

## NEW STRATEGIES FOR BONE REGENERATION

### EUROPEAN CONSORTIUM TO COPE WITH OSTEOPOROSIS SEQUELAE

28.11.2011 - How to ensure healthy and strong bone regeneration and reduce patients' pain and suffering associated with bone lesions is the main objective of InnovaBone, a project financed by the 7th Framework Programme of the European Commission which has been officially launched during a Kick-Off Meeting in Vienna on November 24, 2011.

Bone is a living tissue that is continuously renewed in a two-stage remodelling process: a formation stage in which osteoblasts build new bone, and a resorption stage occurring when cells called osteoclasts remove old bone. This is a fine-tuned process, highly regulated and altered in different pathologies. Osteoporosis, traumatic bone lesions and osteolytic bone metastases put a strain on patients' suffering and have an increasing impact on health care costs, as the unprecedented ageing of population affects the prevalence of osteoporosis and related fractures. The development of novel approaches for bone repair is crucial: approximately one third of women and one out of every eight men over the age of 50 will suffer an osteoporotic fracture and will be at risk for this potentially debilitating disease. Annual direct cost in Europe for such bone lesions alone is estimated as EUR 36 billion.

The aim of fracture healing is to establish both the original geometry and biomechanical competency of the damaged tissue. Bone reconstruction or grafting is used to surgically repair bone by replacing the missing bone with human bone or synthetic materials. Still, non-union fractures and critical-size bone lesions are difficult to repair or are inadequately healed.

Despite substantial advances in biomaterials, further R&D is essential to overcome the limitations of current implant materials, such as improper mechanical strength and durability, insufficient healing caused by foreign body reactions and inefficient vascularisation. "New bone regeneration strategies are necessary" says, Dr. Oskar Hoffmann, coordinator of the InnovaBone project. "Our main objective is to achieve radical innovation in state-of-the-art bone biomaterials to address the serious morbidity and mortality associated with bone lesions".

"We plan to produce novel smart bioactive biomaterials that will fit within the lesions and recruit the body's cells and factors to reconstruct the bone" explains, Dr. Hoffmann. "Then new, healthy bone will eventually replace the biomaterials and generate stronger bone than before". The expected impact will be a radical innovation that accelerates the treatment of large bone lesions and reduce the associated pain and suffering".

The novel biomaterials will be evaluated for effects on bone growth, healing and foreign body reactions using forefront technologies such as in vitro cellular assays, BioMEMS technology, non-invasive imaging and gene expression profiling for the discovery of biomarkers associated with bone repair. Additionally, the biomaterials will be tested for mechanical strength and durability.

The multidisciplinary and integrated Consortium consists of fourteen partners including universities, research centers and companies from eight European countries, cooperating for four years to develop this innovative bio-inspired product.

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