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Preparation and characterization of zein/chitosan/nanohydroxyapatite nano composite scaffold prepared by freeze-drying method for tissue engineering

Abbas Teimouri and **Zeinab Shahbazarab**
Payame Noor University, Iran

The nanocomposite scaffolds were synthesized using freeze-drying method by mixing zein, chitosan (CS) and nanohydroxyapatite (nHAp) in the inorganic/organic different weight ratio. The prepared nanocomposite scaffolds were characterized using scanning electron microscopy (SEM), X-ray diffractometer (XRD), Fourier transform infrared spectroscopy (FT-IR) and BET studies. Also, degradation, swelling, and biomineralization capability, cell viability and cell attachment of the composite scaffolds were accomplished. Study FTIR spectrum nanocomposite scaffold of zein/chitosan/nano hydroxyapatite (zein/cs/nHAP) confirms the presence of nano-hydroxyapatite in the polymer field. The study tests SEM, XRD, SEM and BET can be concluded that zein/chitosan (zein/cs) scaffold cannot be changed in the presence of nano-hydrpxyapatite and micro-pores in the scaffold with good communication and influence to facilitate cell migration and there is also supplying the cell. The biological properties of the scaffolds affected nHAp content changing the ratio of CS in the scaffolds. The test thermal analysis (TGA) indicated a slower destruction zein/chitosan/nano-hydroxyapatite nano composite (40/40/20) compared with two other polymers scaffolds. Bio-ceramic nano-hydroxyapatite increase in scaffolding zein/chitosan (zein/cs) increases the compressive strength of the scaffold, but decreases the amount of water absorption and porosity and speed of degradation of scaffolds due to the nano particles hydroxyapatite of pores in the scaffold of zein/chitosan (zein/cs). The biological answer of MG-63 cells on nanocomposite scaffolds was exceptional regarding enhanced cell attachment, higher proliferation, and expansion. The results associated with physicochemical properties and superior cyto-compatibility suggests that zein/cs/nano hydroxyapatite scaffold are potential candidate materials for tissue engineering.

a_teimoory@yahoo.com

Associated kinase proteins and ionic liquids for biosensor design

Mostefa Belarbi
University of Tiaret, Algeria

The aim of the research work is to increase the performance of a biosensor based on the GSK-3 protein kinase and to improve its performance against biosensors based on existing protein kinases and leucettamine B derivatives. The protein kinases on which we have focused are involved in many biochemical processes and are therefore targets of choice for a large number of major pathologies such as cancer and neurodegenerative diseases. The proteins kinases responsible for these diseases are associated with ionic liquids to test certain properties related to biosensors such as response time, detection threshold, etc. The combination of recent methods of numerical parallel computation with the interpretation of vibration spectra Raman genuine signature leads to a quantity of data that requires intelligent data analysis based on data mining (SVM, component analysis, etc.), the purpose of which is to identify and predict the properties of biosensors in correlation with databases of existing data. The research work included several tasks such as developing database of biosensors of interest based on Raman characterization and other properties of biosensors in order to predict the performance of the biosensor designed.

belarbimostefa@yahoo.fr