

# Johns Hopkins Engineering

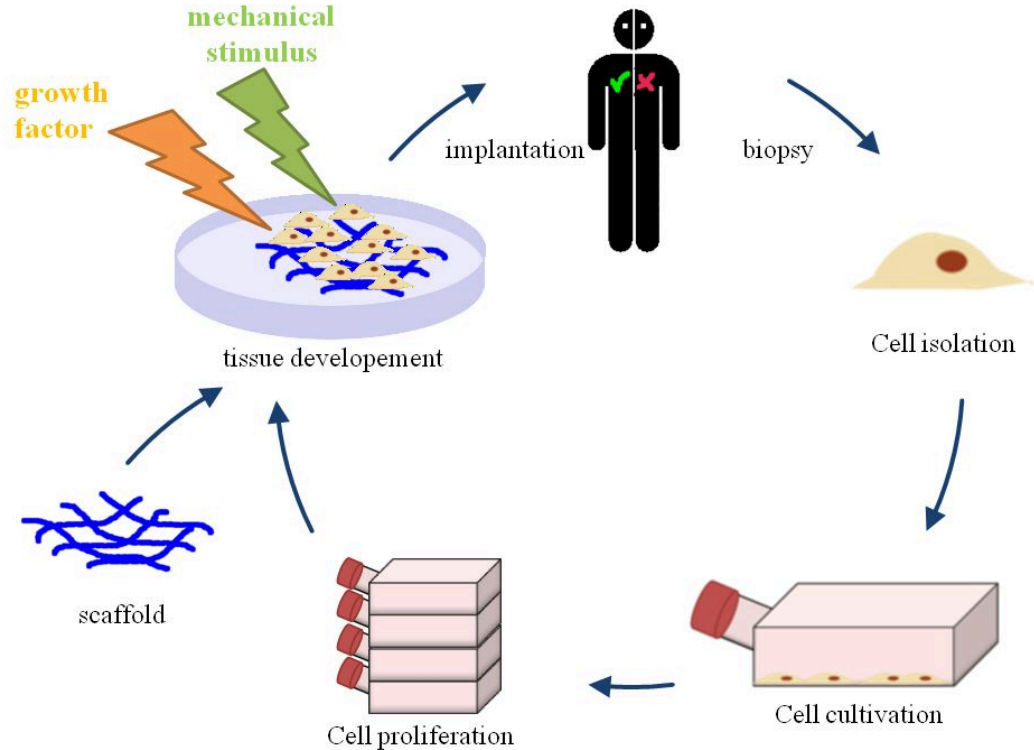
## **Immunoengineering**

**Immunoengineering: Tissue Engineering**

**Introduction to Tissue Engineering and Regenerative Medicine**

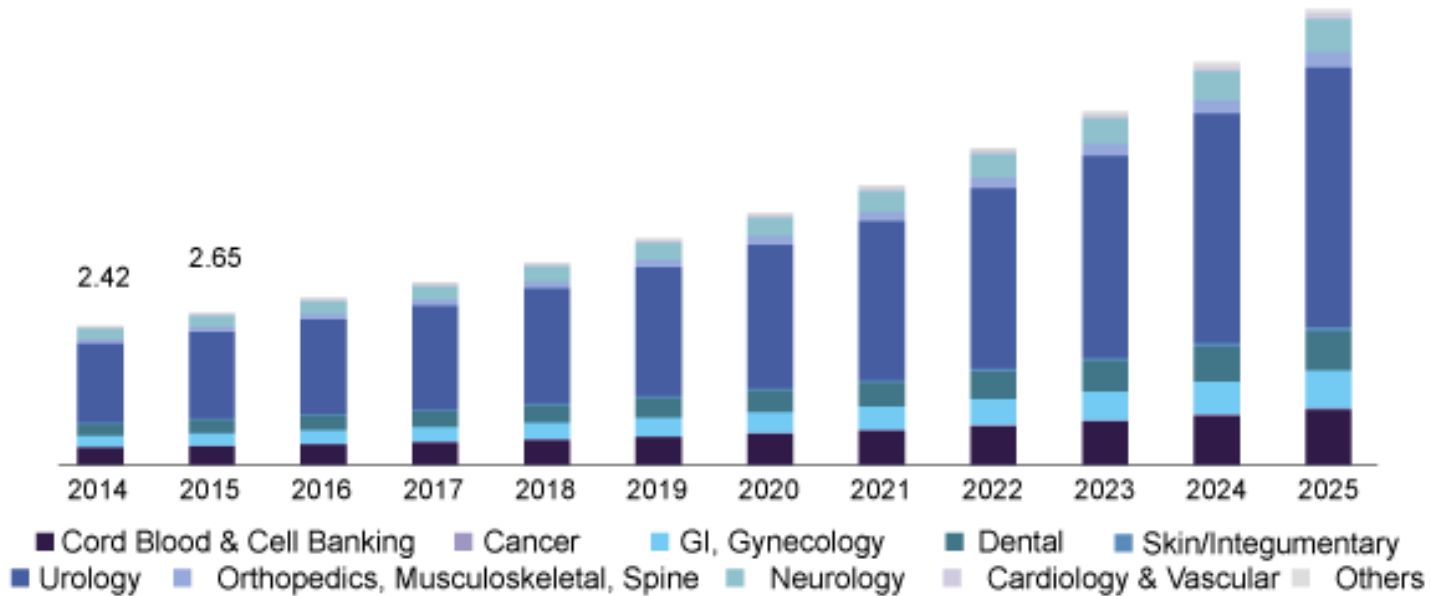
# Tissue Engineering and Regenerative Medicine

- Engineering therapies to enable the body to repair, replace, restore, and regenerate damaged or diseased cells, tissues, and organs
- Replacement vs. regeneration



# Tissue Engineering Market

U.S. tissue engineering market size, by application, 2014-2025 (USD Billion)

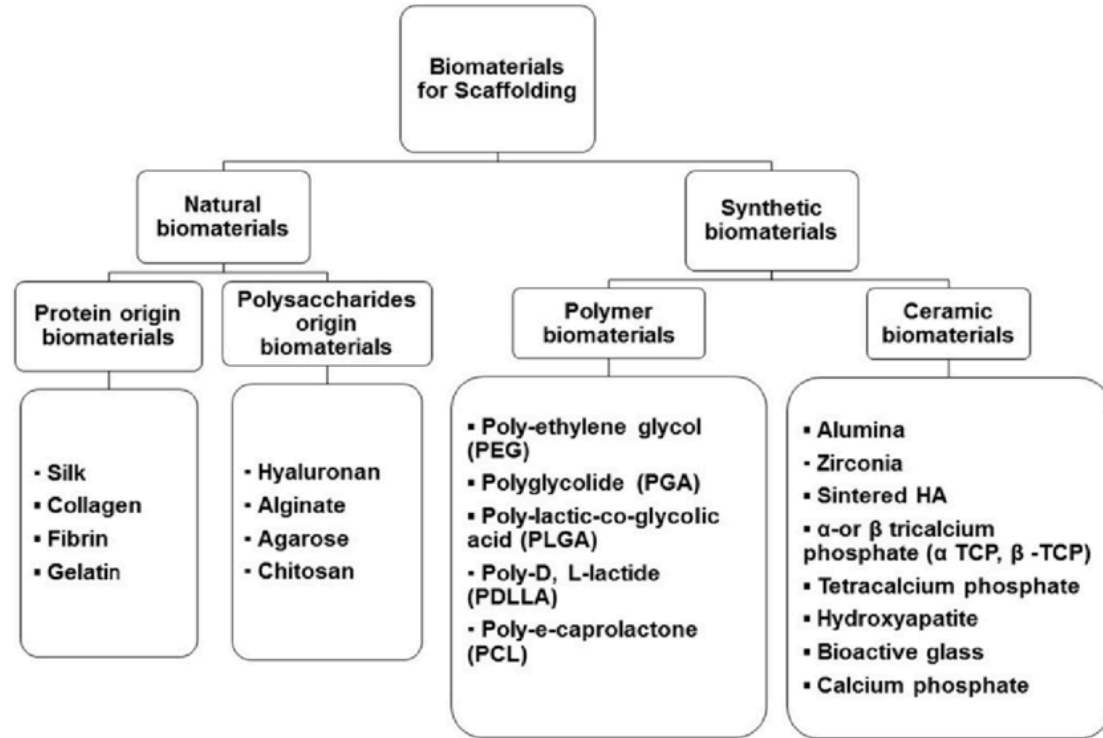


# Biomaterials for Tissue Engineering

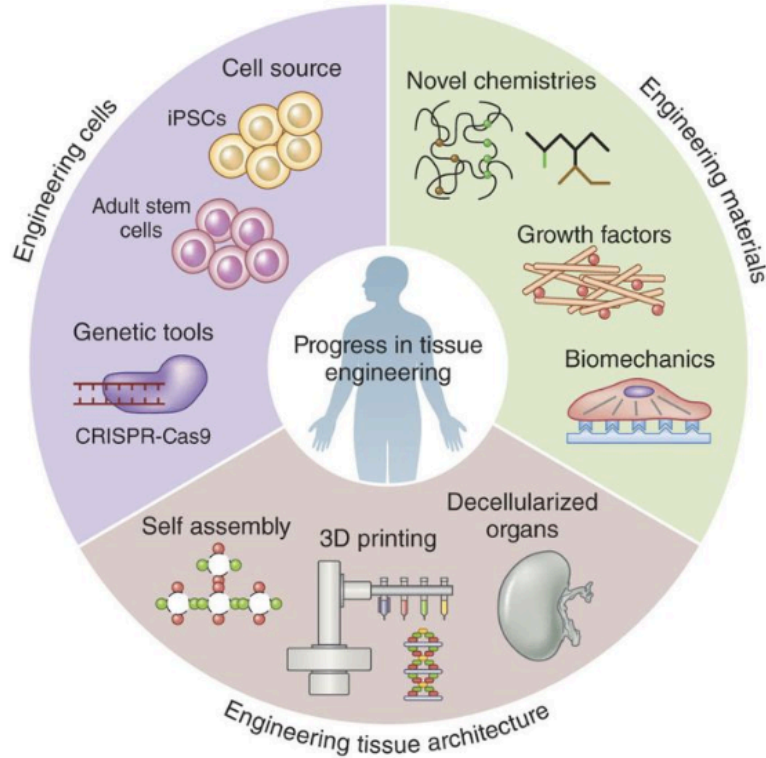
- Three main components
  - Cells
    - Precursors (stem cells) or differentiated
  - Scaffold/matrix
    - Typically designed to be biodegradable, porous
    - Provides structural support and shape
    - Allows for cell attachment and migration
  - Bioactive cues
    - Signals to cells for proliferation, differentiation, etc.

# Scaffolds

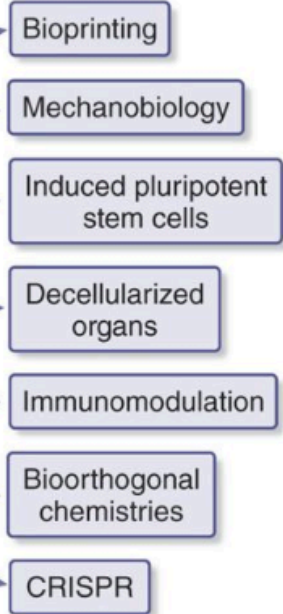
- Natural vs. synthetic materials
- Should have high porosity with interconnected pores of suitable size for cell migration
- Biocompatible materials
- Provide mechanical stability
- Hydrogels



# Tissue Engineering Advances



Selected advances  
relevant to tissue  
engineering





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