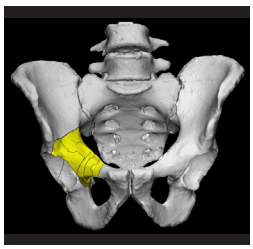
10th International Tissue Repair and Regeneration Congress
12th Annual Conference on Stem Cell and Regenerative Medicine
&
International Conference on Cell Biology and Genomics
June 13-14, 2019 Helsinki, Finland

Gianni Pertici

Industrie Biomediche Insubri SA, Switzerland

Xenohybrid scaffolds for bone regeneration



Hard tissue regeneration is a complex phenomenon that involves intricate interplays within the patient autologous cells and the grafted material. Autologous bone remains the gold standard as it naturally presents appropriate mechanical and biological characteristics and avoids rejection or disease transmission risks. Nevertheless, a major limitation is represented by the available volume for removal from patient's body alternative sides. A valid alternative, not limited in this sense, is represented by hybrid composite scaffolds. Taking advantage of porous and interconnected natural structures, such as the one of xenogeneic cancellous bone, it is possible to improve their characteristics via combination with other functional components. This way, mechanical and biological performance, similar to the one of autografts, can be obtained. In this contribution, we present a newly developed material (SmartBone®) which is composed of bovine bone, polymer and proteins. The mineral matrix provides adequate solid framework and open porosity, ensuring cells proliferation. The bioresorbable polymer reinforces the main structure and the collagen, exposing RGD sequences, stimulates blood cell's adhesion. This way, this innovative scaffold is osteoconductive and osteoinductive, promoting complete remodeling to mature bone after 8-12 months, as supported by histological data. Since its launch on the market, this technology was successfully used on roughly 60,000 patients worldwide, covering dental and orthopedic applications. A relevant example of the many destination of use is visible in Figure 1, in which a customized solution for hip reconstruction after tumor removal is presented. During surgery, the piece was perfectly located inside the gap and firmly fixed with osteosynthesis titanium screws. Surgery was faster with respect to the standard procedures and very precise, allowing obtaining very satisfactory results both in terms of anatomical reconstruction and functionality. The post-operative follow-up recorded no issues and proceeded optimally. Control CT scan showed good osteo integration and massive volume stability (>95%).

Biography

Gianni Pertici has completed his Master's degree in Chemical Engineering from the University of Pisa and PhD in Biomaterials at the Dept. of Chemistry of University of Pisa and at King's College of London. His studies were focused on Processing Engineering and Material Properties especially for the biomedical field. He has worked as a R&D director of Swiss Stem Cell Bank and founded IBI a Swiss Biotech company. He is Author in more than 30 papers, 3 books and single inventor of 2 patents. He was also the Researcher at the University of Applied Science of Southern Switzerland from 2010 until 2018.

gianni@ibi-sa.com