School of Chemical Engineering and Materials Science
And
The University of Oklahoma Bioengineering Center
Norman, Oklahoma
2003 – 2004 Seminar Series

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DR. ANU SUBRAMANIAN
ASSISTANT PROFESSOR
DEPARTMENT OF CHEMICAL ENGINEERING
THE UNIVERSITY OF NEBRASKA - LINCOLN
LINCOLN, NEBRASKA

Will present a seminar on

"COMPARISON OF THE NEOCARTILAGE FORMED ON TWO SCAFFOLD MATERIALS"

Tissue engineering concepts and methodologies that employ biocompatible matrices or scaffolds have the potential to meet needs encountered in the repair of defects in cartilage, as damaged cartilage cannot undergo repair. One approach is to generate histological and functional normal tissue by seeding cells in a biocompatible scaffold and to then implant the cell-material complex to repair chondral defects. In our efforts to tissue engineer cartilage, we will proceed with the underlying premise that "cartilage with appropriate form and function for *in vivo* implantation can be created by selectively stimulating the growth and differential function of chondrocytes through optimization of the matrix or substrate topography concurrent with an optimization of the *in vitro* culture environment". In addition, we also work under the premise that the optimization of manufacturing methods to produce a matrix which is able to distribute the strain in a manner to promote chrondrogenesis is equally important as the optimization of the cell culture environment. To test our hypotheses, we will perform three independent studies. In study 1, we will seed articular chondrocytes on two different scaffold materials. Porcine SIS, naturally derived collagen rich biomaterial that is rich in growth factors and PLA-PLGA scaffold prepared by the solvent evaporation technique will be used as scaffold materials. Seeded scaffolds were implanted onto to the back of athymic mice. Based on our results from study 1, in study 2 use the method of modified electrospinning to prepare scaffolds with controlled fiber orientation to create scaffolds with a variety of mechanical properties, and we will also prepare scaffolds by freeze drying and lyophilization for comparison purposes. We will we will undertake physiochemical characterization of the scaffolds generated to understand the degradability and the viscoelastic properties as a function of fiber composition and orientation. In study 3, we will evaluate how the scaffolds support matrix elaboration and develop mechanical properties when seeded with articular chondrocytes in static or dynamic cultures. Results of our ongoing research will be presented.

THURSDAY, SEPTEMBER 18 2003
COOKIES AND COFFEE -- 3:15 P.M.
SEMINAR -- 3:30 P.M.
SARKEYS ENERGY CENTER, ROOM M-204

THIS IS A REQUIRED SEMINAR FOR CHE 5971