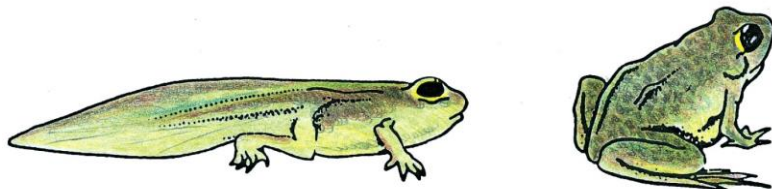


Cellular and Molecular Biochemistry



Spring 2017
CBCH-4414
CRN 24210, 28834

Lecture: M, W (3 PM-4.20 PM); LART 210

Professor: Sid Das

Office: Biosciences Building 5.128 (747-6896)

E-mail: sdas@utep.edu.

Office Hours: T and R: 3-4 PM (or through prior appointment).

TEXT: *The Molecular Biology of Cell* by Alberts, Johnson, Lewis, Raff, Roberts, Walter (5th or 6th Edition), Garland Science

Reference Texts:

Lehninger's Biochemistry or any Standard Biochemistry Text Book or any other Biochemistry Text Book.

Objective:

This course is aimed at students, who would like to learn the recent advances in Cellular Biochemistry. We will discuss the experimental methods of working with proteins, DNA, RNA and intact cells. In-depth analyses of (1) protein functions (2) protein sorting (3) signaling through receptor kinases (4) apoptosis (5) cell cycle (6) apoptosis and (7) understanding the process of cancer.

Examination Procedure

There will be four class exams and a final exam. In addition, there will be several quizzes and take-home exams, which will be counted. Your grade will be distributed as follows:

Total five exams including the final	80%
A short project report (due by May 8, 2017, i.e., the day of the final exam)	15%
<u>Attendance</u>	5%
Grand Total	100%

Notes:

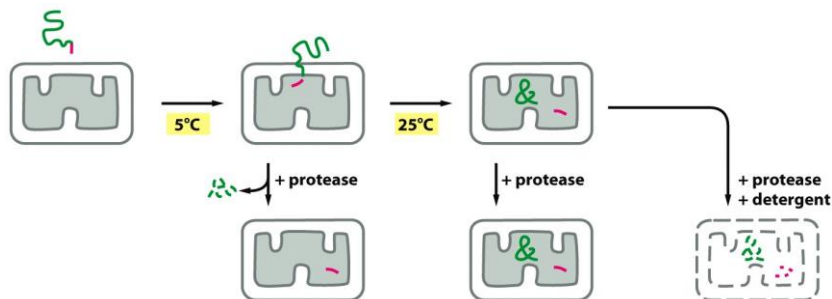
- 1) Try not to miss any exam or class without proper notification.
- 2) Attendance is must and everyone needs to sign the attendance roster which carries 5% of your total grade.

Grading Policy

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

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 on Chapter-12, Exam-1)

II. Mechanism of Cell Communication (Chapter-15)

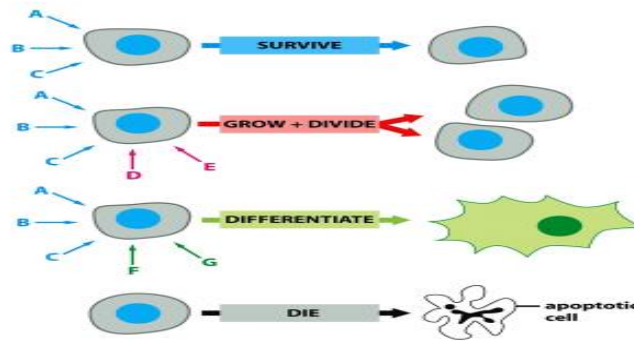


Figure 15-8. Molecular Biology of the Cell (© Garland Science 2008)

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

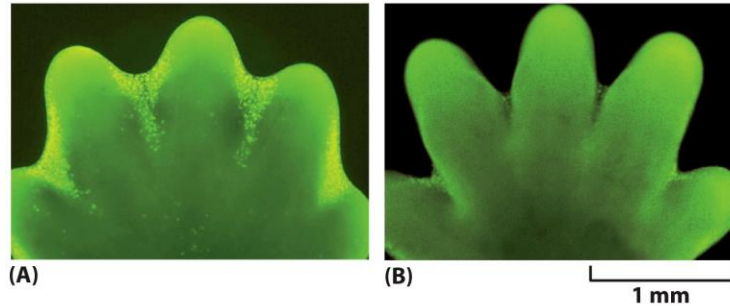
Protein Tyrosine Phosphatases

The receptor protein Notch is a latent gene regulatory protein

Hedgehog proteins

(Quiz-1 and quiz-2 on chapter-15 and Exam-2)

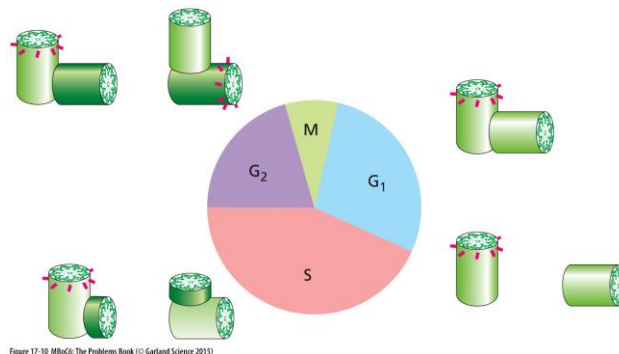
III. Apoptosis (Chapter-18)



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

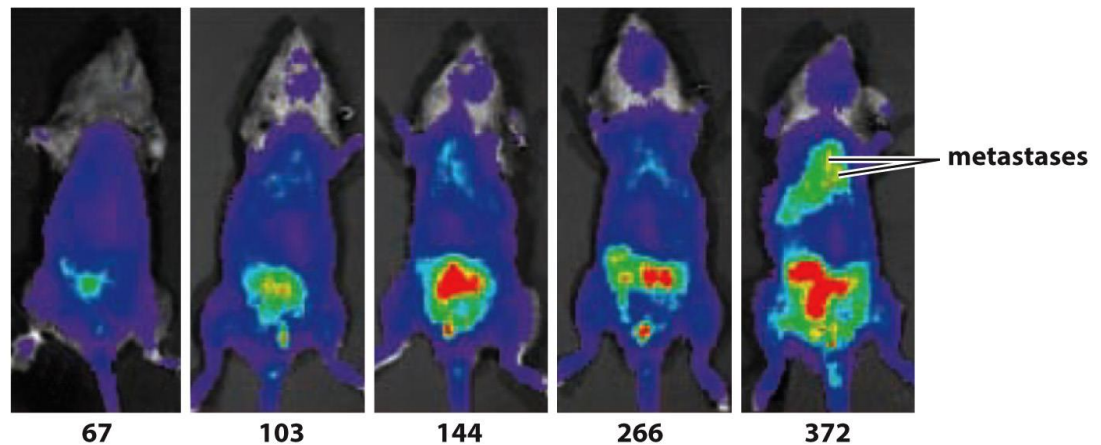
(Exam-3 on Chapter 18)

IV. Cell Cycle (Chapter-17)



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

V. Cancer (Chapter-20)



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
Cancer Ge

(Quiz-3 and Exam-4)

Final Exam on May 8th, 2017 (1-3.45 PM)