

BIOCHEMISTRY and GENETICS:

rvsd 27 Sept '96, 24 sept 99, 24 Sept 01, 27 Sept 02, 24 Sept 03, 21Sept07, 26Sept08, 24Sept10, 23Sept11
 BKH, 6th, p 4, 5, BKHB 7th: 5-13

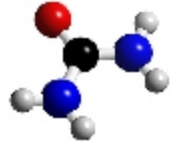


BIOCHEMISTRY: Controversy ov Vitalists versus mechanists:

Vitalist illustration:

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

Friedrich Wohler 1828 Showed urea, an organic molecule, could be formed from ammonium cyanate (NH₃OCN), an inorganic salt. Thus, laws of chemistry and physics apply to biology, **vitalism** incorrect at least on several points.

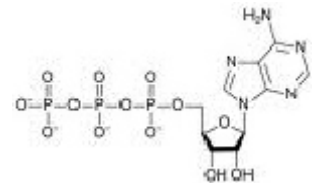


Louis Pasteur 1880s showed that fermentation not spontaneous, yeast turns sugar to alcohol.

Eduard Buchner 1897 prepared yeast extracts (ferments) and conducted fermentation *in vitro*. Agents in extracts causing fermentation called *enzymes*. Again, vitalism wrong, fermentation *could* occur outside living cells.

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

Melvin Calvin, 1940s-50s Pioneered use of radiotracer technology

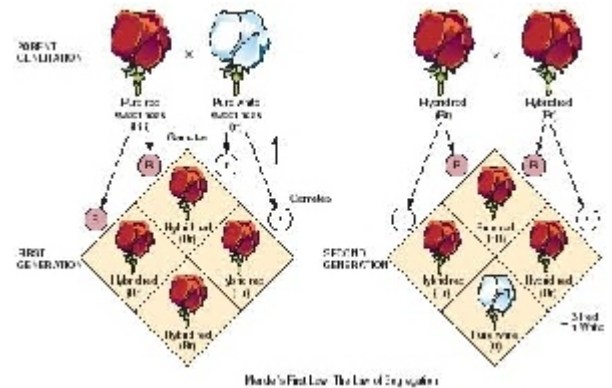


The Svedberg 1925-30 Ultracentrifuge, n allowed cellular fractionation

GENETICS:

Gregor Mendel 1866 studied peas, proposed

1. Paired hereditary factors which, during gametogenesis
 2. segregate and
 3. assort independently
- Unappreciated for 35 years



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

Walther Flemming 1870s observed thread-like structures in dividing cells, termed **chromosomes**, process **mitosis**.

Wilhelm Roux 1883 suggested chromosomes might carry genetic information

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

Walter Sutton 1903 proposed chromosome theory of heredity: *Flemming's threads* = *Mendel's factors*.



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

Robert Feulgen 1914 developed DNA stain, showed component in chromosomes, most thought couldn't be genetic material: possessed only 4 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.

