

Introduction to Biochemistry

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- Addicted to Mt Dew
- NASCAR
- From Blaine MN (SLP HS)
- BSU - Chemistry and Biology Major
- UND - PhD in Biochemistry and Molecular Biology
- Three years at Vanderbilt in Nashville
- Howard Hughs Medical Institute
- Signal transduction - cancer research



What is Biochemistry ?

- Advanced organic chemistry?
- Cell biology?
- Molecular biology?
- The most fun and interesting subject in science (personal bias)!
- The study of life on a molecular level. Or, the formal term of bios = life meaning biochemistry is the science concerned with the chemistry of various molecules that occurs in living cells
- Biochemistry encompasses large areas of cell biology, molecular biology, and molecular genetics
- Biochemistry is essential to all of the life sciences (biomedical and plant sciences)
- All advanced degrees require that biochemistry is one of the first courses
- This class will be taught not - as an advanced organic but as an encompassing science that should help tie several of your classes together

Study Tips

- Do not cram, too much material and topics build on the next from the first day.
- Read the study tips
- Write an outline, ask yourself what does all of this mean in a few words

Test Tips

- The tests are multiple guess, short answer and essay
- DO NOT read the question and then look for an answer. Think of the answer and then find it. Looking for a likely answer will nearly always cause problems

Subjects covered this semester

- pH, buffers and amino acids, protein structure and function, enzymes and kinetics, carbohydrates, lipids and fats, metabolism biochemical source of diseases
- Real life and interesting examples

- Next semester: More metabolism, Diabetes, Cancer, Nutrition, Signal Transduction

... And now the fun begins

Review - Thermodynamic on pages 13 - 19.

Functional Groups - One of the reasons why organic chemistry is a prerequisite for the class

Just for review - know and be able to draw each of the structures in fig 1-2..

Also Know

Disulfide

Thioester

Anhydride (2 carboxylic acids)

Guanidino

Imidazole

Cellular Organization - comparison of prokaryotic and eukaryotic cells

	<u>Prokaryotes</u>	<u>Eukaryotes</u>
Organisms	Eubacteria, archabacteria	Animal, plants, fungi, yeast
Organization	Simple	Complex
Cell Size	Small 2 -5 μm	Large 10 - 100 μm
Membranous organelles	No	Many
Cytoskeleton	No	Yes
Peptidoglycan cell walls	Yes - helps with rigidity	No
Endo- and exocytosis	No	Yes yeast -> mammals
Chromosomes	Circular and few	Linear and many

Organelle:	Organelle Specialization
Nucleus	Function: Contains genetic material
Mitochondria	Aerobic energy metabolism
Endoplasmic reticulum	Synthesis of phospholipids; synth of membrane and secretory proteins
Golgi apparatus	Modification and sorting of proteins
Lysome	Intracellular digestion
Chloroplast	Photosynthesis