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Simulated Collagen Placement with Varied Movement of Cells

Abstract

Biological Scaffolds provide cells a matrix on which to move, place collagen, and eventually restore tissue function. This process and the effects varying types of scaffolds produce is just yet beginning to develop. This model hopes to replicate in vivo conditions to improve this understanding. A part of this model specifically aims to simulate the cell's distribution of collagen as well as its movement when one direction is favored over the others, based off what is seen in *Sato et al.* This model is two-dimensional, therefore cell movement will be increased and decreased in the positive and negative X and Y directions. During each trial one direction was slightly favored over the others. The resulting cell trajectories and collagen distributions for the experimental trials showed increased collagen density in the modified direction when compared to the control trials. When using this model cell movement and therefore collagen placement can be successfully varied to favor a specific side of the model. Further development of this model will include collagen placement based on amount of collagen already placed (modeling on/off stages of collagen production) and nonlinear directional changes based off of published research.