ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ

ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ & ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

UNIVERSITY OF CRETE

DEPARTMENT OF MATERIALS SCIENCE & TECHNOLOGY

ΠΡΟΣ
1) Όλα τα μέλη ΔΕΠ του Τμήματος Επιστήμης και Τεχνολογίας Υλικών
2) Την Επταμελή Εξεταστική Επιτροπή
3) Όλα τα μέλη της Πανεπιστημιακής Κοινότητας

Πρόσκληση σε Δημόσια Παρουσίαση της Διδακτορικής Διατριβής της

κ. Γεωργοπούλου Ανθής

(Σύμφωνα με το άρθρο 41 του Ν. 4485/2017)

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θα γίνει η δημόσια παρουσίαση και υποστήριξη της Διδακτορικής Διατριβής της υποψήφιας διδάκτορος του Τμήματος Επιστήμης και Τεχνολογίας Υλικών

κ. Γεωργοπούλου Ανθής με θέμα:

«Μελέτη Βιοσυμβατότητας Καινοτόμων Βιοϋλικών με Χρήση Κυττάρων για Αναγέννηση Οστίτη Ιστού»

«Biological Response of Innovative Biomaterials for Bone Tissue Engineering Applications»

Abstract:

Bone tissue engineering strategies guide tissue regeneration via osteoconductive and highly porous scaffolds. The main objective during this thesis was to combine chitosan with either synthetic or natural biomaterials and examine their biocompatibility and potential to promote osteogenesis. The first biomaterial, containing chitosan and poly-ε-caprolactone (CS-g-PCL), was tested for adhesion, proliferation and differentiation of MC3T3-E1 pre-osteoblastic cells. Our results showed a strong adhesion of MC3T3-E1 pre-osteoblastic cells, indicating the characteristic spindle-shaped morphology as early as the first day of culture onto the copolymer surface. The viability and proliferation of the cells on the CS-g-PCL surface were found significantly higher compared to the tissue culture treated polystyrene control (TCPS). Moreover, our results demonstrated that CS-g-PCL is capable to promote changes in pre-osteoblastic cells affecting important osteogenic traits and thus facilitating their differentiation. The second biomaterial, consisting of chitosan and gelatin (CS:Gel), was chemically crosslinked with either glutaraldehyde or genipin

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and the blend was used to fabricate three-dimensional scaffolds by freeze-drying. Since the glutaraldehyde crosslinked CS:Gel scaffolds showed more efficient cell adhesion and infiltration properties, they were selected for further investigation of their osteogenic potential. These scaffolds significantly enhanced cell viability, cell proliferation and extracellular matrix formation in both MC3T3-E1 pre-osteoblastic cells and human bone marrow (hBM) mesenchymal stem cells (MSCs). Expression analysis of early and late osteogenic markers of hBM-MSCs cultured on these scaffolds demonstrated a significant increase in their differentiation capacity. These results show that both chitosan-based biomaterials support new tissue formation and therefore provide a promising strategy for cancellous bone tissue engineering applications.