ΕΡΕΥΝΗΤΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ ΚΑΙ ΧΗΜΙΚΩΝ ΔΙΕΡΓΑΣΙΩΝ ΥΨΗΛΗΣ ΘΕΡΜΟΚΡΑΣΙΑΣ

Οδός Σταδίου, Πλατάνι, Πάτρα
http://www.iceht.forth.gr

ΣΕΜΙΝΑΡΙΟ

ΟΜΙΛΗΤΗΣ: Γεώργιος Σταματάς
Senior Scientist, Johnson & Johnson Consumer Products

ΘΕΜΑ: **CONTROLLED RELEASE OF TRANSFORMING GROWTH FACTOR BETA-1 FROM BIODEGRADABLE POLYMER MICROPARTICLES WITH APPLICATIONS TO BONE HEALING**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ΕΙΧΗΜΥΘ-ΙΤΕ

ΗΜΕΡΟΜΗΝΙΑ: Πέμπτη, 19 Ιουλίου 2001

ΩΡΑ: 11:00

ΠΕΡΙΛΗΨΗ

Transforming growth factor β1 (TGF-β1) is a potential induction factor for bone tissue engineering. This multifunctional protein regulates many aspects of cellular activity, including cell proliferation, differentiation, and extracellular matrix metabolism, in a time- and concentration-dependent manner. Recombinant human TGF-β1 was incorporated into biodegradable microparticles of blends of poly(DL-lactic-*co*-glycolic acid) (PLGA) and poly(ethylene glycol) (PEG). Fluorescein isothiocynate labeled bovine serum albumin (FTIC-BSA) was co-encapsulated as porogen. The effects of PEG content and buffer pH on the protein release kinetics and degradation of PLGA were studied *in vitro* for up to 28 days. The FITC-BSA and TGF-βι were both released in a multiphasic fashion including an initial burst effect. The degradation of PLGA was enhanced at 5% PEG and acidic pH conditions. Aggregation of FITC-BSA occurred at pH 3, which led to decreased release rates of both proteins. Rat marrow stromal cells showed a dose response to TGF-β1 released from microparticles similar to that of added TGF-β1 in the culture medium, indicating that the activity of TGF-β1 was retained during microparticle fabrication. Optimal doses were determined for the enhancement of cell proliferation and osteoblastic differentiation of marrow stromal cells cultured on poly(propylene fumerate) substrates. These results suggest that controlled release of TGF-β1 from the PLGA/PEG blend microparticles may find applications in modulating cellular response during bone healing at a skeletal defect site.

Short Biography

Dr. Georgios Stamatas graduated with honors from the Chemical Engineering department of Aristotle University of Thessaloniki in 1994. His diploma thesis dealt with the theoretical study of steric stabilization of colloidal suspensions with applications to polymerization reactors. He received his Ph.D. from Rice University in 1998. During his doctoral research and under the supervision of Prof. Larry McIntire, he studied the fluid shear stress-induced mechanical signal transduction in cells of the vasculature, an important step in understanding vascular physiology and the pathology of diseases like atherosclerosis and post-operational restenosis. After receiving his Ph.D. he worked in Prof. Antonios Mikos lab as a postdoctoral fellow studying the delivery of growth factors from biodegradable polymer microparticles to induce bone marrow stromal cell differentiation to osteocytes. Such tissue-engineered devices can be applied to enhance the healing of bone fractures. Currently Dr. Stamatas works at the Methods and Models department of Johnson & Johnson Consumer Products developing non-invasive methods to study skin physiology and product efficacy.