Tissue Engineering

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Description: Tissue engineering is an interdisciplinary field that applies the principles of engineering and life sciences toward the development of biological substitutes that restore, maintain, or improve tissue function or whole organs. Typically scaffolds, cells, and biologically active molecules are combined to form or repair functional tissues. The goal of tissue engineering is to assemble functional constructs that restore, maintain, or improve damaged tissues or organs. Applications can be in vitro (e.g., “organs on a chip”) as well as in vivo (e.g., “regenerative medicine”).

Guide for class selection: Any three courses from the list below may be taken to satisfy this concentration.

Restricted Electives

20.205 Principles and Applications of Genetic Engineering for Biotechnology and Neuroscience (U) same as 9.26J
   Prereq: 7.28, 7.32 or 20.020, 9.01 or 9.09

20.310 Molecular, Cellular and Tissue Biomechanics (U) Spring
   Prereq: Biology (GIR), (2.370 or 20.110[J]), and (3.016B or 18.03)

20.352 Principles of Neuroengineering (U)
   Prereq: Permission of instructor

20.361 Molecular and Engineering Aspects of Biotechnology same as 7.37J, 10.441J
   Prereq: 2.005, 3.013, 5.60, 20.110, or 20.111; 7.06; or permission of instructor

20.363 Biomaterials Science and Engineering (U) same as 3.005J
   Prereq: 3.034, 20.110, or permission of instructor

20.375 Applied Developmental Biology and Tissue Engineering (U) meets with 20.47S
   Prereq: 7.06, 20.320, and 7.02 or 20.109; or permission of instructor

2.782/HST.524 Design of Medical Devices and Implants (G) Spring
   Prereq: (Biology (GIR), Chemistry (GIR), and Physics I (GIR)) or permission of instructor

2.787/HST.535 Tissue Engineering and Organ Regeneration (G) Fall
   Prereq: (Biology (GIR), Chemistry (GIR), and Physics I (GIR)) or permission of instructor

2.796/6.522 Quantitative Physiology: Organ Transport Systems
   Prereq: 6.021[J] and (2.006 or 6.013) (G) Fall

7.20 Human Physiology (U)
   Prereq: 7.05