Stem Cells for Tissue Engineering

1. What method can be used for obtaining embryonic stem cells which can be recognized as “self” by the recipient (i.e., genetically matching the recipient)?

2. Using the method describe in “1,” a company is proposing to commercialize embryonic stem cells for treating defects in articular cartilage. The cells will be injected under a tissue flap sutured over the defect. The company is proposing that undifferentiated embryonic stem cells be used for this application. The supposition is that the cells will receive the necessary signals from microenvironment in the cartilage defect to induce their differentiation into chondrocytes. Do you agree that undifferentiated ES cells should be used?

3. What is the principal concern in using stem cells from cell reprogramming (induced pluripotent stem cells) for human implantation?

4. Is there a method that might be employed to produce embryonic stem cells without destroying the embryo? Explain.

5. What are 2 potential advantages and 2 potential problems in using allogeneic differentiated cell types (e.g., chondrocytes) for tissue engineering applications?