Dimitrios A Lamprou, J Pharm Drug Deliv 2019, Volume 8
DOI: 10.4172/2325-9604-C1-038

Dimitrios A Lamprou

Queen's University Belfast, UK

A new chapter in pharmaceutical manufacturing: 3D-printed and electrospun drug delivery systems

The talk will cover the challenges and opportunities in pharmaceutics by adopting new formulation technologies to bring new products into the market. 3D printing and electrospinning are an example of technologies that have been widely used in other industries, however are new to pharmaceutical manufacturing. Therefore, the use of these techniques in drug delivery and tissue engineering applications, including the use of state of the art techniques (e.g. FastScan AFM, ToF-SIMS, nanoCT) will be discussed. The first part will focus on the preparation of drug-loaded polymeric electrospun nanofibers. The purpose of this study is to examine any potential effects, chemical and mechanical, of drug loaded electrospun nano fiber 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 fibres were characterised through various methods in order to measure the drug efficacy, antibacterial properties and drug-polymer interactions. There are a number of different applications within medicine that require materials to be developed with the optimal characteristics, such as their strength, rate of degradation and porosity as well as their shapes and sizes. 3D printing process was patented in 1986, however only recently have been utilised in the field of pharmaceutical printing. Therefore, in the second part, 3D printed systems (e.g. microneedles, rings and tablets) of various designs with high drug payloads that have been formulated using advanced additive technologies and characterised using advanced characterisation techniques will be discussed.

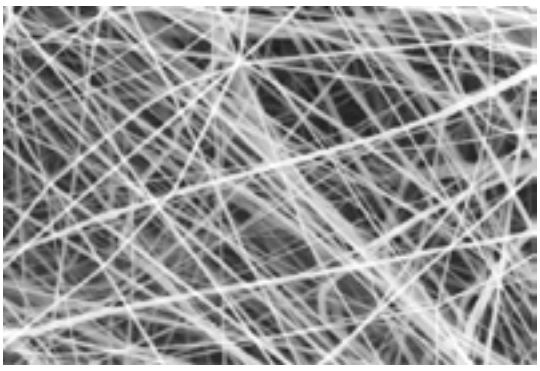

Figure: An example of electrospun nanofibers

Recent Publications

1. Hall Barrientos I, MacKenzie G R, Wilson C G, Lamprou D A and Coats P (2019) Biological performance of electrospun polymer fibres. Materials 12(3):363.

2. Pissinato Pere C P, Economidou S N, Lall G S, Ziraud, C, Boateng J S, Alexander B D, Lamprou D A and Douroumis D (2018) 3D printed microneedles for insulin skin delivery. Int. J. Pharm. 544(2):425-432.

3. Economidou S N, Lamprou D A and Douroumis D (2018) 3D printing applications for transdermal drug delivery. Int. J. Pharm. 544(2):415-424.

4. Hall Barrientos I, Paladino E, Brozio S, Passarelli M K, Moug S, Black R A, Wilson C G and Lamprou D A (2017) Fabrication and characterisation of drug-loaded electrospun polymeric nanofibers for controlled release in hernia repair. Int. J. Pharm. 517(1-2):329-337.

5. 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 utilisation for tissue engineering applications. Int. J. Pharm. 531:67-79.

Biography

Dimitrios A Lamprou is reader in Pharmaceutical Engineering and MSc Programme Director at the School of Pharmacy at Queen's University Belfast (UK) and Visiting Researcher at University of Strathclyde (Glasgow, UK). He has experience of teaching in higher education, conducting research and has 60+ publications, 200+ conference abstracts, 70+ oral/invited presentations) and securing national and international funding (£2M+). He is Secretary at the United Kingdom and Ireland Controlled Release Society (UKICRS), external PhD viva examiner for UK and International Institutions, and referees for journals, publishers and research funding bodies. His group is applying aspects of Pharmaceutical Technology to a range of areas such as cancer, antimicrobial resistance and nanomedicine development. The group research interests focused on four distinct areas like biosurface engineering, electrospinning, microfluidics and pharmaceutical 3D printing and bioprinting.

Notes: