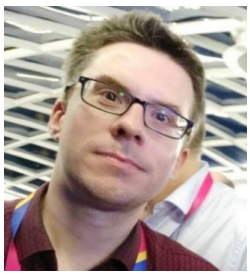

Contribution of the Keynote Speaker

Novel Nanotechnologies for New Medicines

In order to be effective, a drug must be delivered to the right part of the body, at the correct time, and in an appropriate amount. If any one of these three criteria is not met, then a medicine will be ineffective or even dangerous. To develop potent medicines, pharmaceutical scientists need to find ways to enhance the intrinsic properties of drug molecules, for instance by increasing their solubility in water. There are a number of technologies which have been adopted to achieve these goals. One emerging approach which is attracting significant interest is electrospinning, which applies an electric field to generate nano-to-micro sized fibres from a polymer solution.

Electrospun fibres have been very widely explored in the context of drug delivery. The rapid drying nature of the process tends to result in amorphous systems, and use of a hydrophilic filament-forming polymer can give significant increases in dissolution rate, apparent solubility, and bioavailability. Electrospun formulations thus have great potential to overcome the solubility challenges faced by >70% of emerging drug candidates. Beyond this, by careful choice of the polymer carrier and the nanoscale architecture of the fibres, it is possible to precisely control both the drug release rate and location, and in a number of cases much sought after zero-order (constant rate) release has been obtained with electrospun systems.

In this study, we will first introduce the electrospinning technology, and then discuss a number of recent studies exploring its applications for drug delivery. We will further consider issues of translation from bench to bedside, and the likely patient acceptability of electrospun formulations.

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