Tissue healing and regeneration: filling the gap from preclinical and experimental intervention to routine clinical practice.
• **Preclinical research develops regenerative medicine approaches** based on the combination of polymeric and ceramic biomaterials, cells, physical energies, and bioactive drugs for in vivo applications (self-repair stimulation) and for developing implantable devices (controlled release of drugs, cells and cell derivatives such as exosomes)

• **The clinical targets of preclinical investigations include** Central Nervous System repair following neonatal hypoxia and traumatic injuries or stroke, with a primary focus on myelin repair, repair of chronic and diabetic ulcers, the differentiation of human amniotic epithelial cells into insulin-producing cells, and the reconstruction of musculoskeletal tissues following surgical or traumatic loss

• **A Good Laboratory Practice (GLP) facility for preclinical validation of processes/products** is currently being implemented. Clinical application of regenerative medicine and tissue engineering are already routine at the Istituto Ortopedico Rizzoli, a research and teaching hospital connected to the University of Bologna, for orthopaedic applications and at the University Hospital S-Orsola Malpighi for maxillofacial reconstruction

**HIGHLIGHTS**

Excellence at the University of Bologna encompasses a number of EU-funded projects in the regenerative medicine sector, such as H2020 ORTHOUNION, which aims at combining expanded cells with ceramics to promote bone healing in non-unions of long bones, and H2020 ADIPOA-2, which consists in a clinical trial of autologous adipose-derived mesenchymal stromal cells in the treatment of mild to moderate osteoarthritis.

The University of Bologna is chairing IRMI, the Italian Regenerative Medicine Infrastructure funded by the National Ministry of Research as flagship project in the Life Sciences.