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Dimitrios Lamprou

Queen's University Belfast, UK

Electrospun nanostructured scaffolds for tissue engineering applications

The current mesh implants are composed of polypropylene (PP), polyethylene terephthalate (PET), expanded polytetrafluoroethylene (ePTFE) and polyvinylidene fluoride (PVDF). Mesh implants have been widely used, but given the number of complications associated with mesh insertion, pursuing research for the development of a new generation of mesh inserts is now of the utmost importance for the future of patient care and recovery. Potential mesh-related complications include chronic infections, chronic pain and mesh rupture. Electrospun nanofibers offer advantages for a wide range of applications in a variety of fields, including biomedicine and biotechnology. The particular seminar will focus on the preparation of drug-loaded polymeric electrospun nanofibers for Drug Delivery and Tissue Engineering applications (e.g. hernia mesh implants). The purpose of this study is to examine any potential effects, chemical and mechanically, of drug-loaded electrospun nanofiber scaffolds. Biodegradable polyesters that commonly used in biomedical applications for controlled release and targeted drug delivery was loaded and electrospun with different types of drugs. The electrospun fibers were then characterized through various advanced characterization techniques (e.g. Bio-AFM, ToF-SIMS, NanoCT) and methods in order to measure the drug efficacy and antibacterial properties, and investigate any changes in mechanical and chemical properties and drug-polymer interactions.

Recent Publications

1. Zhu L M, Schuster P and Klinge U (2015) Mesh implants: an overview of crucial mesh parameters. World J. Gastrointest. Surg. 7:226–236.
2. Hall Barrientos I, Paladino E, Brozio S, Passarelli M K, Moug S, Black R A, Wilson C G, Lamprou D A (2017) Fabrication and characterization of drug-loaded electrospun polymeric nanofibers for controlled release in hernia repair. Int. J. Pharm. 517:329-337.
3. Hall Barrientos I, Paladino Szabó P, Brozio S, Hall P J, Oseghale C I, Passarelli M K, Moug S J, Black R A, Wilson C G and Lamprou D A (2017) Electrospun collagen-based nanofibres: a sustainable material for improved antibiotic utilization for tissue engineering applications. Int. J. Pharm. 531:67-79.
4. Xue J, Xie J, Liu W and Xia Y (2017) Electrospun nanofibers: new concepts, materials, and applications. Acc. Chem. Res. 50:1976-1987.
5. Kenry, Chwee Teck Lim. (2017) Nanofiber technology: current status and emerging developments. Prog. Polym. Sci. 70:1-17.

Biography

Dimitrios Lamprou (Ph.D., MBA) is Reader in Pharmaceutical Engineering and MSc Programme Director at the School of Pharmacy in Queen's University Belfast (UK; a member of the Prestigious Russell Group) and Visiting Researcher at University of Strathclyde (Glasgow, UK) with experience of teaching in Higher Education, conducting research (60+ publications, 200+ conference abstracts, 60+ Invited Presentations) and securing national and international funding (£2M+). He is Secretary at the United Kingdom and Ireland Controlled Release Society (UKICRS), external viva examiner for UK and International Institutions (15+), and referees for journals (50+ Pharmaceutical and related), publishers and research funding bodies (10+). His Group Research Interests focused on five distinct areas: Biosurface Engineering, Electrospinning, Microfluidics, Nanoanalysis, and Printing of Medicines.

d.lamprou@qub.ac.uk