BIOLOGICAL FRAMEWORKS FOR ENGINEERS

Session #24 [nm-m: Tissue Engineering]

General Objectives:

- ✓ Discuss the replacement of biologic tissues in the body which have failed
- ✓ Provide an overview of tissue engineering from the approaches to the strengths and weakness of specific examples

Central Framework:

- ✓ When tissues or systems in the body fail, our natural response is to replace that tissue with a biologic analog to perform the function of the original tissue.

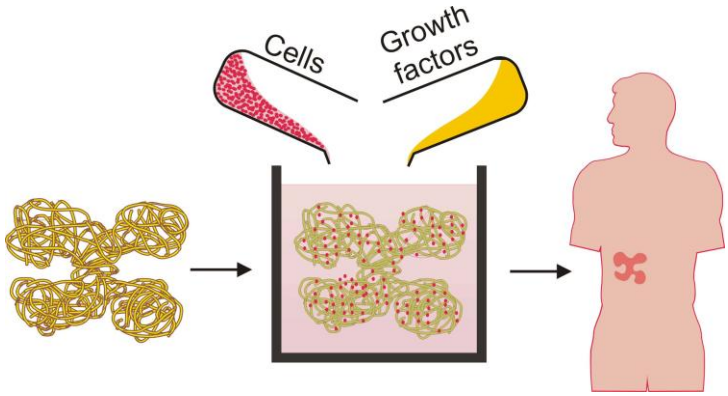
Session Outline:

Tissue Engineering

A field that seeks to replace, repair or enhance biological function at the scale of a tissue or organ by manipulating cells via their extracellular environment.

Central Hypothesis:

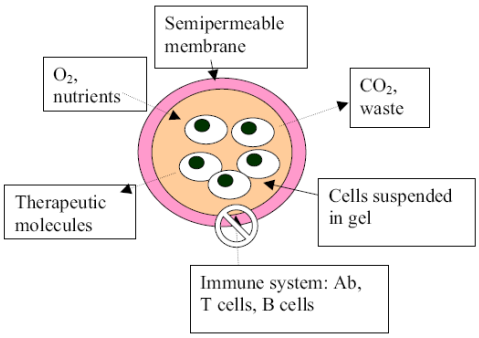
Cells + ECM + GF = New Tissue



Objectives:

Success Stories:

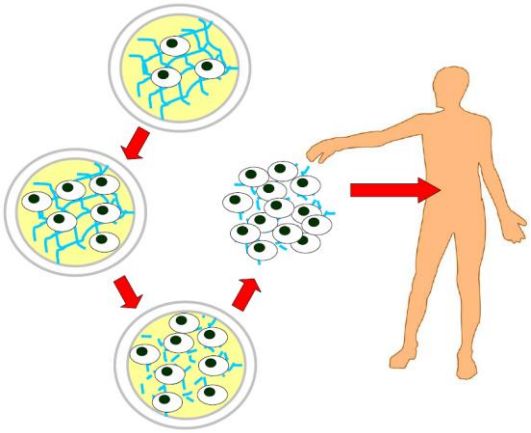
1. Extracorpeal/Microencapsulation Method:



Advantages:

Issues:

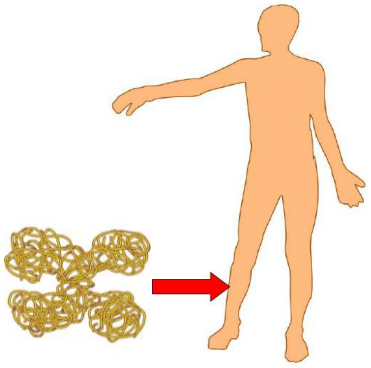
2. *In vitro* Synthesis *Method:*



Advantages:

Issues:

3. In vivo synthesis Method:



Advantages:

Issues:

Scaffolds for Tissue Generation

Purpose: replace functions of extracellular matrix (ECM)

ECM functions:

Materials:

Design issues:

Fabrication: