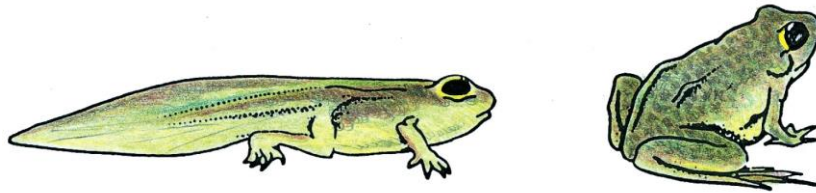


Cellular and Molecular Biochemistry



Spring 2021
CBCH-4414
CRN 23017

Virtually by Blackboard Collaborate

Lecture: M, W (3 PM-4.20 PM)

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

Office Hours: M and W: 4.20 PM-5 PM (or through prior appointment).

TEXT: *The Molecular Biology of Cell* by Alberts, Johnson, Lewis, Raff, Roberts, Walter (6th Edition), Garland Science

Guidelines:

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. We will cover topics on **protein functions**, **protein sorting**, **interorganelle protein transport**, **signaling through receptors**, **apoptosis**, **cell cycle**, and **cancer**.

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

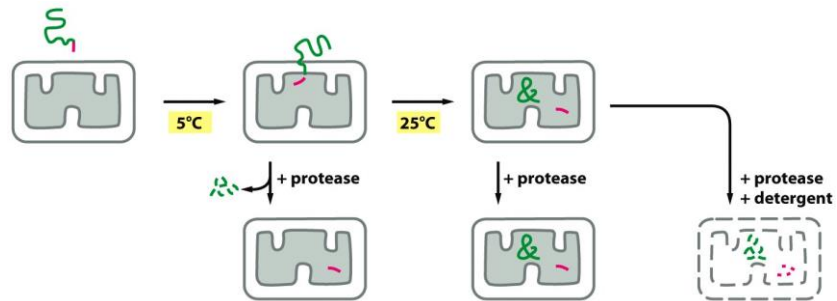
April 1st: Drop Deadline

May 7th: Dead Day

May 10th: Final Exam (1-3.45 PM)

Course Materials

I. Intracellular Compartments and Protein Sorting
(Chapter -12)



The Compartmentalization of Cells

The Transport of Molecules between the Nucleus and Cytosol

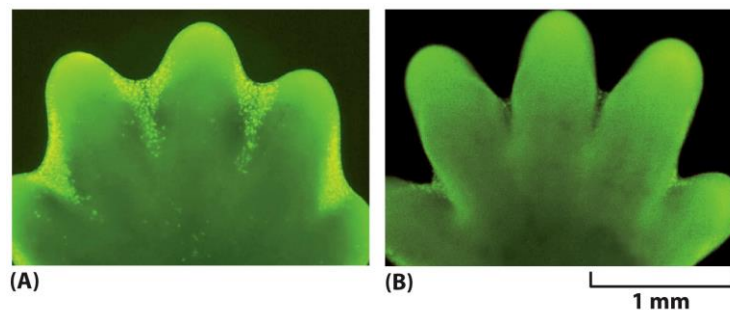
The Transport of Proteins into Mitochondria and Chloroplasts

Peroxisomes

The Endoplasmic Reticulum

(Quiz-1 on Chapter-12)

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)

Exam-1 (chapters 12 and 18)

III. Mechanism of Cell Communication (Chapter-15)

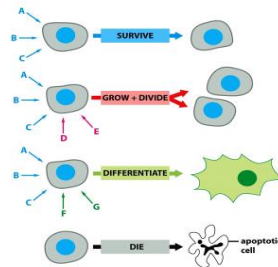


Figure 15-8 Molecular Biology of the Cell (© Garland Science 2008)

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-3 on chapter-15)

Exam-2: Chapter-15

IV. Cancer (Chapter-20)

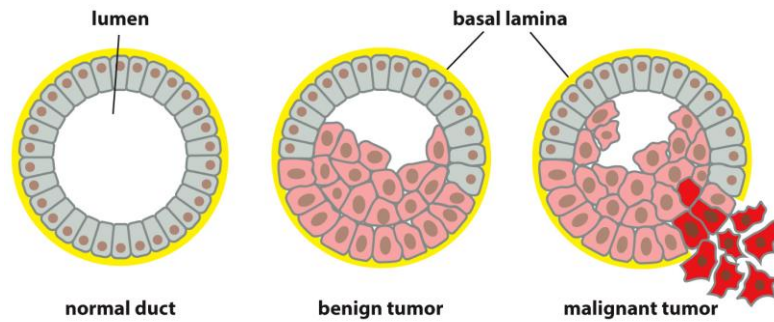


Figure 20-3 Molecular Biology of the Cell 6e (© Garland Science 2015)

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

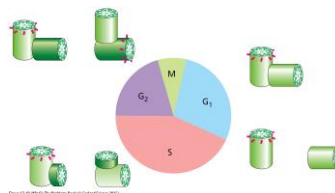
The epigenetic changes that accumulate in cancer cells involve inherited chromatin structures and DNA methylation

Tumors induce angiogenesis

The Preventable Causes of Cancer

Exam-3: Chapters 17 and 20.

V. Cell Cycle (Chapter-17)



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

Quiz on chapter 17

Final Exam on May 10th, 2021 (1-3.45 PM)