

Scientific Report for Short Visit Grant

The aim of my research visit to Prof. Dawson's group was to explore opportunities for collaboration and joint research projects. Prof. Dawson's group and the University of Crete Biomaterials group that I represent, share common scientific interests in the area of development of novel functional nanoparticles for bone tissue repair. In this visit I intended to bring up our recent work on the in vitro biocompatibility investigation of novel synthetic and biomimetic biomaterials and scaffolds that are useful in bone tissue repair. One direction that I consider interesting to pursue as a collaborative project is to develop and manufacture appropriate nanoparticles, functionalize them with specific biomolecules (proteins or small peptides) that can promote osteogenesis, and finally perform an in vitro study of them according cell proliferation and differentiation. The goal of my visit was to explore these and other research ideas forging closer ties between our and Prof. Dawson's groups.

During my visit we had the opportunity to discuss extensively a strategic collaboration plan and set the work planned to be performed in Heraklio and in Dublin. We defined the materials and the technologies we are going to employ in order to pursue our common project. We specified the chemical composition and the size of the nanoparticles, their synthesis and characterization. Furthermore, we proposed the methods that we will use for the investigation of the biological response in pre-osteoblastic cells and in bone marrow mesenchymal stem cells. In this work we intend to use modification techniques to immobilize the osteoinductive recombinant human bone morphogenetic protein 2 (rhBMP-2) on the materials and study their osteogenic potential compared to other osteogenic conditions. For the in vitro investigations we perform viability, proliferation, and differentiation experiments in MC3T3-E1 pre-osteoblasts and in bone marrow mesenchymal stem cells.

Finally, during this visit to Prof. Dawson's group we discussed publication perspectives as well as a research proposal based on our collaborative scientific work.

Host: Prof. Kenneth Dawson

