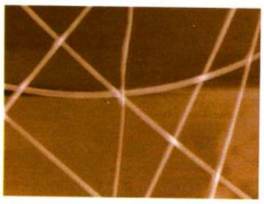
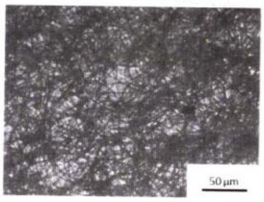
Electrospun Nano- and Microfibres for Biomedical Applications Conference

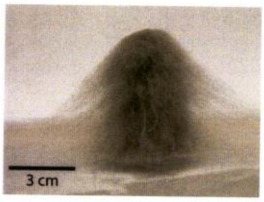
COST MP1206

31 August – 3 September 2015, Eger, Hungary

BOOK OF ABSTRACTS







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ELECTROSPINNING
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In vivo performance of electrospun biodegradable materials for soft and hard tissue replacement

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Electrospinning method has been used for the nanofibrous fabrication from many nondegradable and biodegradable natural/synthetic polymers such as polyurethanes, polyamides, collagen, alginates, gelatin, chitosan and poly(a-hyroxy acids)[1]. Due to unique properties of the materials produced from these nanofibers, including their structure which is very similar to the natural extracellular matrix (ECM), several novel applications in biomedicine including tissue engineering, controlled release systems, intra abdominal adhesion preventing membranes[2], soft and hard[3] tissue repair materials have been proposed and investigated.

Both soft and hard tissue can regenerate by natural pathways. However, if the tissue defect is larger than the critical size, during this regeneration period it needs to be supported, preferentially by biodegradable repair materials, which should be degraded during or better after healing and disappear without need of elimination by a second surgery. Electrospun nanofibrous matrices enhance new tissue formation by mimicking ECM and guiding the regeneration process. In addition, electrospining enables us to produce functionalized nanofibers including drugs or growth factors, either during the process or after the nanofibres are produced. This work reviews some selected examples of electrospun matrices mainly for soft/hard tissue reconstruction and as intraabdominal adhesion prevention barrier. Electrospun matrices were prepared from biodegradable/biocompatible polymers and plain or drug loaded form of the nanofibrous scaffolds were implanted in different animal models to evaluate their *in vivo* performance. This presentation summarizes the results of these studies.

REFERENCES

[1] Pişkin, E., Bölgen, N., Egri, S., İşoğlu, A., "Electrospun matrices made of poly(a-hydroxy acids) for medical use", Nanomedicine **2**(4): 441-457 (2007)

[2] Pişkin, E., İşoğlu, A., Bölgen, N., Vargel, İ., Griffiths, S., Çavuşoğlu, T., Korkusuz, P., Güzel, E., Cartmell, S., "*In vivo* performance of simvastatin-loaded electrospun spiral-wound polycaprolactone scaffolds in reconstruction of cranial bone defects in the rat model", Journal of Biomedical Materials Research Part A **90**(4): 1137-1151 (2009)

[3] Bölgen, N., Vargel, İ., Korkusuz, P., Menceloğlu, Y.Z., Pişkin, E., "*In vivo* performance of antibiotic embedded electrospun PCL membranes for prevention of abdominal adhesions", Journal of Biomedical Materials Research Part B: Applied Biomaterials **81**B(2): 530-543 (2007)

Session 4

14.30–15.30 Nimet (Bölgen) Karagülle (Mersin, Turkey): *In vivo performance of electrospun biodegradable materials for soft and hard tissue replacement*

15.30–16.00 Dávid Juriga (Budapest, Hungary): *Poly(aspartic acid) based scaffolds for hard tissue regeneration*

16.00–16.30 Csaba Balázsi (Budapest, Hungary): *Cellulose acetate-hydroxyapatite fibrous scaffolds for growing of bone cells*

16.30–17.00 Coffee break

Session 5

17.00–17.40 Kateřina Vodseďálková (Pardubice, Czech Republic): *Artificial electrospun matrices for 3D cell culture*

17.40–18.10 Marek Kozłowski (Wroclaw, Poland): *Biodegradable 3D structures produced by different technologies*

19.00–22.00 ***Wine tasting (optional event)***

WEDNESDAY, 2 SEPTEMBER

Session 6

09.00–10.00 Akihiko Tanioka (Tokyo, Japan): *High Productive Systems of Nanofibers for Medical Applications*

10.00–10.30 Brenda Sanchez-Vazquez (London, UK): *Fabrication of multifunctional formulations for drug delivery using the electrospinning/electrospraying technique*

10.30–11.00 Zeynep Aytac (Ankara, Turkey): *Thymol/γ-CD-IC Incorporated Zein Nanofibers: Controlled Release, Antibacterial and Antioxidant Properties*

11.00–11.30 Coffee break