CHAPTER 4

Microscale Tissue Engineering

A. Khademhosseini, G.T. Franzesi and B. Rajalingam

Summary

We can describe many of the recent advances in the field of tissue engineering as a trend toward the microscale. On one hand, this emphasizes the possibility to miniaturize the experiments, in order to carry out high-throughput screens with limited resources. On the other hand, it also reflects our ability to mimic the native microenvironment to an unprecedented degree, to study the effect of chemical, topographical, and even electrical and mechanical stimuli on cell behavior. This has been made possible by several technological advances, from soft lithography to microfluidics, to self assembling peptides, to electrospinning, to name a few. Equally important has been a better understanding of what to mimic: hence the importance of mathematical modeling, and of our knowledge from developmental biology. Possible fruitful directions for research could then be the integration of more parameters together, as well as a more quantitative description of phenomena, to figure out what aspects of the native microenvironment need to be recapitulated for in vitro models and for in vivo clinical applications.

Topics in Tissue Engineering, Vol. 5, 2009. Ed. N Ashammakhi © *2009.*