Biopolymer implants for regenerative and replacement surgery purposes and an electrospinning technology

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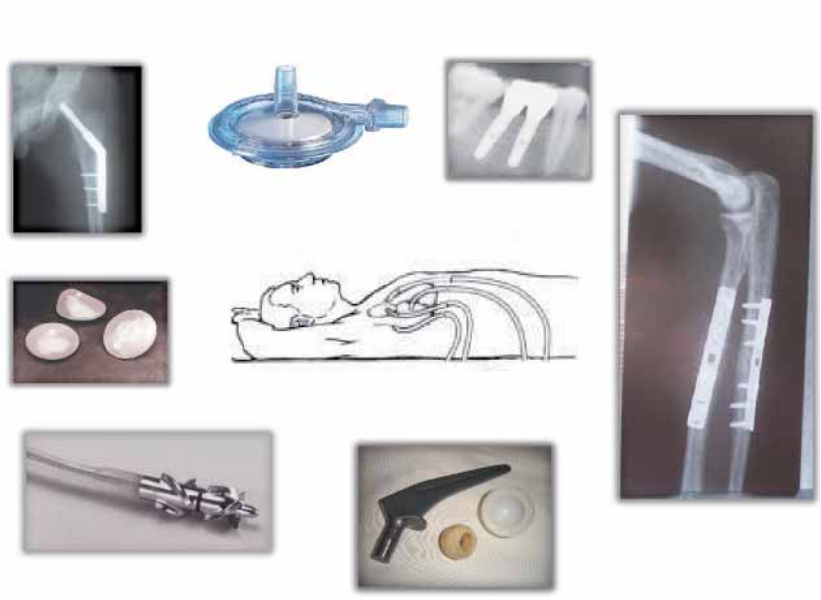
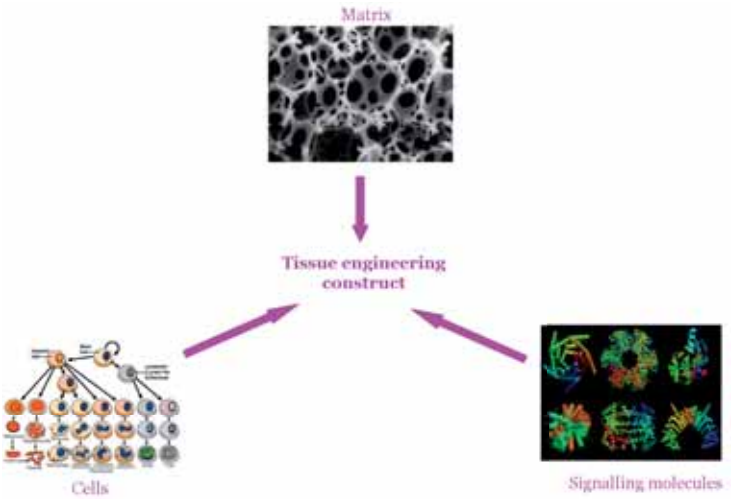
Implants in modern medicine



Bio-mimetic concept



Matrix functions and properties

- Biocompatibility
- Foster cell attachment, growth and proliferation
- Biodegradability
- Mechanical support for cells
- Porous structure

Materials for matrices

Biodegradable natural or synthetic polymers

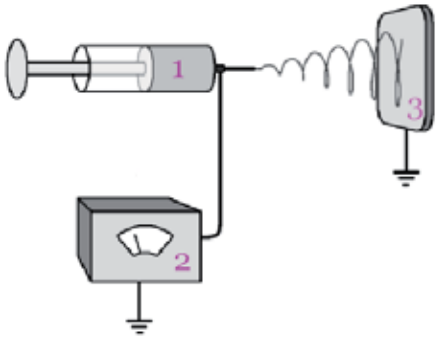
- collagen
- silk
- poly(glycolic acid)
- poly(L-lactic acid)
- poly(ε-caprolactone)
- poly(lactide-co-glycolide)
- poly(3-hydroxybutyrate-co-3-hydroxyvalerate)

PHBV copolymer of microbial polyester, is one of the most promising materials for tissue engineering

Technologies for matrices creation

- particulate leaching
- gas foaming
- phase separation
- emulsion freeze-drying
- melt molding

Electrospinning



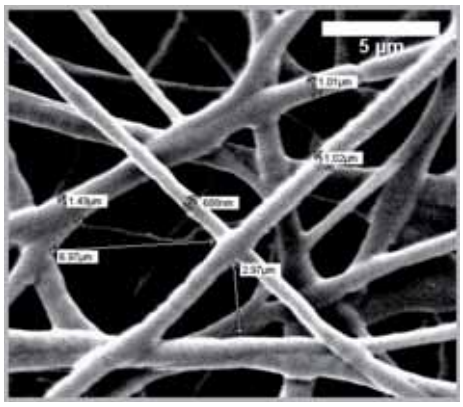
1. Syringe with a polymer solution
2. High voltage supply
3. Collector plate

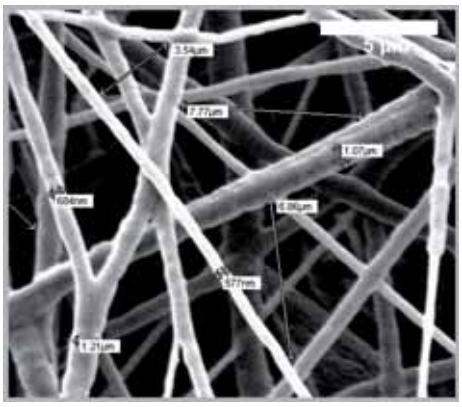
Purpose of our investigation

Developing and exploring bio-degradable matrices using electrospinning technology

Results

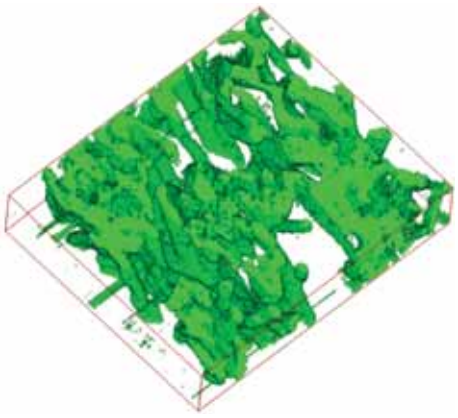
Micro photographies from SEM

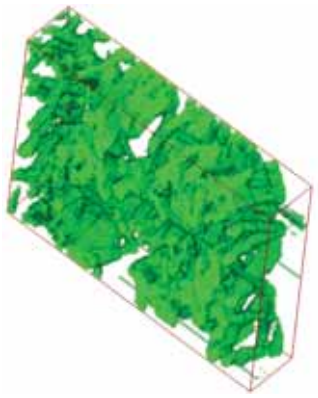




Results

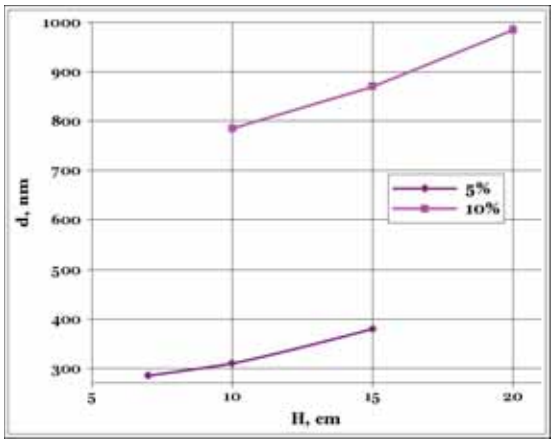
NTERGO tomo platform





Results

Dependency of the average diameter of fibers
on the distance between the syringe and the collector plate



Conclusions and future plans

1. We developed the technology to produce PHVB matrices with the aid of electrospinning technology.
2. By variation the main parameters of the process we were able to regulate and control the main parameters of polymer matrix
3. At the moment we are going to proceed biological testing of our PHVB matrices.

Thank you
for your attention!