Assignment 10: Biomaterials and Host Integration

Cell and Tissue Engineering

Problems

1. The company Baxter received approval for its Fibrin Sealant (Tisseel®) in July, 2000 for application in surgical procedures. Features of this produce can be found at the website (http://tisseel.com/us/index.html). This material is being evaluated for a number of tissue engineering applications. Consider its use as a possible material in which to deliver tendon cells to a defect between bone and avulsed tendon. With regard to this prospective biomaterial application, please answer the following questions. Remember to give references when appropriate.
    a. What type of biomaterial is Tisseel® and what are its components?
    b. What reaction does Tisseel® undergo to form a sealant?
    c. How quickly does Tisseel® degrade?
    d. What surface properties would be desirable for such an application? Does the product have such properties?
    e. What bulk properties would be desirable for such an application? Does the product have such properties?

2. In lecture 1 we discuss the use of lithographic methods for tailoring biomaterials at the cellular level. Please briefly describe one technique each for tailoring biomaterials at the subcellular and supracellular length scales. 2-3 sentences each MAX.

3. Name the immunomodulatory strategy based on the description:
    a. Encapsulation of cells with semipermeable material
    b. Blocking co-stimulators of T-cell activation
    c. Use of corticosteroids
    d. Forced expression of human proteins in xenograft cells

References:

Question 1 adapted from *Tissue Engineering, Palsson and Bhatia*

Rubric

Question	Component	Total Point Value
1	a	2
	b	2
	C	2
	D	2
	E	2
2	Subcellular	6
	Supracellular	6
3	A	2
	B	2
	C	2
	D	2