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Nanostructured Gel for Cellular Therapy of Degenerative Skeletal Disorders

Acronym

STRUCTGEL

Project partners

- SudhirBhatia | GENEKAM (Germany)
- Y. Murat Elcin | Ankara University Science Faculty (AUSCI) (Turkey)
- Benoit Pinteaur, Bio Elpida (France)
- Omer Besalti | Ankara University Veterinary Faculty (AUVF) (Turkey)

Abstract

The project involves partners from Spain, Germany, France and Turkey. Aiming to tackle degenerative skeletal tissue disorders such as osteoarthritis and osteoporosis, the consortium will combine high performance materials and advanced nanotechnology to design an implant with unique properties which can influence site-specific tissue regeneration. The project 'toolbox' consists of biocompatible hydrogel units (slices) with controlled mechanical properties and degradation time being combined with nanofibres to provide spatial orientation to cells. Different techniques will be used to incorporate biologically active molecules and to assemble the 3D gel/nanofibre construct after seeding with mesenchymal stem cells. Single gel slices and fully assembled bone and cartilage constructs will be propagated in vitro to demonstrate their biocompatibility and bioactivity. Feasibility studies will be carried out in vivo.

Demonstrative illustration:
Electrospinning equipment for
production of nanofibres and their
alignment (left). SEM image of random
and aligned PEA nanofibres (lower
panel on the right) produced using this
technology. Morphological response
of endothelial cells on nanofibres
organization (upper panel): left - when
adhering on random and right - on
aligned nanofibres.

