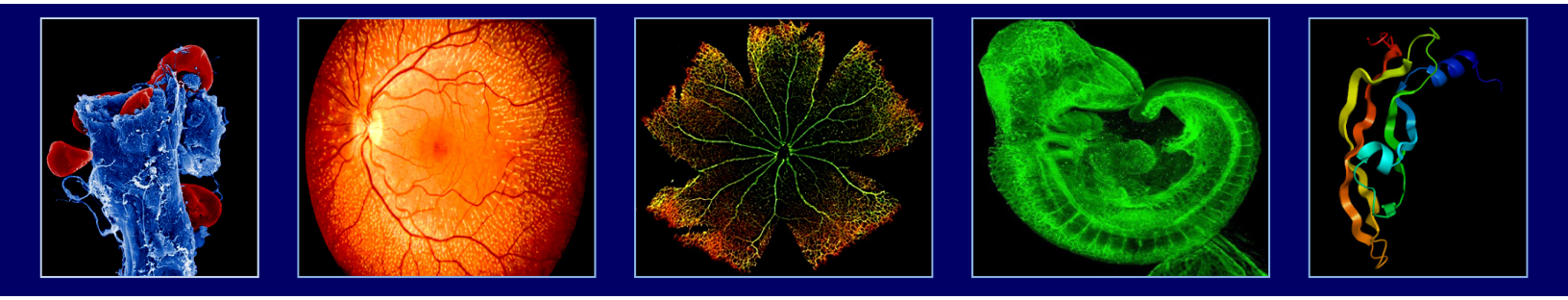
Massachusetts Institute of Technology

MASSACHUSETTS INSTITUTE OF TECHNOLOGY DEPARTMENT OF BIOLOGY

Advanced Undergraduate Seminar Series – Fall 2009 – Course 7.345

Blood Vessel Development
in Life, Disease & Cancer Medicine



The growth of blood vessels, a process known as ***angiogenesis***, is one of the earliest events in mammalian development and is regulated by a sensitive interplay of growth factors and other molecules. Abnormal or excessive angiogenesis occurs in diseases that include cancer, diabetes and atherosclerosis, whereas insufficient angiogenesis or vessel regression can lead to Alzheimer's disease, ischemic heart disease and impaired wound healing. For this reason, more than $4 billion dollars has been invested in research and development to identify medicines that either promote or reduce the growth of new blood vessels, making angiogenesis one of the most exciting and heavily funded research areas in biomedicine today.
In this course, we will discuss the ***key molecular regulators of blood vessel development*** as well as the techniques and experimental systems that have been utilized by vascular biologists. Emphasis will be given to the recent progress made in the microscopic visualization of blood vessels and live cell and intravital imaging used for diagnosis in the clinic. We will also examine the success of several ***anti-angiogenic treatments*** that have been approved by the Food and Drug Administration (FDA), that inhibit the pro-angiogenic vascular endothelial growth factor, VEGF, and that are now being used to treat age-related macular degeneration. Finally, we will explore how during the course of cancer progression, establishment of a blood supply into a tumor can lead to the growth and spread of cancer cells to secondary sites. We will discuss the caveats and potential pitfalls of ***targeting tumor blood vessels to starve cancer cells*** and prevent the spread of cancer, which remains one of the leading causes of death in the USA.

*The objective of this course is to introduce students to the analysis of primary research literature. During our weekly course, we will discuss in detail two scientific papers. Our readings will include both historical and recent breakthrough papers. Emphasis will be placed on introducing the different model systems and techniques (in vivo, ex vivo and in vitro) used by vascular biologists to study angiogenesis. In addition, practical training session on how to make a presentation using **Powerpoint** and how to search for research article using **PubMed** as well as a **field trip** to a lab of the Koch Institute for Integrative Cancer Research at MIT will be organized.*

http://stellar.mit.edu/S/course/7/fa09/7.345

Wednesdays 1-3pm (flexible) – Room 68-151

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Free Lunch will be served!