2.79J/3.96J/BEH.441J/HST522J - Fall 2003

Biomaterials - Tissue Interactions

Homework #4

1. A company is investigating a new polymer for applications in bone and soft tissue. They arranged for a testing company to implant cylindrical samples of the polymer in a bone defect in an animal, and also in a soft tissue site. After 6 months, their histological studies have demonstrated the presence of macrophages on the surface of the implant in the soft tissue site but not on the implant in the bone site. Because macrophages are inflammatory cells and persistent on the implant surface in soft tissue for 6 months, their recommendation is that the polymer should not be used for the production of devices to be implanted in soft tissue, but should only be used for the fabrication of devices to be implanted in bone. Do you agree? Explain.

2. Describe one advantage and one disadvantage of using autologous and allogeneic cells for tissue engineering. Describe two advantages of using a marrow-derived stem cell versus a differentiated cell type (isolated from the type of tissue to be produced) for tissue engineering.