

Ηράκλειο 6 Σεπτεμβρίου 2022

ΠΑΡΟΥΣΙΑΣΗ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

Της φοιτήτριας Λητώς Αναστασίας Παπαδοπούλου, θα γίνει τη

Τρίτη 13/09/2022 και ώρα **13:00**

στην αίθουσα Α2 του Κτιρίου Επιστήμης Υπολογιστών

Επιβλέπουσες: Ανθή Ρανέλλα και Καλλιόπη Βελώνια

Θέμα Διπλωματικής:

« In vitro investigation of the cellular mechanisms activated by GO and rGO in Mesenchymal Stem Cells (MSCs)»

Abstract:

Tissue Engineering embraces the employment of novel biomaterials in order to realize functional tissue/organ repair or reconstruction. Graphene-based materials (GBMs) have attracted enormous interest due to their unique structure and properties, however, concern has been raised about their potential adverse effects. Therefore, it is of utmost importance to evaluate the cell-graphene interactions, as well as the underlying mechanisms in order to facilitate their proper development and use for biomedical applications.

In this thesis, we have studied two GBMs – graphene oxide (GO) and reduced graphene oxide (rGO) – and their effect on mesenchymal stem cells (MSCs), a pluripotent cell line extensively used in tissue engineering applications. We focused on whether the presence of these two materials activates the cellular oxidative stress response, a ubiquitous phenomenon related with disturbances in the normal redox state of cells. To determine the toxicity of graphene, cytotoxicity and proliferation assays were performed in cell cultures for different concentrations of GO and rGO. The localization of key transcription factors relating to the oxidative stress response was evaluated through immunofluorescent staining and confocal microscopy. The expression patterns of genes encoding for proteins of the glutaredoxin and thioredoxin cellular detoxification systems were also studied and analysed via quantitative RT-PCR, to detect potential alternations in mRNA expression caused by GO and rGO exposure. Through this work, we were able to determine that both GO and rGO affect cellular responses in a dose-dependent manner.