

Study Guide: Highlights from Last Set of Chapters

Chapter 5 – Cellular Membranes

Models & Evidence for Membrane Composition
Animal & Plant Cell Junctions
Active & Passive Transport Processes
Osmosis is water movement
Membrane based Pumps: chemical and electrical
Membrane Dynamics
Receptor-Mediated Endocytosis
Regulation Processes: Signal Transduction

Chapter 6 – Energy, Enzymes, and Metabolism

The Laws of Thermodynamics
Free energy isn't free!
Energy: endergonic/exergonic
Heat: endothermic/exothermic
Exergonic reactions release free energy.....to the cell
Activation Energy and Coupled Reactions
ATP structure, function, and cellular recycling
Allosteric regulation and Cooperativity are mechanisms of Feedback Regulation
 Q_{10} Rule of Enzyme Kinetics

Chapter 7 – Respiration

Glycolysis – Carbon Count, ATP & NADH considerations
Fermentation....why?
Pyruvate Oxidation....what tax?
Citric Acid Cycle – Carbon Count, ATP & NADH considerations
Substrate level vs. OxPhos: What difference does it make?
Electron Transport Chain: e- donors and acceptors
Energy Yields in Gross and Net ATP
Regulation of Metabolic pathways: Anabolic & Catabolic extensions of the Core
Key Enzymes involved in Metabolic Pathways
Location, Location, Location

Chapter 8 – Photosynthesis

Autotrophy

Tracking atoms

Electromagnetic Spectrum – Absorption vs. Action spectra

Reaction Center and Accessory Pigments

Light Reaction: Z-scheme vs. Physical Location

Cyclic vs. Noncyclic photophos – PS I & PSII

Electron Transport Chain: e- donors and acceptors

Energy Yields in Gross and Net ATP

Dark Reactions: Calvin Cycle, Major Stages

RuBisCO – Structure and Function

Photorespiration – How do Plants deal with it?

Chapter 24, 25, 26 – Earth’s Natural History, Origins of Life

Time Line – Major Events

Impact Frustration

Relatively Short Period for Transition from Abiotic to Biotic

Oxygen story: BIFs and Red Beds

How does Photosynthesis fit into this?

How does Multicellularity fit into this?

Origin of Eukaryotes....photosyntetic too!

Where do Mitochondria fit into this scenario?

Chemical Aspects of the Origins of Life

Four major hurdles must have been overcome to allow the evolution of life

Two other major critical concepts key to the transition from Abiotic to Biotic

Molecular Clues

Miller’s Experiment, Did it reasonable replicate primitive conditions?

Conceptual Models for the Origins of Life

Thioester World & RNA World

Implications regarding Hydrothermal Vents

Lessons from the Big Tree of Life