PART ONE

The Cell: Organelles to Beyond the Membrane

Part I: Major Topics:

* Why study cell biology?
* What do all cells have in common? How do they differ?
* How do we visualize cells?
* How can we conceptualize the size and scale of cells and other macromolecules?

* Introducing the Cell
* Scientific method and scientific thinking
* What is alive? [Activity]
* Cross section of the cell
* A brief history of the cell and cell biology
* Visualizing cells using microscopy
* Units and measurements
  + nanometers, micrometers, Daltons
* Cell size and scale [Animation]
* The cell plasma membrane and membrane proteins
* Classifying Cell Types
  + Prokaryotes vs. Eukaryotes
  + Plant vs. Bacteria vs. Animal Cells
* Organelles
  + Double-membrane-bounded organelles
    - The Nucleus
    - Mitochondria (and ATP)
    - Chloroplasts
  + Single-membrane bounded organelles
    - Smooth and rough endoplasmic reticulum (ER)
    - Golgi apparatus
    - Lysosomes
  + Other organelles
    - Ribosome
    - Secretory vesicles
* Model Organisms

**Preparation for Next Class:**

1. REVIEW slides from class, and organize notes
2. CREATE a thorough Venn diagram that compares and contrasts animal cells, plant cells, and bacterial cells.
3. COMPLETE the ‘Inside a Cell’ Worksheet alongside the interactive animation [here](http://learn.genetics.utah.edu/content/cells/insideacell/).
4. *OPTIONAL:* Read Prologue of Skoot’s *Immortal Life of Henrietta Lacks*

Introduction to Cell Biology: Parts I and II

Biochemical Basics and Molecular Motors

Part II: Major Topics:

* Review of cellular structures (Homework)
* Biochemistry basics
* What makes up the structural support of a cell?
* How do cells move?
* \*What is DNA? What is a genome?
* Review Homework and Readings
* Biochemical foundations of the cell
* Normal cell environment
* Chemical bonds and strength
* Acids and Bases, pH
* Overview of monomers and polymers
* Cytoskeleton
* Cytoskeleton is a network of fibers in eukaryotes
* Intermediate filaments (IFs)
  + Epidermolysis bullosa simplex
* Microtubules (MTs)
  + Tubulin subunits and polarity
  + Dynamic instability
  + MT-associated proteins (MAPs)
  + MTs and Cancer—a look at taxol
* Actin filaments
  + G-actin and F-actin
  + Cell crawling
* Cell junctions
* Cell Motility and Motor proteins
  + Transporting cellular cargo
  + Kinesins, Dyneins, and ATP hydrolysis

What is DNA? A brief intro

**Preparation for Next Class:**

* DNA review
* Review Quiz