

### Lecture 31: Anaerobic Metabolism & Introduction to Genetics

#### Anaerobic Metabolism (Fermentation):

- Glycolysis contains one oxidation step that converts  $NAD^+$  to  $NADH$
- The  $NADH$  normally is converted back to  $NAD^+$  by electron transport.
- In the absence of oxygen, this cannot occur and the cell will become depleted of  $NAD^+$ .

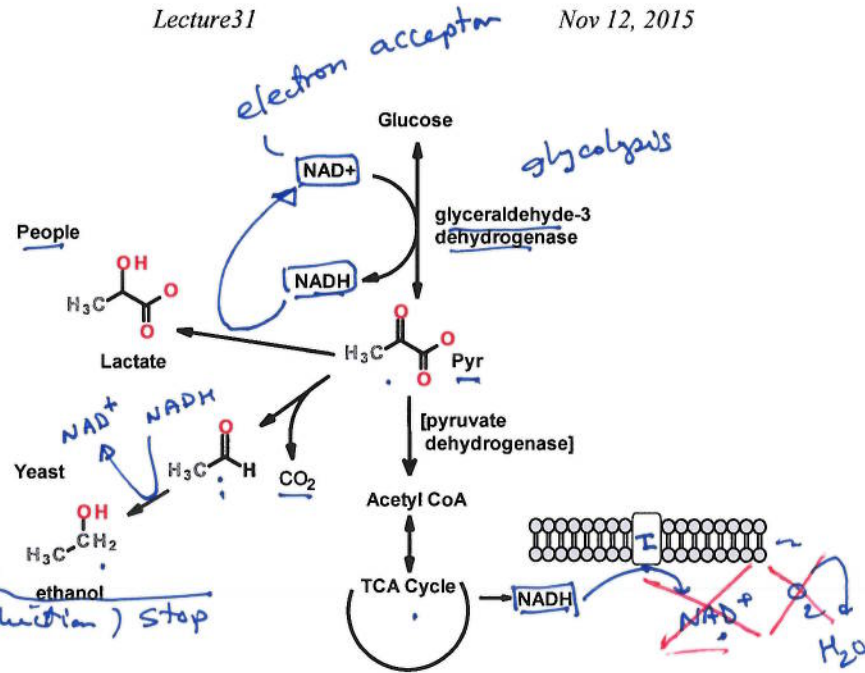
What will happen to glycolysis where there is no oxygen as an electron acceptor?

- deplete  $NAD^+$
- glycolysis (ATP production) stop

Humans:



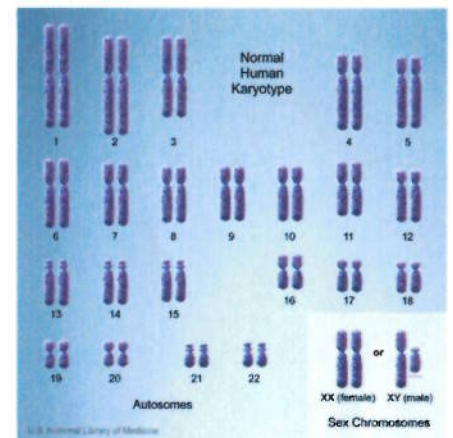
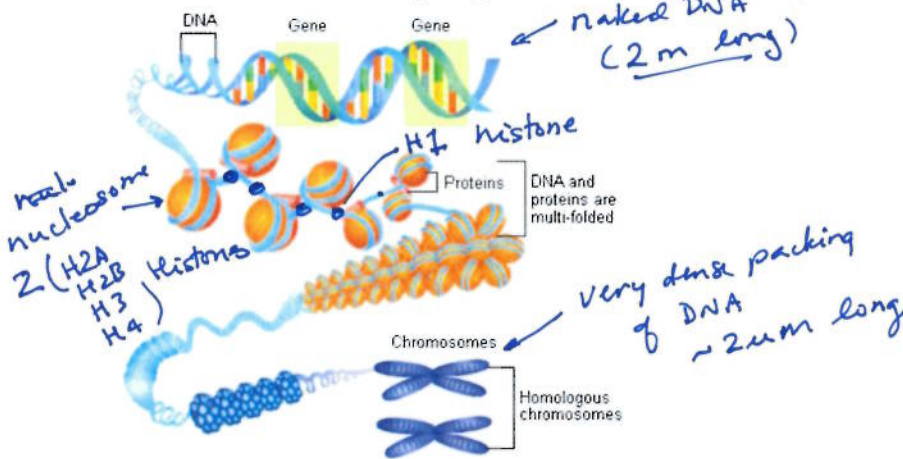
Yeast:



regenerate  $NAD^+$ , so it can act as electron acceptor in glycolysis

#### Introduction to Genetics - Eukaryotic Chromosome Structure.

- The linear DNA is condensed by wrapping around histones. 8 histones 2x(H2A, H2B, H3, H4) forming a nucleosome. H1 histone positions the DNA on the nucleosome.
- The nucleosomes associate to form a polymer, which are further packed into chromosomes.
- This allows a very long DNA strand to be packaged into a very small space.



**Telomere** – the end of a chromosome, repetitive sequence: TAGGGTTAGGGTTAGGG....

**Centromere** – structure at the center of a chromosome.

**Chromatid** – arms of the chromosome.

**Homologous chromosomes:** Two chromosomes that have the same organization of genes. One inherited from the mother, other from the father. There are usually differences between the genes (e.g. Hb and Hb<sup>s</sup> – normal and sickle cell Hb).

**Karyotype** - Appearance of the chromosomes in a cell.

**Autosomes** – non-sex chromosomes

**Diploid** – two copies of each autosome.

**Sex chromosomes** – male = xy, female = xx

