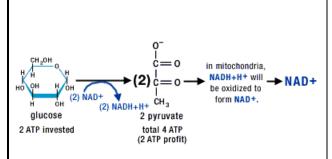
## Biology Lecture Notes

## The Fermentation of Pyruvate

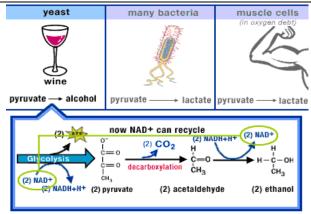
## >> Key Concepts:

- Review: In the process of glycolysis, a net profit of two ATP was produced, two NAD<sup>+</sup> were reduced to two NADH + H<sup>+</sup>, and glucose was split into two pyruvate molecules.
- When oxygen is not present, pyruvate will undergo a process called **fermentation**. In the process of fermentation the NADH + H<sup>+</sup> from glycolysis will be recycled back to NAD<sup>+</sup> so that glycolysis can continue.



In the process of glycolysis, NAD<sup>+</sup> is reduced to form NADH + H<sup>+</sup>. If NAD<sup>+</sup> is not present, glycolysis will not be able to continue. During aerobic respiration, the NADH formed in glycolysis will be oxidized to reform NAD<sup>+</sup> for use in glycolysis again.

When oxygen is not present or if an organism is not able to undergo aerobic respiration, pyruvate will undergo a process called **fermentation**. Fermentation does not require oxygen and is therefore anaerobic. Fermentation will replenish NAD<sup>+</sup> from the NADH + H<sup>+</sup> produced in glycolysis.



One type of fermentation is **alcohol fermentation**. First, pyruvate is decarboxylated (CO<sub>2</sub> leaves) to form acetaldehyde. Hydrogen atoms from NADH + H<sup>+</sup> are then used to help convert acetaldehyde to ethanol. NAD<sup>+</sup> results.

**Facultative anaerobes** are organisms that can undergo fermentation when deprived of oxygen. Yeast is one example of a facultative anaerobe that will undergo alcohol fermentation.

Some organisms, such as some bacteria, will undergo **lactate fermentation**. Two pyruvates are converted to two lactic acid molecules, which ionize to form lactate. In this process two NADH + H<sup>+</sup> are converted to two NAD<sup>+</sup>.

Our muscle cells can undergo this process when they are in oxygen debt. If enough oxygen is not present to undergo aerobic respiration, pyruvate will undergo lactic acid fermentation.

