Course goals:

The primary objective of this class is to enable students to understand the molecular and developmental factors underlying tissue growth in both benign and cancerous contexts. By the end of class, students should possess the knowledge to grasp the biological foundations for identifying potential targets in the treatment of cancer. Additionally, they will gain insight into the pharmaceutical considerations involved in the development oncology drugs.

Course format:

Lectures and class discussion. Active participation in class will be highly encouraged and will be a big part of the class. Recent primary papers from the scientific literature and reviews will be the main reading components for the class.

Typical enrollees:

Prerequisites are Life Sciences 1a or equivalent; Life Sciences 1b; SCRB 10; MCB 52 or permission of the instructor.

When is course typically offered?

Spring only.

Assignments and grading:

Midterm Exam #1 20%

Class Participation 40%

Class project 20%

Final Exam 20%

Class project: This will involve preparing a written and oral presentation on one topic to be chosen by the student. The objective of this project is to encourage the student to apply the knowledge of what they have learned in class to connect a cellular/tissue-based observation with a problem in the cancer research field. The work should focus on the biological basis of the problem, the clinical consequences of this, the current therapeutic approaches (or lack thereof) available to tackle this problem, and a potentially novel way to approach or understand this aspect of such malignancy. We will connect the students with experts in the field in the Boston and international community to discuss the plan. Finally, the project will be presented at the end of the semester.

Enrollment cap, selection process, notification:

Considering that this is a discussion heavy student enrollment will be limited to 16.

Course Dates and Topics:

	Date:	**Guest Speaker**	**Topic**:
Lecture 1	January 23		Introduction
			Developmental pathways in action: organogenesis

Lecture 2	January 25		and morphogen gradients
Lecture 3	January 30		Paper discussion
Lecture 4	February 1		Cell lineage and plasticity
Lecture 5	February 6		Paper discussion
Lecture 6	February 8		Chalones and organ size regulation
Lecture 7	February 13		Paper discussion
Lecture 8	February 15		Cancer as a developmental biology problem
Lecture 9	February 20		Paper discussion
Lecture 10	February 22	Ruben Van Boxtel	Genome and Cancer
Lecture 11	February 27		Paper discussion
Lecture 12	February 29		Oncogenes and tumor suppression
Lecture 13	March 5		In vitro models of cancer Biology
	March 7		MIDTERM
	March 12		SPRING BREAK
	March 14		SPRING BREAK
Lecture 14	March 19		Humans as genetic mosaics
Lecture 15	March 21		Paper discussion
Lecture 16	March 26		Metastasis and the cancer niche
Lecture 17	March 28		Paper discussion

Lecture 18	April 2		Lecture and Paper discussion
Lecture 19	April 4	Mario Suva	Single cell approaches in cancer
Lecture 20	April 9		Paper discussion
Lecture 21	April 11	Pietro Genovese	Immunotherapy
Lecture 22	April 16		Immunotherapy
	April 18		Presentation of Class Projects (I)
Lecture 23	April 23	Milenko Cicmil	
	April 24		Presentation of Class Projects (II)

PAPER DISCUSSION SECTION

	Date:	Topic:	Paper 1 (PMID)	Paper 2 (PMID)	Paper 3 (PMID)	Student 1	student 2	Student 3
Lecture 5	6-Feb	Paper discussion 1	**16862118**	**19092804**		Jake Benoit	Maddy Kidd	
Lecture 7	13-Feb	Paper discussion 2	**29670281**	**36131018**		Lance He	Ellen Chen	
Lecture 9	20-Feb	Paper discussion 3	**28358093**	**26091037**		Olivia Stringham	Justin Su	
Lecture 13	27-Feb	Paper discussion 4	**35978189**	**25557080**		Anthony Xu	Ting Ting Yan	
Lecture 15	21-Mar	Paper discussion 5	**35650442**	**33029006**		Jake Benoit	Maddy Kidd	
Lecture 17	28-Mar	Paper discussion 6	**22265420**	**31485072**		Lance He	Ellen Chen	
Lecture 18	2-Apr	Paper discussion 7	**36175792**				Justin Su	
Lecture 22	9-Apr	Paper discussion 8	**28723893**	**36922589**	**36634707**	Anthony Xu	Olivia Stringham	Ting Ting Yan

April 18	Olivia, Anthony, Justin	Presentation of Class Projects (I)
April 24 12- 2 pm	Lance, Maddy, Ting Ting, Jake, Ellen	Presentation of Class Projects (II)