

## BIOCHEMISTRY and GENETICS:

rvsd 27 Sept '96, 24 sept 99, 24 Sept 01, 27 Sept 02, 24 Sept 03, 21Sept07, 26Sept08, 24Sept09  
 BKH, 6<sup>th</sup>, p 4, 5, BKHB 7<sup>th</sup>: 5-13

**BIOCHEMISTRY:** Controversy of Vitalists versus mechanists:

	matter	natural laws	origins?	Heated?	spont. gen?
<b>Vitalists:</b>	organic qualitatively different from inorganic	involves "anima", different laws apply	Organic cannot be made from inorganic	inorganic melts organic cooks	No
<b>Mechanists:</b>	all matter the same	all laws of nature apply	interconvertable		Yes

**Friedrich Wohler** 1828 Showed organic urea, could be formed from inorganic ammonium cyanate (NH<sub>3</sub>OCN). Thus, laws of chem and phys apply to biology, **vitalism** incorrect.  
[http://upload.wikimedia.org/wikipedia/commons/8/8c/Wohler\\_synthesis.gif](http://upload.wikimedia.org/wikipedia/commons/8/8c/Wohler_synthesis.gif)

**Louis Pasteur** 1880s showed that yeast conducted fermentation of sugar to alcohol, not spont.

**Eduard Buchner** 1897 prepared yeast extracts (ferments) and conducted fermentation in vitro. Called the fermenting agents in extracts *enzymes*. "Central dogma, biochem"  
 Again, vitalism wrong, fermentation could occur outside living cells.

**Embden, Meyerhof, 1920s & 30s** Elucidation of biochemical glycolytic pathways by Germans:  
**Warburg and Krebs** Glycolysis = Embden-Meyerhof pathway, ATP recognized as energy storage molecule.

**Melvin Calvin,** 1940s-50s Pioneered use of radiotracer technology, elucidating dark reactions.

**Svedberg, The** 1925-30 Ultracentrifuge, in Sweden allowed cellular fractionation

**GENETICS:** (Will save most of this for Winter Quarter...)

**Gregor Mendel** 1866 studied peas, proposed  
 1. Paired hereditary factors which, during gametogenesis  
 2. segregate and  
 3. assort independently  
 Ignored for 35 years

**Friedrich Miescher** 1869 isolated DNA from salmon sperm and human pus. (75 yrs ahead of time)

**Walther Flemming** 1870s observed, named chromatin in thread-like structures in dividing cells, (later named **chromosomes** by Waldeyer-Hartz). He called the process **mitosis**.

**Wilhelm Roux** 1883 suggested that chromosomes might carry genetic information

**Correns, von Tschermak, & de Vries** 1900: all simultaneously rediscovered Mendel's work.

**Walter Sutton** 1903 proposed chromosome theory of heredity, linking Flemming's threads with Mendel's factors.

**Thomas Hunt Morgan** 1910-1920 used *Drosophila* to show Sutton correct.

**Robert Feulgen** 1914 developed stain for DNA, showed component in chromosomes, most thought could not be genetic material: composed of only four bases.

**Avery, MacLeod and McCarty** 1944 showed DNA could transform bacteria

**Hershey and Chase** 1952 phage inject DNA, not protein.

**James Watson, Francis Crick** 1953 elucidated the structure of DNA.