

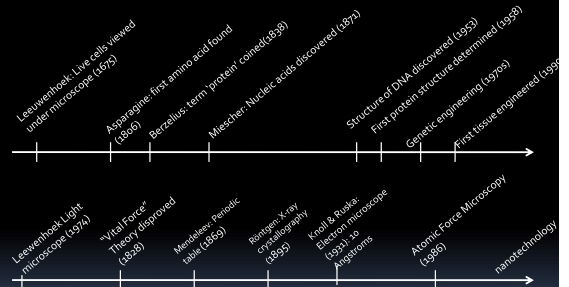
INTRODUCTION TO BIOPHYSICS: CLASS 1

Topics

- What is biophysics?
- History
- Biomolecules: polymers in biology

- Definition: applying physical concepts to biology
- Organisms are complex, but still obey the laws of physics and chemistry!
- We'll be talking about fields traditionally applied to engines, machines, and electronics, but applied to living things!

History Timeline



Discoveries in biology closely followed the invention of new technologies to visualize the components of living things!

Pg. 6, Biophysics Demystified

Timeline

- 1892: Karl Pearson: first coined the discipline "biophysics"
- "a branch of science...dealing with the application of the laws of inorganic phenomena...to the development of organic forms"
- 1943: Erwin Schrodinger: published "What is life? The Physical Aspects of the Living Cell"
 - 1946: King's College in London created the biophysics Department
 - 1953: Rosalind Franklin, Watson, and Crick discovered structure of DNA using X-ray diffraction

Pg. 4-6, "Biophysics Demystified"

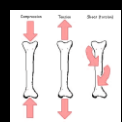
Subdivision of Biophysics by size

- Molecular and Subcellular Biophysics
- Physiological and Anatomical Biophysics
- Environmental Biophysics

Taken from "Biophysics Demystified", Daniel Goldfarb, 2011

Branches:

Tissue mechanics



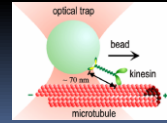
<http://dodges.washington.edu/bonebio/ASBMRed/mechanics.html>

Electrophysiology: recording electric current along cell membranes



http://www.bbc.co.uk/1/health/science/2006/06/060621_electrocardiogram.shtml

Sub-cellular biomechanics



<http://www.jhu.edu/~kinesin/>

Environmental biophysics: "energy and mass exchange between organisms & their environment"



<http://www.csbio.org/energyandmassexchange.html>

Subjects

- Chemistry
- Thermodynamics
- Statistical mechanics
- Biomechanics
- Electricity/Electrophysiology