Dept. of Chemistry
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Course Number: CHM 642
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Title: Electrospinning of Collagen Nanofibers

Abstract:

Due to its nature of depositing polymers and metal in a random or orientated alignment, electrospinning has been considered as an efficient and cost-effective approach of manufacturing fibrous mats consisted of fiber diameters ranging from microns to nanoscale. As well known, collagen is beneficial to cell growth and penetration into extracellular matrix (ECM). This work investigated electrospun collagen as a potential tissue engineering scaffold to mimic structural, material and biological properties of the native ECM. The authors optimized the electrospinning conditions of calfskin type I and type III, and produced a nonwoven fabric composed of 100 nm fibers. The various effects, caused by collagen origin, isotype and concentration, on structural properties of electrospun collagen has been investigated. The tunable orientation of electrospun collagen fibers was demonstrated for a feasible controlling over the matrix mechanic properties. The authors proposed this novel processing technique of preparing bio-mimic collage fibrous matrix by electrospinning could be an ideal candidate in tissue engineering scaffold.