



NANO-SCORES NANOSTRUCTURED OSTEOCHONDRAL SCAFFOLD: NOVEL BIOMIMETIC TRIGGERS FOR ENHANCED BONE REGENERATION

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"This project aims to revolutionize osteochondral regeneration by developing new nano-strategies to trigger and sustain subchondral bone regeneration."

Degeneration of the articular osteochondral tissues causes pain and decreased function leading to osteoarthritis (OA), one of the most globally widespread diseases with a huge impact on society. OA development and progression could be prevented by regenerating the osteochondral unit. Until now, the regeneration of the subchondral bone remains a critical aspect, dooming most patients to prosthetic implants. This project aims to revolutionize osteochondral regeneration by developing new nano-strategies to trigger and sustain subchondral bone regeneration. The first strategy will chemically improve the bone layer of an osteochondral scaffold through nanostructured "ion banks". The second strategy will biologically improve the new nanostructured material through bioactive and bioconjugated peptides for osteoprogenitor cells homing and stimulating bone formation.

The most promising strategy will be evaluated with a translational approach up to a model closely resembling the human application, developing a successful regenerative prototype for the treatment of osteochondral lesions and the prevention of OA.

