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# FINAL PROGRAMME AND BOOK OF ABSTRACTS

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## Core-shell fibers for drug delivery produced in electrospinning process

Electrospun nanofibers indicate proper characteristics to be efficient and targeted drug administration in tissue engineering applications. A novel technology is the triaxial electrospinning technique which combines three component nanofibres formation. A core and two surrounding layers form the three layers of the fibers produced using this approach. Triaxial electrospinning is a reasonable alternative to uniaxial and coaxial techniques for alleviating major limitations such insufficient sustained and controlled drug release, low drug solubility, difficulties loading multi pharmaceuticals, biodegradation, and inadequate biocompatibility [1].

The primary goal of the research is to optimize the triaxial electrospinning process to get homogenous/ free of beads fibers and desired drug release profile.

A merger of biodegradable synthetic and natural polymers, including polycaprolactone (core layer), gelatin (intermediate layer), and poly(lactic-co-glycolide) (shell layer) were used to fabricate the fibers. Synthetic polymers enhance mechanical properties of the system, while natural polymers mimic natural chemistry of the extracellular matrix. Rhodamin B was inserted to selected layers as a model of the drug.

Preliminary research will be discussed, including the optimization of triaxial fiber production. Microscopic images showed that numerous experiments led to the development of homogenous free-bead fibers. Moreover, it was observed that fibers are covered by an outer layer in accordance with expectations. Transmission electron microscopy images proved that under the shell layer, there is a middle that surrounds the core layer. We were able to select parameters of the process which ensure core-shell fiber structure. To examine the release characteristics from triaxial and coaxial fibers, preliminary in-vitro tests using rhodamin B were conducted. As compared to coaxial fibers, the results showed that triaxial fibers greatly reduced initial burst release.

According to our study, triaxial fibers indicate promisingproperties to be employed as cutting-edge drug delivery systems in biomedical applications.

**References:** 1. S. Tabakoglu, D. Kołbuk and P. Sajkiewicz,Biomater. Sci., 2022, Advance Article, DOI:10.1039/D2BM01513G