

Antibiotic-Loaded PLGA Nanoparticles against *Pseudomonas aeruginosa*

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Abstract

Background and objective: *Pseudomonas aeruginosa* biofilm is of interest due to its involvement cystic fibrosis and prosthesis-related infections. Unique biofilm structure, the vast application of antibiotics and accordingly antibiotic resistance, increase the need for new drug delivery methods to enhance drug efficiency. Nanocarriers are one of the new choices. The aim of the presented study is to evaluate the efficiency of amikacin-loaded PLGA nanoparticles in *P. aeruginosa* biofilm eradication.

Materials and methods: Antibacterial (MIC and MBC) and antibiofilm (MBEC) activity of synthesized nanoparticle, by double emulsification method, was assayed against *P. aeruginosa* PAO1.

Results: The synthesized nanoparticles contain an appropriate amount of antibiotic ($\approx 26 \mu\text{g}$ Amikacin/mg/ nanoparticle) and have a suitable size ($\approx 440 \text{ nm}$) for inhalation and injection. The particles are sustainable, have a good antibiotic release kinetic for antibacterial applications. Furthermore, the antibiotic loaded in the particles also keep their antibacterial activity.

Conclusion: Amikacin is known to possess nephrotoxic and ototoxic properties and therefore loading it in a polymeric cover, makes the nanoparticles suitable candidate antibacterial and antibiofilm applications with fewer side effects.

Key words: Polymeric nanoparticles, PLGA, Amikacin, Biofilm, *Pseudomonas aeruginosa*

Anti-cancer Activity of Fractions Derived from Venom of Iranian Cobra Snake (*Najanaja oxiana*) on Breast Cancer Cell Line 4T1

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Abstract

Background and objective: Breast cancer is the leading cause of cancer-related death in women. Many biotoxins like snake venom as a source of useful biologically active compounds are potential anti-cancer agents. Venom is a complex mixture of active pharmaceutical ingredients. The purpose of this study was investigation of anticancer activity of the fractions obtained from the venom of Iranian cobra, *Naja naja oxiana*, by gel filtration and anion exchange chromatography on breast cancer cell line.

Methods: Breast cancer cell line (4T1) was cultured in RPMI with 10% fetal bovine serum. Iranian cobra venom purified by gel filtration and anion exchange chromatography. The concentrations of these fractions were determined by BCA method and their molecular weight measured by SDS-PAGE. Cytotoxicity of the fractions on cancer and normal cell lines was evaluated with MTT assay.

Result: Based on the results obtained from gel filtration chromatography, 6 fractions were separated. Fraction F3 had a protein with molecular weight of 50 kDa that is equivalent to the molecular weight of disintegrin. Therefore, fraction F3 selected for further purification by anion exchange chromatography. Four fractions were isolated by anion exchange chromatography. Fraction F2 had anticancer activity by MTT and Anti-adhesion assays and determined as active anti-cancer fraction. Molecular weight of fraction F2 was 47 kDa. The results of MTT assay showed 45 and 8 percent cytotoxicity on 4T1 and normal cell lines (HEK293) respectively.

Conclusion: The active fraction of Iranian Cobra venom had cytotoxic effects on breast cancer cells with very low toxicity on normal cells. According to results, this fraction had anti-adhesion and cytotoxic activity can be a good candidate for more purification and characterization.

Keywords: Iranian cobra snake, *Naja naja oxiana*, Gel filtration chromatography, Ion exchange chromatography, MTT assay, Breast cancer

Fungal Air Flora in Zahedan. Spring and Summer 2015

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Abstract

Background and objective: Fungi are organisms of air pollution and can development disease in humans or animals certain circumstances. According the importance of disease caused by fungi in the air, this study aimed to Identification of Zahedan fungal air flora in spring and summer was performed.

Materials and methods: In this descriptive cross sectional study, Zahedan was divided into 5 sampling sites, and done active and passive sampling method by using Dextrose Agar medium containing chloramphenicol (SC). Slide culture method used for the detection of mold colonies and to identify yeast colonies.

Results: The most segregated fungi In this study, respectively in spring: *Aspergillusflavus* 22.22%, *Aspergillus fumigatus* 16.66%, *Alternaria* 16.16% *Aspergillusniger* 11.11%, *Mucor* 11.11%, sterile mycelium 11.11%, *Penicillium* Spp. 5.55%, *Cladosporium* 5.55%, and in the summer respectively: *Mucor* 20.83%, *Scopulariopsis* 11.33%, , *Aspergillusflavus* 8.33%, *Aspergillusniger* 8.33%, sterile mycelium 8.33%, *Aspergillus fumigates* 8.33%, *AspergillusNidulans* 7.33, *Cladosporium* 8.33%, *Alternaria* 6.16 %, *Penicillium* 5.16%, *absidia* 2.16%, *Rhizopus* 4.16%.

Conclusion: Our findings showed that, Zahedan air contains a variety of fungal spores and immunocompromised, transplant and leukemia patients are prone to fungal infections observance with health advice, use of mask, using appropriate filter in air conditioner, install the anti-humidity devices in the home and workplace and wet areas can prevent the onset of many diseases associated with these factors.

Key words: fungal air flora, Zahedan, Spring and Summer

The Frequency of Infection with *Mycoplasma hominis* , *Mycoplasma genitalium* and *Ureaplasma urealyticum* among Women with Genital Tract Infection by Multiplex PCR

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Abstract

Background and objective: Mycoplasmataceae are the smallest self-replicating organisms without cell wall. The *Mycoplasma hominis*, *Mycoplasma genitalium* and *Ureaplasma urealyticum* are associated with genitourinary tract and non-genital infections and could cause complications such as infertility, preterm delivery, itching vagina, abortion. This study designed for rapid detection of *Mycoplasma hominis*, *Mycoplasma genitalium* and *Ureaplasma urealyticum* among infected women by Multiplex PCR .

Materials and methods: In this cross-sectional descriptive study in a period of 6 months (June to November 2015), 115 vaginal swabs samples were collected from women with genital tract infections referring to diagnostic laboratories in Tehran. All specimens were subjected to Multiplex PCR and cultivation methods. The results and the sensitivity and specificity of test were analyzed by Chi-squared and Independent T tests using SPSS software.

Results: Our results indicated that 38 cases (33%) were positive for *Mycoplasma* infection by cultivation method while 54 cases (46.9%) were positive by Multiplex PCR method. *Mycoplasma hominis*, *Mycoplasma genitalium* and *Ureaplasma urealyticum* were detected in 13.9%, 7.8% and 23.4% respectively. In 1.8% we found coinfection that infected by two species. The maximum rate of infection were detected among 30- 42 years old group, that statistically is significant (P= 0.001). The sensitivity of Multiplex PCR method for detection of *Mycoplasma hominis*, *Mycoplasma genitalium* and *Ureaplasma urealyticum* were 100% while its specificity for them were 96.1%, 97.2% and 92.63% respectively.

Conclusion: Regarding the importance of genital Mycoplasmas among genital infections and their related complications and regarding the difficulty of cultivation method and its low sensitivity, we recommend Multiplex PCR method for their detection. Multiplex PCR method is very sensitive and rapid and its specificity for detection of all genital Mycoplasmas significantly is acceptable.

Key words: *Mycoplasma hominis*, *Mycoplasma genitalium* ,*Ureaplasma urealyticum*, Multiplex PCR

Animal Bites in the City of Kermanshah. 2011-2015

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Abstract

Background and objective: Rabies One of the most common diseases among humans and animals, which can be transmitted through animal bites. The disease is a major public health and economic priorities. This study aimed to investigate the characteristics of epidemiology of animal bite in Kermanshah city during 2011 to 2015 years in was conducted in patients referred to health centers.

Material and methods: This study was a descriptive study and included records of animal bites in the city of Kermanshah had during 2011-2015 years. Data was analyzed according to demographic, epidemiological and clinical information through descriptive statistics using SPSS V. 16.

Results: During the 5-year period studied a total of 5031 cases of animal bites occurred in the city of Kermanshah, of which 3961 were men (78.7%) and 1070 women (21.3%). The mean age of 31.52 and standard deviation was 18.36. Animal bites are the most common 1284 cases (25.4 percent) in the age category 29-20 years. The number of cases has increased to the extent that from 976 cases (19.4%) in 2011 until 1071 cases (21.3%) increased in 2015. Dogs accounted 3873 (77%) of the cases of bites respective.

Conclusion: Due to the rising cases of animal bites in the city for more attention to training and general care to reduce the frequency of animal bites are recommended.

Key words: epidemiology, animal bites, rabies

Estimating Cost Analysis for Health Care Services Delivered to Animal Bites Patients in Qom Province

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Abstract

Background and objectives: Animal bites considered as one of the issues and problems of public health .Increasing number of animal bites is a very important, because of its potential risk of rabies disease and economic damage. This study was performed to evaluate the cost for health care services delivered to animal bites patients in Qom Province.

Materials and methods: This cross - sectional study based on data from animal bite patients in Qom, during 2015 was performed. At first, by using the forms that made by researchers, the direct and overhead costs related with the health services in the studied areas were calculated. This costs obtained by visiting the archives and accounting documents. The price paid for out of pocket cost per patient and treatment services to patients and the overall total costs were calculated using Excel software.

Results: During 2015 a total of more than 961 million tomans have spent on providing health services to 844 patients with Brucellosis in Qom. Direct health care costs about 913 million tomans, overhead, about 48 million tomans, the state cost per patient over 1 million and 139 thousand tomans, the patient's out of pocket costs to the patient and finally the average total cost of about 30 thousand tomans during one year of service to each of these patients was estimated at 1,169,000 tomans.

Conclusion: Based on results, considerable costs for treatment and prevention of rabies spent in Qom. So health planners should give priority to prevent this disease in their programs.

Keywords: Animal bite, Cost analysis, Health Service, Qom

Frequency of Cytomegalovirus Active Infection in Renal Transplant Recipients in Kermanshah by ELISA and Real-Time PCR methods

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Abstract

Background and objective: Cytomegalovirus (CMV) is one of the most important infections in renal transplant recipients. This virus is a major cause of death in these patients. In this study, we investigated Frequency of Cytomegalovirus active infection in renal transplant recipients in Kermanshah by ELISA and Real-time PCR methods, 2013-2014.

Materials and methods: This research was a descriptive cross-sectional study. 142 renal transplant recipients were investigated in this study during 2013-2014. Demographic information of patients was recorded. The clinical samples of patients were investigated as presence of IgG, IgM and Cytomegalovirus DNA by ELISA and Real-Time PCR methods. The results analyzed by SPSS software version 20.

Results: Results of this study showed, of 142 patients, 93 cases (65.5%) were male. The mean age of patients was 47.61 ± 29.43 . 130 cases (91.5%) and 53 cases (37.3%) were positive as IgG and IgM, respectively. Cytomegalovirus DNA were seen in 51 cases (35.9%). There is not the meaningful relation between age, gender with Cytomegalovirus active infection ($p > 0.05$).

Conclusion: Results of this study showed the frequency rate of Cytomegalovirus active infection in renal transplant recipients in Kermanshah is high and these active infections are detectable using Real-Time PCR method with more rapid and accurate.

Keywords: Cytomegalovirus, renal transplant, ELISA, Real-time PCR

Various Morphologic Shapes of *Leishmania major* Amastigotes with low Genetic Structure among People Afflicted with Zoonotic Cutaneous Leishmaniasis in Khuzestan Province

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Abstract

Background and objective: Tegumentary leishmaniasis has been implicated in many types of different phenotypes due to diverse genetic extent with polymorphic amastigote shapes. Molecular diversity and morphological changes of *Leishmania major* (*L. major*) have turned into a controversial issue among researchers. This investigation revealed the features of amastigote polymorphic shapes in clinical manifestations of suspected patients to zoonotic cutaneous leishmaniasis (ZCL) in the direction of genetic variation in Khuzestan province.

Materials and method: Of 315 suspected patients, sampling, smear preparation and staining were carried out during 2012-2014. After DNA extraction, the PCR products were digested with *Bsu*RI endonuclease enzyme in the process of RFLP by targeting ITS-rDNA, *Cyt b* and Microsatellite genes.

Results: *L. major* and *L. tropica* were the parasites identified in patients having regular amastigotes' shapes (oval or round) with a size of 2-4 µm in each of dry, wet and classical mixed lesions. Whereas, irregular shapes (spindle, pear or cigarette) were observed in non-classical wet lesions with more than 4 µm. Sequencing of ITS-rDNA and *Cyt b* genes of *L. major* demonstrated low molecular variation ($P > 0.05$) except for one common haplotype (GenBank access no. EF413075)

Conclusion: On the basis of present findings, there is no significant correlation between phenotypic and genotypic features of *L. major* isolates. This study is considered as the first exhaustive report to incriminate morphometric shapes of *L. major* amastigotes concerning their relevance with various clinical appearances and genotypic characteristics.

Key word: *Leishmania major*, Clinical manifestations, Amastigote shapes, Genetic variations, Khuzestan.