Factsheet

ACRONYM SBR

FULL TITLE Smart Bone Regeneration

PROGRAMME Horizon 2020/ SC1-BHC-07-2019/ Regenerative medicine: from new insights to new applications

CONTRACT NUMBER 874896

ABSTRACT The management and reconstruction of bone defects is a significant global healthcare challenge. While autografts offer ideal compatibility, they are often not suitable for large bone defects, and allografts suffer from potential immunorejection. The limited efficacy of conventional treatment strategies for large bone defects and the increasing aged population has inspired the consortium to propose a SMART RESORBABLE BONE (SRB) IMPLANT embedding stem cells and bioactive agents with the aim of a controllable and fast restoration. The proposed solution includes 3D printed medical grade polymers enriched with electrospun fibers (for increased mechanical properties) that can be customized for patient physiology, pathology, and gender. The scaffold design will ensure easy and minimal Injury placement, and will embed different sensors for monitoring e.g. pressure, pH value and temperature based on biocompatible conductive inks. The smart implant will thus be able to provide vital information of implant performance in terms of bone growth and infection/inflammation. The proposed method is unique because it includes a customized smart implant (3D printed parts with adjustable sensors and communication electronic system), together with tissue engineering methods i.e. in-vitro programming of stem cells for embedding into the smart implant. The proposed solution introduces an innovative regenerative chain, from early testing and characterization (identification/ adjustment of the proper specifications) and embedding regenerative stem cells and particulate bioactive agents into the smart implant in preclinical research (in-vitro). The in vivo proof of concept of SBR solution will be tested in (large animal model) preclinical studies within the scope of the project. Finally the regulatory and commercialization strategy on how to further explore the proposed concept and deliver it for clinical testing will be elaborated.

DURATION 48 months (01/01/2020 - 31/12/2023)

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