IS-BioBone

In-Situ formed Biomimetic Biomaterial for Bone Regeneration

Objective

The main objective of the present proposal is to open a new and complementary field of research by designing, developing, evaluating, translating into an in-patient trial and finally into the market a new in-situ formed biomimetic biomaterial for bone regeneration.

State of the art

The field of biomaterials for bone regeneration is advancing rapidly. Because of the risks associated to auto and allogeneic bone grafts, biomaterials are likely to have an increasingly important role in reconstructive skeletal surgery and especially in oral and maxillofacial surgery.
Osteogenesis, that is, the formation of new bone, is a natural repair mechanism that occurs in the human body. However, there are some critical sized defects above which bone tissue will not regenerate itself and need clinical repair. The vast majority of marketed bone graft substitutes are based on non-living inorganic materials. The clinical and biological properties of these materials are unfortunately far from being optimal. Their manipulation and handling is difficult for the clinician and sometimes uncomfortable for the patients and the osteoconductive properties are somehow limited if growth factors driving cell chemotaxis, proliferation and differentiation are not present.

Activities

The new biomaterial will mimic the natural bone's composition while promoting physiological bone regeneration process by combining in-situ a pro-active composite with an autologous and biomimetic platelet-fibrin matrix rich in growth factors prepared from patient's plasma after a simple centrifugation process. BTI ImasD will develop the technology to design and produce a pro-active composite of hydroxyapatite and collagen.
The involvement of BEL and IOG will be of paramount importance to complete the multicentric prospective study that evaluates the safety and bone regeneration potential of IS•BioBone. BEL will have a major role both in managing the administrative protocols related to the biomaterial introduction in the Italian market and in dealing with the needed certifications for the in vivo study and the clinical trial. IOG will diffuse the basic, animal and scientific data of the biomaterial in scientific and dental international events facilitating its market penetration.

Project partners

Biotechnology Institute ImasD (BTI ImasD)
BioEngineering Laboratories (BEL)
IRCCS Istituto Ortopedico Galeazzi (IOG)