Mechano-dependent Biosynthetic Response of Micro-integrated Cells in Elastomeric Scaffolds

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The field of tissue engineering combines the principles of biology and engineering in an effort to create biological substitutes that mimic the mechanical and structural properties of healthy native tissues. This project examines the biosynthetic effects of cyclic mechanical strain placed on a PEUU scaffold densely integrated with rat vascular smooth muscle cells. Cells isolated from rat aorta were expanded onto tissue culture plates from which specimen were prepared by concurrently electrospinning the PEUU scaffold and electrospraying the cells. The specimen was placed in a tension bioreactor that mechanically conditioned the specimen in a controlled manner. The specimen will be assessed in groups as follows: day 0 control, day 7 static, and day 7 15% and 30% strain. Soluble collagen and proteoglycan DNA production will be quantified compared to day 0 controls. It is expected that large strain will cause a statistically significant increase in the production of extracellular matrix.