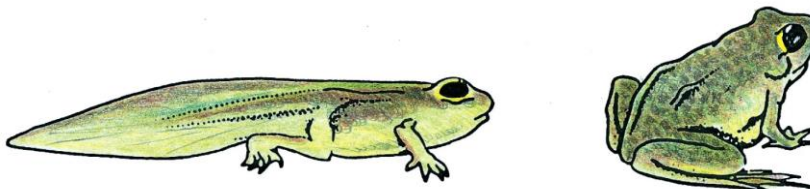


Cellular and Molecular Biochemistry



Spring 2022

CBCH-4414

CRN 29425

In person and Online

Lecture: M, W (1.30 PM-2.50 PM)
College of Business Admin 321

Professor: Dr. Sid Das
Office: Biosciences Building 5.128 (747-6896)
E-mail: sdas@utep.edu.

Office Hours: M and W: 3.20- 4.20 PM (or through prior appointment).
Biosciences 5.128 (face to face, zoom, e-mail or phone X8896)

TEXT: 1) *The Molecular Biology of Cell* by Alberts, Johnson, Lewis, Raff, Roberts, Walter (6th Edition), Garland Science
2) Research articles (should be provided by the instructor)

Guidelines:

Both class-room teaching and Blackboard will be used as the primary platforms for online instructional activities.

Non-synchronous alternative such as recordings of lectures will be provided.

No webcams are required by students.

The schedule assigned by the Goldmine will be followed.

Inform the instructor beforehand if you have to miss the class, facing technical difficulties during the lecture or need some additional assistance.

Objective:

This course focuses on understanding the recent advances in Cellular and Molecular Biochemistry. **signaling through receptors**, **apoptosis**, **cell cycle**, **cancer**, **pathogenesis** and **stem cells**.

Examination Procedure

There will be three class exams and a final exam. In addition, there will be practice quizzes. Your grades will be as follows:

Point distributions:

Total four exams including the final. Best three will be counted	80%
Lab	20%
Grand Total	100%

Grading Policy

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = Below 60

January 19th: Spring classes start

March 14-18th: Spring Break

April 1st: Drop Deadline

May 6th: Dead Day

May 11th: Final Exam (4 PM-6.45 PM)

Course Materials

I. Mechanism of Cell Communication (Chapter-15)

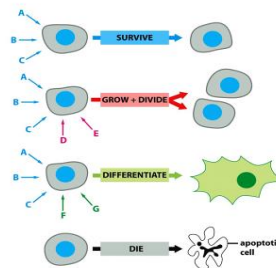


Figure 15-8 Molecular Biology of the Cell (© Garland Science 2008)

General principles of cell communication

Signaling through G-protein-coupled

Signaling through enzyme-coupled receptors

Phosphorylation of Receptor Tyrosine Kinases (RTKs)

RTKs serve as Docking Sites for Intracellular Signaling Proteins

SH2 Domains of RTKs

Activation of RTKs

PI-3-Kinase Lipid docking and RTKs

Cytoplasmic Tyrosine Kinases

Jak-Stat Pathways

TGF β Signaling

Protein Tyrosine Phosphatases

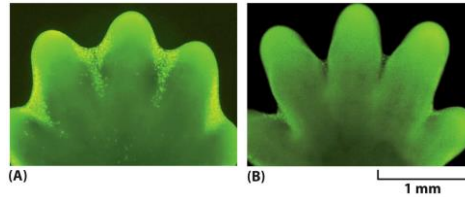
The receptor protein Notch is a latent gene regulatory protein

Hedgehog proteins

(Quiz-1 on Chapter-15)

Exam-1

II. Apoptosis (Chapter-18)



Programmed cell death eliminates Unwanted Cells
 Apoptotic cells are biochemically recognizable
 Intracellular Proteolytic Cascade and Apoptosis
 Death Receptor
 Mitochondria and Apoptosis
 Bcl2 and apoptosis
 Extracellular Survival Factors Inhibit Apoptosis in Various ways

(Quiz-2 on Chapter 18)

III. Cancer (Chapter-20)

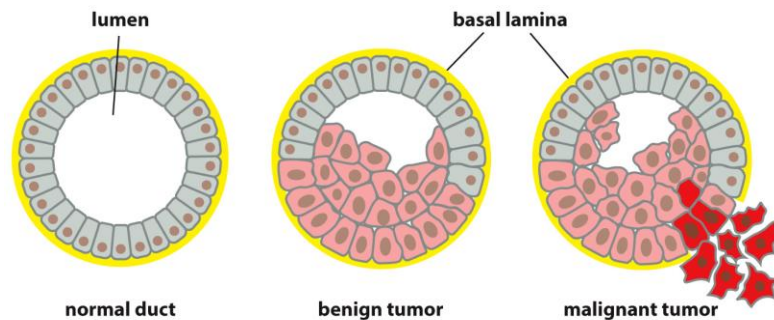


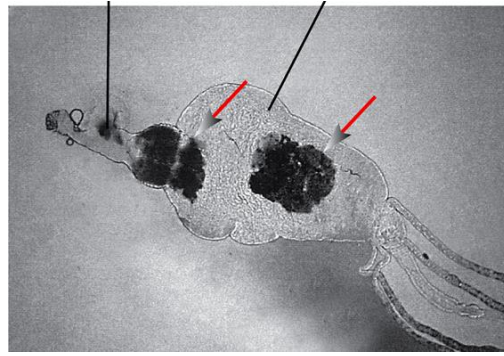
Figure 20-3 Molecular Biology of the Cell 6e (© Garland Science 2015)

Cancer as a Microevolutionary Process
 Cancer cells reproduce without restraint and colonize others
 Most cancers derive from a single abnormal cell
 Cancer cells contain somatic mutations
 A single mutation is not enough to cause cancer
 Cancers develop gradually from increasingly aberrant cells
 The epigenetic changes that accumulate in cancer cells involve inherited chromatin structures and DNA methylation
 Tumors induce angiogenesis
 The Preventable Causes of Cancer

Quiz-3 on chapter 20

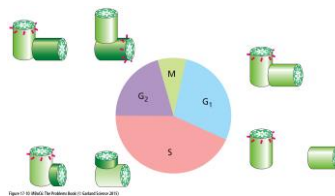
Exam-2: Chapters 18 and 20.

IV. Pathogens and Infection (Ch-23)



Introduction to pathogens and human microbiota
Pathogens can contribute to cancer, cardiovascular disease
Pathogens can be viruses, bacteria or eukaryotes
Fungal and Protozoans involving multiple multiple forms
Cell biology of infection

V. Cell Cycle (Chapter-17)



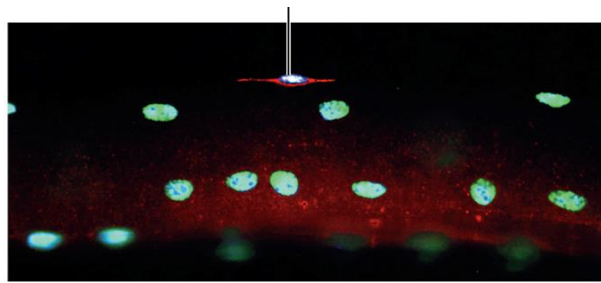
Overview of the cell cycle
The cell cycle control system
S-phase
Mitosis

Cytokinesis

Quiz-4 on chapters 23 and 17

Exam-3 (on chapter 23 and 17)

VI. Stem Cells and Tissue Regeneration



Stem cells and renewal in epithelial tissues
Fibroblasts and their transformations
Genesis and regeneration of skeletal muscle
Blood vessels, lymphatics and endothelial cells
A hierarchical stem cell system: blood cell formation
Regeneration and repair
Cell programming and pluripotent stem cells

Final Exam on May 11th, 2022 (4-6.45 PM)