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Nanofiber Technology for 3D Nano-Biointerface Fabrication and Cellular Engineering

The significance of the overall fibrillar and porous nanoscale topography of the extracellular matrix (ECM) in promoting essential cellular processes has led to consideration of biomaterials with nanofibrous features. Of the many methods for fabricating fibers with micrometer and nanometer diameters, electrospinning is simplest, most straightforward and cost-effective. Fibers are produced by forcing a polymer melt or solution through a spinneret in the presence of a high electric field. This approach becomes intriguingly powerful when remarkable morphological features such as very large surface area to volume ratio and porosity are combined with unique chemical, physical, or mechanical functionalisation by adding desired components with ease and control. Our current research focuses on exploring new possibilities to fabricate three-dimensional Nano-biointerfaces that recapitulate the in vivo environment. The developed biocompatible, therapeutics-incorporated nanofibers synergise the nanostructural induction and the bioactives signalling to affect cellular behaviours, such as gene knockdown, cell adhesion and migration, proliferation and stem cell differentiation. The biomimetic nanofibers that are responsive to different stimuli, such as temperature, pH, light, and electric/magnetic field were also developed for on-demand therapeutic delivery and intervention.

Biography

Dr Chen has completed her PhD in 2008 from Aarhus University and is currently an Assistant Professor at Department of Engineering, Interdisciplinary Nanoscience Center (iNANO), Aarhus University in Denmark, and visiting assistant professor at Stanford University School of Medicine. She leads the research group of Nanofiber Technology and Cellular Engineering, and has published more than 50 peer-reviewed papers in reputed journals.

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