Curcumin, the main compound of spice turmeric- as one of the natural products- was demonstrated to possess effective anti-cancer properties, with no significant effect on normal cells. Also many studies have been accomplished using curcumin for diabetes treatment. Therefore we based the main aim of this study on improving the efficiency of differentiating human MSCs into IPCs utilizing polymeric nanocurcumin. The absorption efficacy of curcumin is too low to make dramatic results in therapy. Curcumin bioavailability could be improved using nanoparticle carriers. Our data indicates that polymeric nanocurcumin -in specific dose and time- reduces the expression of nestin (protein coding gene, expressed in IPC progenitors) with no significant effect on insulin expression in mRNA and protein level.

Keywords: Diabetes type I, Regenerative Medicine, MSCs, IPCs, Polymeric Nanocurcumin.

Abstract No.107

Electrochemical Investigation of Hemoglobin via Gold-Coated Magnetic Nanoparticles

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Using direct electrochemistry of redox proteins it is possible to establish a foundation for fabricating the mediator-free biosensors. In the last few years, by development of nanotechnology, magnetic gold nanoparticles as especial carrier for immobilizing biomolecules have aroused great interest. Among the various protein immobilization approaches, the technique based on electrostatic interactions has much attention due to their facility and wide availability of materials.The direct electron-transfer of hemoglobin (Hb) immobilized on magnetic gold nanoparticles was achieved. Magnetic gold nanoparticles were dropped on the surface of Au electrode and hold on it by using magnet behind electrode. The cyclic voltammograms (CVs) of Hb, heme and globin on gold nanoparticles were obtained in phosphate buffer solution (pH 6.8) and air saturated conditions. Hb showed a quasi-reversible CV corresponding to the Fe3+/ Fe2+ redox couple with a formal potential of about −0.33 V (vs. Ag/AgCl). The immobilized Hb exhibited good electrocatalytic activity toward hydrogen peroxide (H2O2). The gold nanoparticles provided a biocompatible micro-environment for protein and could promote the direct electron transferring of Hb. This method may also be examined to other proteins too.

Keywords: Gold Magnetic Nanoparticles, Hemoglobin, Globin, Heme, Direct Electron Transfer.

Abstract No.108

Cloning and Sequencing of Endoglucanase Gene from a Native Strain of Bacillus spp.

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An endoglucanase producing strain of Bacillus spp. was isolated from the forest soils of Ardabil province. The 16S rDNA was amplified using universal primers and the sequencing results were analyzed by nucleotide Basic Local Alignment Search Tool. The data showed that the strain was Bacillus pumilus. A pair of primers was designed according to upstream and downstream sequence of the gene using bacteria genome (NCBI ACCESSION: AY339624) as template, and the gene was amplified using standard three-step PCR reaction. A specific 2200 bp DNA band was amplified and purified from agarose gel. The DNA was cloned into pTG19 vector using T/A cloning method and transformed into E. coli DH5α. The recombinant vector was extracted and sequenced. The results confirmed the endoglucanse gene with two distinct domains of glycosil hydrolase family and cellulose binding domain which was followed a signal peptide in the 5′ end.

Keywords: Bacillus spp., Endoglucanase Gene, PCR Amplification, Cloning.

Abstract No.109

Lung Cancer Tumors Classification by Using Data Mining Tools on Important Protein attributes Derived from Structural and Physicochemical Descriptors Of Involved Proteins

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Patients with non-small cell lung (NSCLC) tumors are treated differently from those with small cell tumors (SCLC), therefore distinction between these two types of lung tumor is very important. Sequence-derived structural and physicochemical descriptors are very useful for machine learning prediction of protein structural and functional classes, classifying proteins and the prediction performance. Recent improvements in DNA microarray techniques have made a large variety of gene expression data available in public databases such as Gene Set Enrichment Analysis (GSEA). Herein, in this study experimental microarray results were analyzed by GSEA to identify gene sets up- or down-regulated in any types of lung tumors, genes IDs converted to their protein accession numbers by DAVID web server (http://david.abcc.ncifcrf.gov) and the classification of lung tumors based on 1497 attributes derived from structural and physicochemical properties of these protein sequences investigated through a combination of attribute weighting, supervised and unsupervised clustering algorithms. Based on eight attribute weighting models, descriptors of autocorrelation, dipeptide composition and distribution of hydrophobicity were the most important protein attributes in classification of SCLC, NSCLC and COMMON classes of lung tumors. The same results observed by most tree induction algorithms while descriptors of hydrophobicity distribution were high in protein sequences common in both groups and distribution of charge in these proteins was very low, showing common proteins were very hydrophobic. Furthermore, composition of non-polar dipeptides in SCLC class was smaller than COMMON proteins and composition of polar dipeptide in SCLC associated proteins was higher than NSCLC class. Some clustering models (alone or in combination with attribute weighting algorithms) were able to nearly classify SCLC and NSCLC proteins. Here for the first time the application of data mining tools to effectively classify lung tumors based on protein attributes reported and also for the first time the importance of dipeptide composition, autocorrelation and distribution descriptor has been revealed.

Keywords: Lung Cancer Classification, Structural and Physicochemical Descriptors, Attributes Weighting, Tree Induction, Clustering Algorithm.

Abstract No.110

Insulin Drug Delivery Through Soft Contact Lenses

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In today's era, insulin delivery by alternative route is an area of current interest in the design of drug delivery system .Hydrogels, the swellable polymeric materials, have been widely investigated as the carrier for drug delivery systems. Conventional soft contact lenses have the ability to absorb a number of drugs when the lenses are pre-soaked in the drug solution, subsequently releasing them into the post-lens lacrimal fluid. Several polymeric hydrogels have been investigated for soft contact lens-based insulin drug delivery systems, polymeric hydrogels for conventional contact lens to absorb and release insulin. We used polyacrilamid and (p-HEMA) hydrogels for in vitro experiment. Protein absorption was a function of pH at low protein concentrations, but independent of pH at higher protein concentrations.Hydrogel soft contact lenses were a gift from University of Aston in Birmingham, all reagents used were of analytical grade and obtained from local representatives in Iran. In vitro release conditions were used to study the release behavior. The rate of release was measured by inserting the protein loaded hydrogels individually in buffer solutions. The 280 nm absorption was measured using UV-visible spectrophotometer.The environment pH can affect the protein structure in terms of its surface charge and the ionicity of the polymer material. The optimum temperature and pH for release of insulin was 30°C and pH 11-12. The results showed that the ability of conventional soft contact lenses to be a drug reservoir strongly depends on the water content and thickness of the lens, the molecular weight of the drug, the concentration of the drug loading solution, the solubility of the drugs in the gel matrix and the time the lens remains in it.

Keywords: Soft Contact Lense, Drug Delivery System, Insulin.