assess histopathological features of cholestasis (bile duct hyperplasia, fibrosis, necrosis and inflammatory cell infiltration), Masson's trichrome staining was performed. In BDL rats treated with folic acid, hepatic fibrosis was significantly ameliorated and the serum and hepatic biochemical variation induced by BDL were moderated. This study suggests that folic acid has a protective effect in liver. Folic acid reduced oxidative stress and inflammatory response and thus prevented liver fibrotic changes.

Key words: Folic acid, Bile duct ligation, Fibrosis, Rat

The effect of *in ovo* injection of *Gherlin* on Sucrase enzyme activity of small intestine mucosa in broiler chicken

Ghiasi Ghaleh-kandi, J.*

*Department of Veterinary Medicine, Islamic Azad University, Shabestar Branch, Shabestar, Iran

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The aim of this study was to investigate the effect of *in ovo* administration of ghrelin on subsequent small intestine Sucrase activity in broilers. In this experiment 900 fertilized eggs were collected from commercial breeder flock. The eggs were divided into five experimental groups; control (without injection), group 2 (*in ovo* injected with basal solution), group 3 (*in ovo* injected with 50 µg/egg ghrelin), group 4 (*in ovo* injected with 100 µg /egg ghrelin) and group 5 (*in ovo* injected with 150 µg /egg ghrelin). *In ovo* injection was done at day 7 of incubation. Two broilers from each group have been choose and slaughtered on days 21 and 42 of rearing period and 1, 10, 30, 50, 70 and 90 percent of small intestine sampled for evaluate Sucrase enzyme activity. According to the results, *in ovo* injection of 100 µg /egg ghrelin increased intestine Sucrase enzyme activity in different parts of small intestine on day 21 post hatch ($P<0.05$) but had no effect on day 42 ($P>0.05$). These results suggest that *in ovo* injection of 100 µg ghrelin had beneficial effect.

Key words: *In ovo injection, Ghrelin, Sucrase enzyme, Small Intestine, Broiler chicken*

The experimental study of bio-engineered free-cell ostrich cornea as xenograft

Fatourehchi, M.^{*1}, Fattahian, H.R.², Kajbafzadeh, A.M.³

1. **DVM graduated student, Faculty of Specialized Veterinary Sciences, Islamic Azad University, Science and Research Branch, Tehran- Iran (m_fatourehchi@yahoo.com)*
2. *Department of Surgery, Faculty of Specialized Veterinary Sciences, Islamic Azad University, Science and Research Branch, Tehran- Iran.*
3. *Pediatric Urology Research Center, Section of Tissue Engineering and Stem Cell Therapy, Children's Hospital Medical Center, Tehran University of Medical Science, Tehran, Iran.*

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Healthy cornea is a major element in optical pathway. Corneal blindness can occur due to various causes and different severities, and almost the best effective treatment is corneal allotransplantation. The limitation of allograft propounds the usage of other alternatives such as xenograft besides synthetic biomaterials and keratoprotheses. The aim of the study is to produce Extra Cellular Matrix (ECM) with decellularization method in ostrichs cornea. The Ostrichs heads were obtained from a local slaughter house. All corneas were excised. Then ECM was prepared by the combination of chemomechanical and ionic detergent methods. Cellular components elimination and stromal structure were assessed by three types of histological staining and ultra-structural studies. Corneal transparency and thickness evaluated in macroscopic observation.

Histological staining of the decellularized cornea confirmed the complete removal of corneal cells as well as preserving the integrity of basement membrane. The ultra-structural studies revealed that decellularization process preserved the native structure of the stromal cornea although the collagen bundle space increased slightly. However, after immersing the acellular cornea in 100% glycerol, their optical properties regained to those native corneas.

The authors believe that tissue processing method of ostrich cornea which applied in present study can be used as an alternative tissue after completing other examinations such as cell culture, immunological and biomechanical properties.

Key words: *Free-cell cornea, Extra cellular matrix, Xenograft, Ostrich.*

Optimization the antioxidative properties of catfish (*Arius thalassinus*) skin gelatin hydrolysate using response surface methodology

Taheri, A.^{1*}, Mokhtarnezhad, V.², Motamedzadegan, A.³

1.* Associate Professor, Faculty of Marine Sciences, Chabahar Maritime University, Chabahar, Iran
(taherienator@gmail.com)

2. MS.C Student of Sea food Sciences, Chabahar Maritime University

3. Department of Food Science, Mazandaran Science and Technology Park Sari, Mazandaran, Iran

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Free radicals are cause of the various diseases. Oxidation also reduces the quality of the food and causes the disease. Synthetic antioxidants have human health risks, so it is necessary to identify the natural antioxidant agents. The objective of this study was to optimize the production of gelatin hydrolysissate with antioxidant properties. The catfish skin gelatin was extracted using sodium hydroxide, sulfuric acid and citric acid by the washing after each treatment, finally 3 volumes of distilled water added at 45° C for 12 h in a shaker incubator and hydrolyzed under various conditions of temperature, enzyme concentration and time using the Flavourzyme. Gelatin for measuring the ion chelating of ferrous iron, mixed with FeCl₂ and Frosin and after ten minutes of stay at room temperature, absorbance at 562 nm was measured. Response surface methodology was used to optimize the production of gelatin hydrolysis. The test variables included the time (min), temperature (°C) and enzyme-substrate ratio (%), percent the chelated Fe (II) was considered as a response. Analysis of variance showed significance of the models, temperature and enzyme to substrate (P<0.05) and not significance for the time (P>0.05). This indicates a good fitness to the model. Catfish skin gelatin hydrolysate show a good percent Fe (II) ion chelating in the range of 20-81%. The results suggest antioxidant peptides from catfish skin gelatin hydrolysis can be a potential candidate for the pharmaceutical industry and for the development of functional foods.

Key words: *Antioxidant, Gelatin, Hydrolysate, Response surface*

Effect of hydro-alcoholic extract of peel of *Punica granatum L.* on growth of *Candida albicans* in alloxan-induced diabetic rats

Sadeghpour, M.¹, Eidi, M.^{2*}, Noorbakhsh, F.³

1. MSc of Microbiology, College of Biological Sciences, Varamin-Pishva Branch, Varamin, Iran
2. * Department of Microbiology, College of Biological Sciences, Varamin-Pishva Branch, Varamin, Iran
(maryameidi@gmail.com)
3. Department of Biology, College of Biological Sciences, Varamin-Pishva Branch, Varamin, Iran

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Nowadays, especially opportunistic fungi such as *Candida albicans* are the most common risk factors in patients who are immunocompromised. Fungal infections caused by *Candida* species and increasing strains resistant to azole drugs in Immunosuppression patients are important to enjoy. The toxicity of drugs used, the resistance of the fungus and problems from drug interactions, necessitates the use of more effective and less toxic drugs cause the screw. Pomegranate consumption except for nutrition is impressive for medicinal and therapeutic effects. The aim of this study was to investigate the effect of pomegranate peel extract at doses concentrations of 25, 50, 100 and 200 mg/kg on growth of *C. albicans* (ATCC 10231) in alloxan-induced diabetic rat. The animals were made diabetic by intraperitoneal injection of alloxan (150 mg/kg). After diabetes induction, they were infected by *Candida albicans*, orally. Then, treatments of extract and Itraconazole were done orally. Sampling of fungus from month, culturing and colony counting were done daily for evaluating effects of extract and Itraconazole on fungal growth. The results showed that oral treatment of hydro-alcoholic peel extract improved *Candida albicans* infections in diabetic rats. Its potency is similar to Itraconazole, as synthetic drug. On the second day of treatment, significant effect of extract on growth *C. albicans* was shown ($P < 0.001$). Comparison between effects of pomegranate extract and Itraconazole on *C. albicans* was significant. The results suggest antifungal effect extract of pomegranate compared with the antifungal medication. As a result, consumption of pomegranate extract inhibited the growth of *Candida albicans* in the diabetic rats.

Keywords: Pomegranate (*Punica granatumL.*), *Candida albicans*, Diabetes, Rat, Alloxan.

Histopathologic evaluation of pulmonary lesions in camel in Iran (*Camelus dromedarius*)

Chitgar, A.¹, Sohrabi Haghdoost, I.^{1*}, Jamshidian, J.², Hesaraki, S.¹

1.* Department of Pathobiology, Science and Research Branch, Islamic Azad University, Tehran, Iran
(i.sohrabihaghdoost@gmail.com)

2. Department of Microbiology, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Pulmonary infections are of important diseases in camel that jeopardize the health of the animal and decrease its production efficiency. Considering that prevention and treatment of pulmonary infections necessitate the knowledge of respiratory diseases and the fact that little information is available in this regard in camel, the present study was conducted to investigate the pulmonary lesions using histopathological methods in camels slaughtered. The respiratory tracts of the camels were thoroughly inspected for lesions. Specimens were fixed in 10% formalin. Next, the samples were stained using Hematoxylin and eosin stain (H&E) and were evaluated. The occurrence of pulmonary lesions was 79.6% (236/447). The occurrence acute interstitial pneumonia, chronic interstitial pneumonia, bronchopneumonia, bronchiolitis, pleuritis and atelectasis were 52.8% (236/447), 5.4% (24/447), 7.8% (35/447), 6.7% (30/447), 3.4% (15/447) and 15.2% (68/447), respectively. The occurrence of pulmonary lesions, acute interstitial pneumonia and bronchopneumonia was higher in fall and winter than spring and summer ($P < 0.05$). In conclusion, the present study showed high occurrence of pulmonary lesions in camels. Moreover, the results revealed higher occurrence of pulmonary lesions in cold seasons.

Keywords: Camel, Pulmonary lesions, Histopathology