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INCORPORATION OF QUANTIC POINTS ANTIMICROBIAL ACTION IN BIO-CERAMIC SCAFFOLD

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SUMMARY

This work reports on the development of a platform to accelerate the repair or recovery of bone tissue that is defective or fractured. These events are commonly caused by impact accidents or due to tissue fragility caused by diseases such as osteoporosis that affects people of different ages and it usually starts in middle age and intensifies with advancing age [1]. Osteomyelitis is another aggravating factor, as it is a bone infection that can reach this fractured bone tissue[2]. The present work aims to evaluate the coating of a bioceramic scaffolds composed of SiO2-CaO-Na2O-P2O5 with antibacterial. It is expected to obtain a scaffold able to interact with living tissue promoting osteoinduction, stimulating bone growth and presenting antibacterial properties to inhibit the unwanted action of bacteria at the site of a bone repair implant. Herein, the bioceramic coating was performed with ternary quantum dots of (Zn)CuInS/ZnS. These nanoparticles are expected to generate reactive oxygen species inducing bacterial death[3] [4]. Thus, firstly the antimicrobial activity of quantum dots in suspension was evaluated under laser irradiation at 665 nm and then the antimicrobial activity was evaluated in the scaffolds coated by quantum dot deposition. The antibacterial activity was evaluated against gram-negative bacteria E. coli. The results showed that in the presence of light the nanoparticles provided antibacterial activity. In

the results obtained with quantum-dot impregnated bioceramic scaffolds, it was observed that both irradiated, control group (scaffolds without impregnation) and quantum-dot impregnated group inhibited the growth of bacteria. Although the presence of quantum dots had not shown an advantage regarding antimicrobial activity, since the bioceramic itself presented antimicrobial activity, it is expected that the presence of quantum dots improves scaffold bioactivity by favoring cell proliferation. Thus, with the continuity of this work it is intended to evaluate cell viability and osteoblasts proliferation on scaffolds samples with and without nanoparticles.

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