Title: Bioresorbable Bioactive Matrix For Bone Reconstruction

Gianni Pertici*, Michele Müller, Simone Maccagnan and Giuseppe Perale
R&D Director
Industrie Biomediche Insubri SA
Switzerland

Researcher
University of Applied Sciences and Arts of Southern Switzerland, SUPSI
Switzerland

Abstract

Objective
Autograft is still playing the role of gold standard in critical sized and non-union bone defects. Hence, adequate bone substitutes for remodelling of native bone tissue are a goal to achieve: biopolymers, bioglasses and bioceramics are often considered to satisfy, at least in part, requirements for bone regeneration, but composite solutions are believed to represent the future, bearing cues from both mineral components and polymeric ones.
Materials and methods
The new proprietary scaffold developed by *Industrie Biomediche Insubri SA* has a composite structure based on a bovine derived bone matrix reinforced with biodegradable polymers and bioactive agents. Bovine derived matrix allows to maintain an adequate 3D-structure and porosity, biopolymers permit to achieve good mechanical properties while bioactive agents promote cell adhesion and proliferation. Scaffolds are produced according to GMP standards applying only human-use approved components.
Results and conclusions
Experimental data collected gave a positive confirmation of the applicability of this novel composite matrix as scaffold for bone tissue regeneration and of its production process developed therewith. Indeed, morphological microstructure analysis confirmed a well diffused cortical bone human-like porosity. Mechanical investigation showed easy shaping by common surgical instruments, in order to replicate and thus replace bone defects, and a relevantly improved resistance to compression with respect to available solutions. *In vitro* investigations showed scaffolds to be promising substrates for cell adhesion and growth.
Key Words: Bone, Scaffold, Tissue Engineering, GMP

Biography

Gianni Pertici was born in Pontedera (Italy) in 1976, got his Master Degree in Chemical Engineering at the University of Pisa, then performed his PhD in Biomaterials at the King's College of London. His studies were focused on processing engineering and material properties especially for biomedical field, but during the last years he acquired good knowledge also in cell culture methods. From 2008 he is R&D director at Industrie Biomediche Insubri SA, Swiss firm manufacturer of Hi-Tech medical devices for applications in tissue engineering, drug delivery and cell therapies. At the same time he is researcher at SUPSI and his objective is the development of projects in biomedical and pharmaceutical field, supervising the QA and regulatory systems. He spent a 2 years period as research manager at Swiss Stem Cells Bank SA, the first Swiss structure to propose a private banking service for stem cells. He was responsible for projects development in the field of Tissue Engineering. All the protocols were performed in GMP conditions and concern the use of Human stem cells and clinical trials (bone, cartilage and ligament regeneration). He is author in more than 10 publications and single inventor in 1 patent.