Designing Competitive Nanobiosensor for Ochratoxin based on FRET using quantum dot

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In this research, using FRET (fluorescence resonance energy transfer) from Cd/Te quantum dot (anti Ochratoxin A antibody immobilized on the external surface of quantum dot or QDs) to (Ochratoxin A labeled with Rhodamine 123 bound to albumin), a sensitive competitive immunoassay was developed for measuring Ochratoxin A. The highly specific immune-reaction between anti-Ochratoxin A antibody on the QDs and labeled Ochratoxin A brings the Rho fluorophore and the QDs in close spatial proximity, and following photo-excitation of the QDs, causes FRET to occur between the Rho fluorophore (acting as the acceptor) and the QDs (acting as the donor). In the absence of free Ochratoxin A, the immune reaction between labeled Ochratoxin and the anti-Ochratoxin antibody on the QDs induces emission and causes FRET to occur. In the presence of free Ochratoxin A, it competes with the labeled Ochratoxin A-albumin complex for binding to the antibody-QDs conjugate in the Nanobiosensor, leading to reduction in Rhodamine emission after FRET. The reduction in the fluorescence intensity of the Rhodamine acceptor directly correlates with the concentration of free Ochratoxin A in the sample. This method has a detection limit of 220pg per ml. It has also been used to measure Ochratoxin A in human serum samples. A linear relationship is found between the increase in the fluorescence intensity of Rho 123 at580 nm and the concentration of OTA in spiked samples over the 100-800 pg· mL−1 concentration range. This highly sensitive homogeneous competitive detection scheme is simple, rapid and efficient. It does not require multiple separation steps and excessive washing.

***Keywords**: Ochratoxin, Nanobiosensor, FRET, Quantum dot*

The survey of pathologic lesions of trachea in co-administration of H120 and 4/91 IB vaccines in broiler chickens

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Infectious bronchitis (IB) disease is one of main infectious disease in poultry production. IB virus posses several serotype that the immunity against each serotype is specific. The protection against any serotype is expected by vaccination against the same serotype. In Iran, the Massachusetts and 4/91 serotypes are common and different commercial IB vaccines were utilized against these serotypes. By considering to this fact that there is no interference between different IB virus serotypes, this seems that administration of different IB vaccines simultaneously or by short interval time can be effective for increasing of protection level. Therefore, in this study the vaccinal reaction was studied following of administration of two distinct IB vaccines by pathological examination. For this, in commercial farms the H120 and 4/91 vaccines administrated distinctly and simultaneously. In this study the vaccination programs were examined and compared with pathological examination of trachea. The result represents that co-administration of H120 and 4/91 can induce higher pathologic lesions on trachea. It concluded that in IB vaccination, it is better to administrate different vaccines with interval time and do not vaccination simultaneously.

Keywords: *Infectious bronchitis, Broiler chicken, Vaccine, Histopathology.*

Experimental study on protective effects of Hesperetin against intestinal ischemia–reperfusion injury in rats

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The intestinal mucosa is known to be adversely affected by ischemia-reperfusion (I/R). It has been demonstrated that Hesperetin has protective effects against ischemia-reperfusion injury on various organs. The aim of this study is to determine protective effects of Hesperetin on I/R injury of the intestine in rats. For this purpose, forty male Wistar rats were randomly divided into four groups as control (group 1), sham IR (group 2), intestinal IR (group 3) and Hesperetin plus intestinal IR (group 4). Intestinal IR was produced by 30 min of intestinal ischemia followed by a 60 min of reperfusion. Rats in the group 4 received Hesperetin (1000 U/kg) subcutaneously, 120 minutes before ischemia. After the experiments, the colon was removed and the tissues were processed for histopathological examination. Serum total antioxidant activity (TAA), and levels of Malondialdehyde (MDA), superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione reductase (GR) were measured in colon tissue. Histopathology show that, severe inflammatory cell infiltration, hyperemia and hemorrhage in lamina propria, as well as epithelial cell necrosis and reduction of mucosal thickening in colon tissues of the intestinal IR group. Administration of Hesperetin alleviated the colon damage in group 4. Levels of TAA, SOD, CAT, GPx and GR decreased in the intestinal IR group, but increased significantly (p<0.05) in the IR+ Hesperetin group. Hesperetin significantly (p<0.05) decreased MDA levels which was increased by IR. The results of this study, showed that Hesperetin treatment protected the rat's intestinal tissue against intestinal ischemia-reperfusion injury.

Keywords: *Hesperetin, Ischemia-reperfusion, Intestine, Rat*

Determination of Doppler ultrasonographic indices of abdominal aorta and renal artery in cat

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The aim of this study was to determine abdominal aorta and intrarenal arteries Doppler indices by duplex Doppler ultrasonography in clinically normal adult domestic shorthair cats. For this purpose, twenty domestic shorthair cats (10 males and 10 females) were evaluated. To determine normal kidney function, ultrasound-guided core biopsy of both right and left kidneys was performed and histopathologic samples were taken. B-mode, color Doppler and pulsed wave Doppler ultrasonography of both right and left kidneys were performed to record the Doppler indices of intrarenal arteries. In the next step, the abdominal aortic lumen diameter was measured and its Doppler indices were also recorded. Mean ± SD RI and PI of the right and left intrarenal arteries were 0.58 ± 0.03, 0.6 ± 0.02, 1.02 ± 0.09 and 1.04 ± 0.07, respectively. The mean ± SD diameter of abdominal aortic lumen was 0.37 ± 0.06. PI and RI values of abdominal aorta were 0.79 ± 0.05 and 1.93± 0.37, respectively. The results of current study may be considered as reference range of Doppler indices of the abdominal aorta and intrarenal arteries in domestic shorthair cats. In addition, these values are helpful in comparison with pathologic conditions.

Key words: *Pulse wave Doppler ultrasound, Abdominal aorta, Renal artery, Feline*

حEvaluation of the effects of cold argon plasma jet on the clearance of Ochratoxin A produced by different isolates of *Aspergillus nigri*

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Mycotoxins are secondary metabolites of the fungi, and often arrange as cyclic hydrocarbons structurally. The aim of this study was an evaluation of the effects of cold argon plasma jet on the clearance of Ochratoxin A produced by isolates of *Aspergillus nigri*. food sources including corn, wheat, oatmeal, rice and flour products were sampled of Iran. The fungal species were cultured for identification on CHAPK medium and also on (SB + YE) and (SB + ME) media for obtaining Ochratoxin A. The mean initial concentration of Ochratoxin A in ME + SB medium was 22.23 µg / kg and at 60 and 360 seconds reached to 38.36 and 4.82 µg / kg concentrations respectively, and in the YE + SB medium being at 38 / 34 µg / kg reached to 25.88 and 2.47 mg / kg concentrations, respectively. In comparison with Log / Lin with Lin / Log, the initial concentrations of Ochratoxin A in ME + SB medium was 39.224 µg/kg and at 60 and 360 seconds reached 22.26 and 8.414 µg / kg, respectively, and in the YE + SB medium from 31.50 to 22.68 and 8.95 µg / kg concentrations, respectively. Statistical analysis showed significant reduction of Ochratoxin changes produced by fungal isolates. This change was significant until the increase of 360 seconds with Plasma jet treatment in the environment (YE + SB), a decrease in the amount of Ochratoxin. Therefore, the jet plasma system can be used to eliminate fungal mycotoxins in order to increase the quality of food.

Keywords: *Aspergillus spp, Ochratoxin A, Cold plasma jet*

Macroscopic and Microscopic study of Oviduct in guinea fowl

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Guinea fowls are considered of pheasant birds. Reproductive system of birds includes ovary and oviduct. The ovary is connected to the cloaca by oviduct and consists of infundibulum, magnum, isthmus, uterus and vagina. Due to anatomical differences in these organs of birds, and because there is scarce knowledge about the oviduct of guinea fowl, this research was performed. For this research 10 female guinea fowl were selected and oviducts were anatomically studied. Then tissue samples were taken, and stained by Hematoxylin and Eosin. Anatomical and histological results were generally similar with other birds. The most prominent anatomical feature of oviduct was the same length of oviduct and body and all oviduct regions except uterus had in the same color. The statistical analyses using Tukey test showed the average size of different parts of active oviduct is greater than inactive oviduct, also this result is significant in magnum, isthmus and uterus and is not significant in the infundibulum and vagina. Histological result showed that the epithelium in oviduct has been seen ciliated pseudostratified columnar. Also Except infundibulum in oviduct, s lumen, there were secondary chains on the primary chains. In lamina propria there were tubular glands that started from the tubular part of infundibulum and disappeared in vagina.

Keywords: *Guinea fowl, Oviduct, Anatomy, Histology.*

Evaluation of β-tricalciumphosphate (β-TCP) nanocomposite granules compared with nanocomposite hydroxyapatite (HA) on healing of segmental femur bone defect in rabbits

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The loss of bone fragments, often due to trauma, infection, mass loss, or even complete bone regeneration after complicated fractures, is one of the constant challenges in medicine and veterinary medicine. Over the last decades, many efforts have been made to obtain materials that have the potential for high bone regeneration and to replace alternatives to autograft or zenografts. In this study, 45 adult male New Zealand male rabbits weighing 3-5 mg/kg, randomly divided into 3 groups of 15, were used. During surgery on the femur of each rabbit, a bilateral, 6 mm diameter defect was created. In the first group (control), no substance was used, in the second group, hydroxyapatite, and in the third group, nanocomposite tri-calcium phosphate (TCP) was used to fill the defect. Bone specimens were harvested for histopathologic evaluation on days 15, 30 and 45 and for evaluation of 4 indexes of union, spongiosa, cortex and bone marrow. The results showed that the results of using nanocomposite tricalcium phosphate in comparison with other groups were significantly different in all cases. Therefore, according to the results, it can be admitted that nanocomposite tri-calcium phosphate scaffold has a positive effect on the healing process and has good bone strength, so it can be widely used in orthopedic surgery as well as tissue engineering.

Keywords: *Nanocomposite, Tricalcium phosphate, Hydroxyapatite, Femur bone defect, Bone healing, Rabbit.*