

COLL/HA Composite Materials as Drug-Delivery Systems in Bone Tissue Engineering

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Bone is a remarkable composite material mainly based on Hydroxyapatite (HA) and Collagen (COLL). Considering this composition, many bone related grafts are based on such composite materials. Moreover, considering the various bone-related diseases a wide range of biological active agents are loaded in order to enhance or to induce new properties. The COLL/HA composite support is essential because bring osteoinductive and osteoconductive properties assuring a proper osteointegration but also resorption and can modulate the release of the biological active agents. Drug delivery systems (DDS) are usually designed for bone reconstruction and augmentation but also in the treatment of the fractures and other bone defects associated with various diseases including bone cancer, bone infections, osteoporosis, *etc.* These drug delivery systems were continuously improved and nowadays a wide range of drug delivery systems based on COLL/HA composite materials are known and even smart drug delivery systems were developed and proved to be efficient. These smart DDSs can be activated by specific internal or external stimuli such as pH, temperature, electromagnetic fields, *etc.*, and thus, even personalized treatment can be developed. The present work is mainly focused on presenting the challenges and the recent advances in the field of COLL/HA composite DDS used in the bone cancer treatment.