

Cell Biology Introduction (iGEM 3/18/07)

- Bacterial, Animal, Plant Cells
 - Membranes
 - Endosymbiosis of Chloroplasts/Mitochondria
- What are cells made of?
 - Lipids
 - Proteins
 - Nucleic Acids
 - Various Ions and organic molecules (cofactors, second messengers, energy sources)
- The Central Dogma
- Parts of an Animal Cell
 - Plasma Membranes
 - Vesicles
 - Lysosomes/Peroxisomes
 - Cytoskeleton
 - MTs, MFs, Ifs
 - Motor Proteins
 - Ribosomes
 - Mitochondria
 - Smooth ER
 - Rough ER
 - Nucleus

- What does the cell need to do?
 - Make usable energy
 - Maintain Homeostasis
 - Respond to the environment
 - “Grow” and pass on genetic information

- Signal Transduction
 - How a cell communicates into, through, and out of the cell
 - How are the messages carried?
 - Second messengers (Ca^{2+} , cAMP)
 - Post-Translational Modification
 - 3 Examples to answer the three universal questions of culture
 - Growth Stimulation (EGFR pathway)
 - Locomotion (Wound, GF, DOCK180, Rac, WAVE, Arp2/3)
 - Apoptosis (Stress/Death Pathways)
 - General Features
 - Positive/Negative regulation for spatiotemporal precision
 - Feed-forward and Feed-back loops
 - Signal Amplification (ER-stored Ca^{2+} release)
 - Signal termination

Questions? Please email me (Andy Clark) at andrewclark@wisc.edu