

Development of an *in vitro* dental implant model

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Abstract :

The objective of this project was to fabricate and evaluate a novel *in vitro* 3D model representative of osseointegration and peri-implant soft tissue integration processes using tissue engineering techniques and bioprinting tools, to provide a reliable and reproducible platform for dental implant research. In this project, we have used cell lines from each tissue of interest, hydrogels and printable polymers to fabricate the model using manual methods, bioprinting or 3D printing. The characterizations were done at the cellular level (viability, proliferation, differentiation...), tissue level (composition of the matrix-extracellular, mineralization, rigidity), but also at the level of the tissue-implant interface (attachment of tissues on the implant, mechanical properties). The final *in vitro* model will also be compared to a reference *in vivo* model. The development of this model will provide a new tool for basic and clinical researchers to better understand the physiology of dental implant integration and the development of peri-implantitis. It can also be used to evaluate new biomaterials and drugs. This model will increase the relevance of *in vitro* studies and will reduce the need for animal testing. The research consortium includes 4 research groups specialized in tissue engineering, dental implantology, immunology and bioprinting,



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