BIOL 450: Stem Cell Biology

This course covers the new field of inquiry of stem cells, in recognition of the role that stem cells play in the post-embryonic phase of life. The course will also examine current understanding of the working of the stem cells in embryogenesis. This course will address, both from the theoretical and practical perspectives, the question of self-renewal, pluripotency, immortal strand synthesis as well as the nature and reasons for differential routes of differentiation into various tissue types. For example, the idea of 'context' will be discussed as will the realization that the microenvironment (the stem cell nitch) plays an important role in fate determination. The class will also discuss the problems around whether induced pluripotent cells—a technical achievement—can be useful for tissue regeneration and therapeutics.

Learning Objectives

- Learn the origin and residence of stem cells in embryos and adult tissues
- Discuss the basis for self-renewal and pluripotency of stem cells, the regulation of stem cells in embryogenesis and their differentiation into adult tissues
- Survey the role of stem cells in human disease, with focus on cancer
- Consider the pros and cons of induced pluripotent stem cells in tissue regeneration and therapeutics
- Discover normal and cancer stem cell niche and fate determination

Credits: 1
Class Type: Graduate Course
Program: Biology, Genetics, and Medicine