Scholarly Quarterly for Applied Biology
Year 6, Issue 2, Summer 2016
Qom Islamic Azad University
Faculty of Basic Sciences
Price: 3500T

License Owner: Qom Islamic Azad University

15 Khordad, Islamic Azad University, Qom | **Telephone and Telefax: 025-37780014**
Journal email: a-biology-j@qom-iau.ac.ir | **Journal Website: http://sjoapb.journal.qom-iau.ac.ir/**

Contents

Scholarly Quarterly for Applied Biology

Mutation, Cloning and Sequencing of Protective Antigene of Bacillus Anthrasis

Mohammad Abootaleb[1*], Hatef Ajoudanifar[2]

1. Ph.D. Student, Islamic Azad University, Qom Branch, Qom, Iran.
2. Ph.D. Department of Biology, Islamic Azad University, Damghan Branch, Semnan, Iran.

(Received: 18 February, 2016; Accepted: 6 April, 2016)

Abstract

Protective Antigen of Bacillus Anthrasis (PA) is a protein that links to receptors of human body cells. There is special Urokinase plasminogen activator receptor on cancer cells and PA cannot be linked to them. This study aims to modify the receptor of PA with site-directed mutagenesis so that the protein can only be linked to the cancer cells. In this study, pMNA1 plasmid that contained PA gene is extracted and site-directed mutagenesis is done with the use of SOE PCR on PA gene. Mutant gene is cloned on pTZ57R vector directly and is transformed into E. coli DH5α through CaCl2 method. Finally, the existing gene and mutation on PA are evaluated by means of PCR, digestion and sequencing. PA gene is separated with PCR and mutated with the use of SOE PCR. Mutated PCR product is cloned on pTZ57R vector and resulted in 5.1 kb plasmid. Recombinant plasmid is evaluated with digestion and PCR. Mutation is confirmed with sequencing. Cancer is a deadly disease. One of the methods for treating cancer is through use of bacterial toxins. Therefore, using a modified PA protein that is linked to the cancer cells can create new hope for cancer treatment.

Keywords: Bacillus Anthrasis, Mutagenesis, Protective Antigene.

∗ **Corresponding Author, Email:** mohammad_abootaleb@yahoo.com

The Study of the Effects and Side-effects of Methyldopa Drug on Changes in Male Rat Kidney Tissue

Seyed Mahdi Kalantar[1], Mahdi Ahmadifar[2*], Sepideh Ja'afarzadeh Rastin[1], Fatemeh Taqvaie[1], Naser Kalhor[3], Mahdi Lotfi Panah[4]

1. Pardis International, Yazd Shahid Saduqi Medical Sciences University, Yazd, Iran
2. Royan Research Institute, Jahad Daneshgahi Research Center for Reproduction Medical Sciences and Biology, Reproduction Medical Research Center, Department of Embryology, Tehran, Iran
3. Faculty of Basic Sciences, Department of Microbiology, IAU, Qom, Iran
4. Royan Research Institute, Research Center for Fertility Health, Department of Immunology and Fertility Health, Jahad Daneshgahi Reproduction Medical Sciences and Biology Research Center, Tehran, Iran

(Received: 4 April, 2016; Accepted: 18 May, 2016)

Abstract

Increased kidney disease in human societies is now one of the concerns of urologists. Many of these kidney disorders can be caused by various drugs including blood pressure lowering drugs. In this experimental study, 40 male wistar rats were used. The rats were divided into 4 groups of 10 including control, first, second and third experimental groups which received respectively water, 0.03, 0.06 and 0.08 mg/ kg methyldopa drug via gavage. After one month, these 40 mice were anesthetized and their kidneys were removed. After preparing microscopic sections, they were stained using H & E staining and stained samples were observed with a light microscope. Then images of desired samples were prepared using a light microscope equipped with camera.

Results: the obtained results show that the consumption of high doses of methyldopa drugs leads to disturbance in kidney function and related enzymatic processes. Moreover, it can cause remarkable changes in different kidney layers.

Regarding obtained results, prescribing methyldopa drug should be done more carefully.

Keywords: Blood Pressure, Kidney Tissue, Methyldopa, Rat.

* **Corresponding Author, Email:** Mehdi_Ahmadifar67@yahoo.com

Scholarly Quarterly for Applied Biology

Application, Advantages and Disadvantages of Galium Arsenide Detectors

Shahin Moradnasab Badrabadi[1*], Daryosh Sardari[2], Mitra Athari[2]

1. Ph.D. Student of Islamic Azad University, Science and Researches Branch, Tehran, Iran
1. Faculty Member of Islamic Azad University, Science and Researches Branch, Tehran, Iran

(Received: 6 April, 2016; Accepted: 25 May, 2016)

Abstract

Particles or ray detectors are devices with which high energy particles are detected, traced or distinguished. One of these detectors is Gallium Arsenide (GaAs). Difficulties in consistent producing the thick layers with sufficiently low doping required for adequate depletion depth (>100 µm), however, precluded further development. Then, there has been renewed interest in detectors based on both bulk and epitaxially grown materials. Hence, this article aims to study characterization, application, advantages and disadvantages of Gallium Arsenide (GaAs). Defects of GaAs can be classified under geometrical aspects (dimensionality) or under the aspect of their origin (intrinsic and extrinsic defects). When GaAs is used as X ray detector, absorption character, resistivity, mobility and lifetime, material uniformity used in detector, performance stability and processibility should be considered. Types of imaging detectors GaAs are detectors based on epitaxial GaAs, detectors based on (compensated) SI-GaAs, detectors based on Cr-compensated HR-GaAs. A good spectroscopic performance, high CCE values and good image quality can be achieved with detectors based on epitaxial GaAs. The material homogeneity is reported to be higher and local variations of material properties to be less pronounced than in bulk material. In addition, advances in flip-chip processing techniques for high-Z compound semiconductors give reason for hope for high pixel yields and thus good image quality.

Keywords: Advantages, Application, Detector, Disadvantages, Gallium Arsenide (GaAs).

∗ **Corresponding Author, Email:** moradnasabshahin@yahoo.com

The Effect of Shark Cartilage on Number and Activity of T-cell regulating cells in Stomach Cancer Patients

Raziyeh Zare'ie[1*], Mohammad Zahir Hassan Sarraf[2], Abolqasem Ajami[3], Daryush Moslemi[4], Amrullah Mostafazadeh[4]

1. PhD Student in Immunology, Tarbiat Modares University, Tehran, Iran
2. Tarbiat Modares University, Tehran, Iran
3. Department of Immunology, Molecular and Cell Biology Research Center, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran
4. Molecular and Cell Biology Research Center, Faculty of Medicine, Babol University of Medical Sciences, Babol, Iran

(Received: 16 April, 2016; Accepted: 14 June, 2016)

Abstract

Gastric cancer is the fourth most common cancer and the second most common cancer in Iran and around the world. . Safety responses in gastric cancer include innate and adaptive immunity. Treg cells in several malignancies including gastric cancer, increase Treg immune response settings, maintain homeostasis and immune tolerance, autoimmunity and cancer survival primarily as a treatment for cancer control. Shark cartilage, a protein that is angiogenesis (angiogenesis) in vitro and stops animal models. Tumors need a network of blood vessels to survive and grow, so by blocking the blood supply to tumor, it disappears. It was observed that in the group treated with shark cartilage, cell viability Treg stood at an average of 48/1% before treatment to 2/0% post-treatment decrease in the amount of cytokine inhibition of TGF-β from pg / ml183 before treatment pg / ml110 and after treatment it decreased, but the amount of cytokines in serum IFN-γ (pattern of cytokine TH1) of pg / ml160 before treatment pg / ml187 and after treatment there was increase in the amount of IL-4 (pattern of cytokine TH2) of pg / ml37 before treatment pg / ml30 and after treatment it was decreased. In the control group, there was no significant difference in the measurement. Shark cartilage in people suffering from gastric cancer cell depletion inhibitory Treg and cytokine inhibiting TGF-β as well as a reduction in IL-4 (immunity cells, TH2) and increased production of IFN-γ (immunity cells, TH1) to enhance immunity responses of anti-tumor cell.

Keywords: Cytokine TGF-β, IFN-γ, IL-4, Gastric Cancer, Treg.

∗ **Corresponding Author, Email:** raziehzareii@yahoo.com

Scholarly Quarterly for Applied Biology

Synthesis of Molecular Template Nanoparticles Aimed at controlled and targeted Drug Delivery of Nitrates to Heart

Alireza Mohebali*, Majid Abdous, Seyed Mahmoud Reza'ie Darvishi

Independent Department of Chemistry, Amirkabir Industrial University

(Received: 24 April, 2016; Accepted: 22 May, 2016)

Abstract

Nitrate-giving drugs, as the most important medicines of heart, play a major role in treatment of cardiac diseases. Short half-life, side-effects and body resistance against such drugs face specialists to have problems when they treat chronic cardiac diseases. Molecular template polymers as safe carriers can deliver drug molecules to the tissue concerned and increase drug's half-life through slow release. In this research, sedimentary polymerization has been applied for provision of polymers. In electron microscopic images, spherical morphology of polymers with suitable topology has been demonstrated. Polymeric absorption capacity was calculated and optimized mole ratio was gauged. Studies conducted in vitro show that molecular template polymers can be safe carriers for targeted and slow-release drug delivery.

Keywords: Drug Delivery, Drug Release, Molecular Template Polymers, Nitrates, Nitrocontin.

* **Corresponding Author, Email:** arma@aut.ac.ir

RNA as Small Interference (siRNA)

Mohammad Abutaleb, Narjes Mohammadi Bandari*

PhD student of Microbiology, Department of Biology, Qom Branch, Islamic Azad University, Qom, Iran

(Received: 9 April, 2016; Accepted: 14 May, 2016)

Abstract

Infectious diseases caused by microorganisms are still major causes of death all over the world and the increasing number of their resistant strains results in great concerns. Using RNA interference, many therapeutic potentials can have treatment or prevention from diseases. This RNA has vital roles in transcriptional regulation and post-transcriptional gene. Currently, many bacteria have shown resistance against antibiotics and even for some of them there is no antibiotic. Alternative methods to treat them are severely felt. Since the discovery of gene silencing use of RNA interference (RNAi), there has been a revolution in its medical applications. Local transfer of siRNA for treatment of diseases is rapidly expanding and it is hoped that one could find application in clinical trials. Local injection reduces the toxic effects and increases the availability of Drugs to tumor cells. In this review, the current clinical status of siRNA therapeutics, the advantages and challenges of applying it are investigated.

Keywords: Infection, Gene Silencing, RNA Interference.

* **Corresponding Author, Email:** Narjes_bandari@yahoo.com