Public Abstract
First Name: Rachael
Middle Name: Lauren
Last Name: Fischer
Adviser's First Name: Sheila
Adviser's Last Name: Grant
Co-Adviser's First Name:
Co-Adviser's Last Name:
Graduation Term:FS 2011
Department:Biological Engineering
Degree:MS
Title: Electrospinning Collagen and Hyaluronic Acid Nanofiber Meshes

There are many risk factors associated with osteoporosis, but they all lead to decreased bone strength and an increased chance of bone fracture. The field of tissue engineering could be used to create bone substitute materials that can increase bone strength or promote new bone growth. Collagen and hyaluronic acid are particularly interesting due to their roles in the extracellular matrix of humans and their ability to stimulate bone forming cells. These materials can be processed into nanofiber scaffolds using a technique called electrospinning; a process that applies high voltage to a polymer solution to draw out nanofibers that are collected on a ground plate. An electrospinning solution of collagen/HA was synthesized, and the electrospinning apparatus was adjusted to generate uniform nanofiber meshes with consistent nanofiber diameter. The meshes were then crosslinked to render them insoluble in aqueous solutions, and gold nanoparticles (AuNPs) were conjugated to the surface to promote cellular in-growth. Scanning electron microscope (SEM) was utilized to image the nanofiber mesh surface and electron dispersive spectroscopy (EDS) was used to quantify the charged particles on the mesh as gold. Fourier transform infrared spectroscopy (FT-IR) was used to find the absorption spectrum and bonding changes after each step. A WST-1 assay was also performed to determine the potential biocompatibility. In conclusion, it was possible to develop scaffolds made from collagen/HA that were insoluble in aqueous solutions, promoted cellular attachment, and could be utilized as a tissue engineered scaffold to promote bone growth.