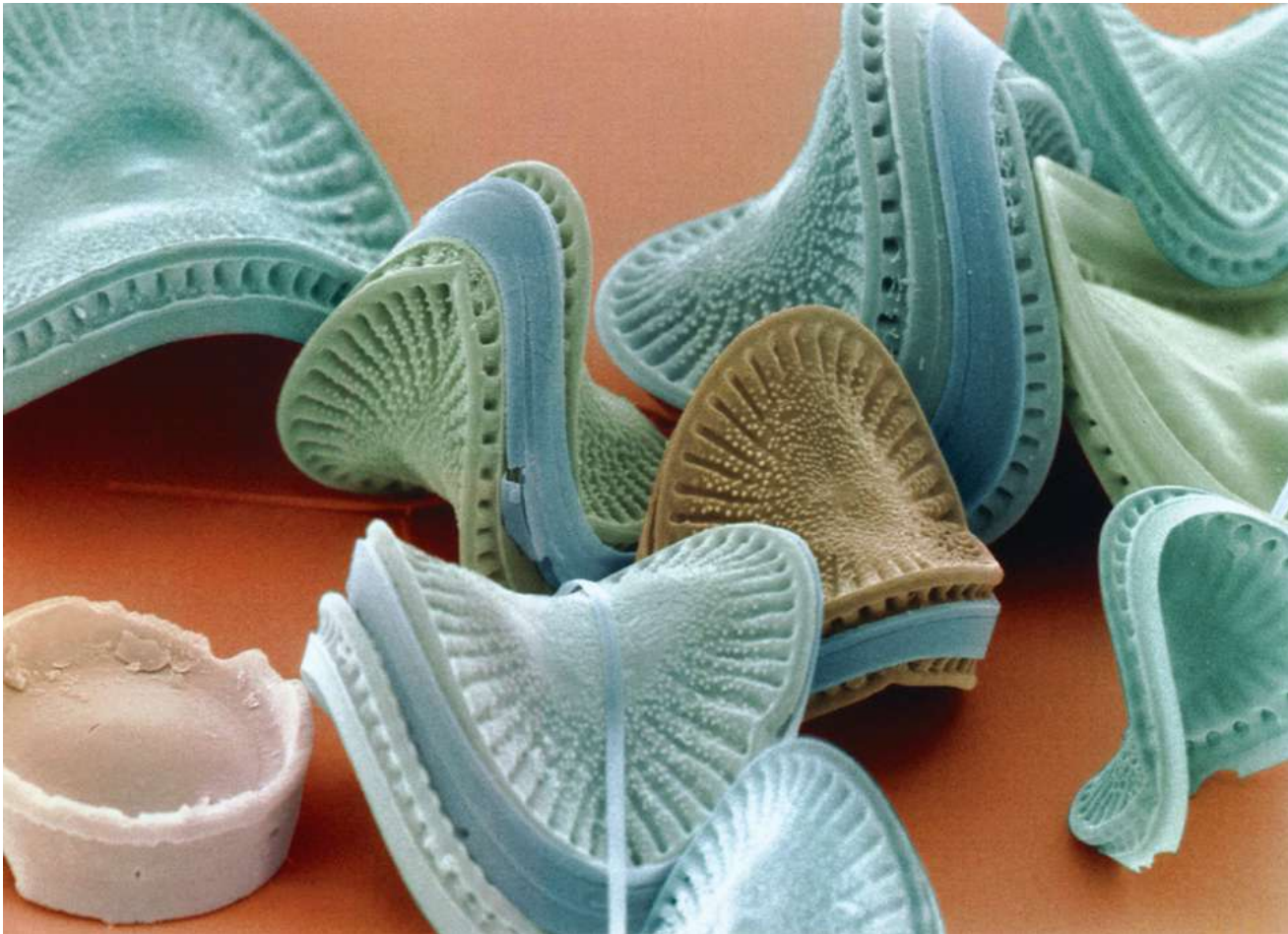


4.6 Fermentation

KEY CONCEPT

Fermentation allows the production of a small amount of **ATP** without oxygen.



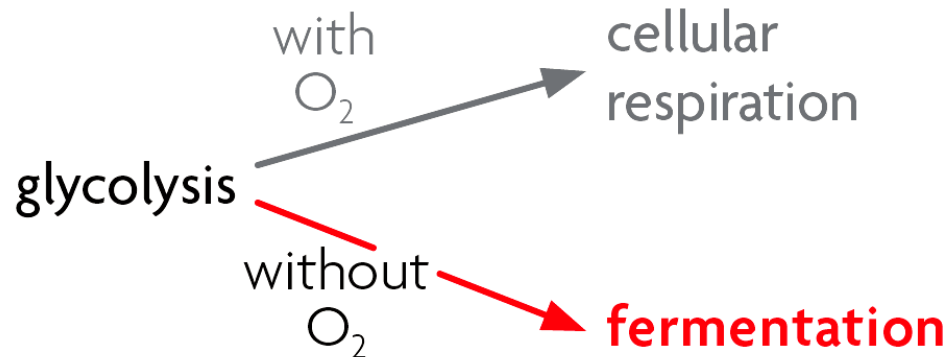
4.6 Fermentation

Fermentation allows glycolysis to continue.

Fermentation allows glycolysis to continue making ATP when oxygen is unavailable.

- Fermentation is an **anaerobic** process.
 - occurs when **oxygen is not available** for cellular respiration
 - **does not produce ATP**

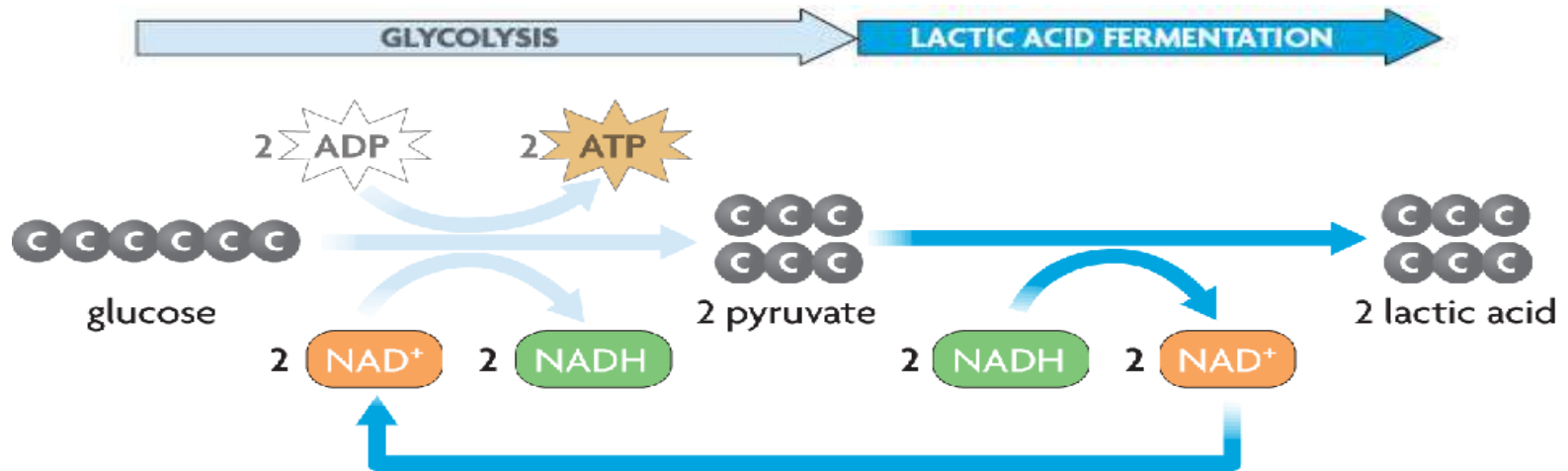
Fermentation is an anaerobic process that allows glycolysis to continue.



4.6 Fermentation

- Fermentation allows glycolysis to continue making ATP when oxygen is unavailable.

NAD^+ is recycled to glycolysis



4.6 Fermentation

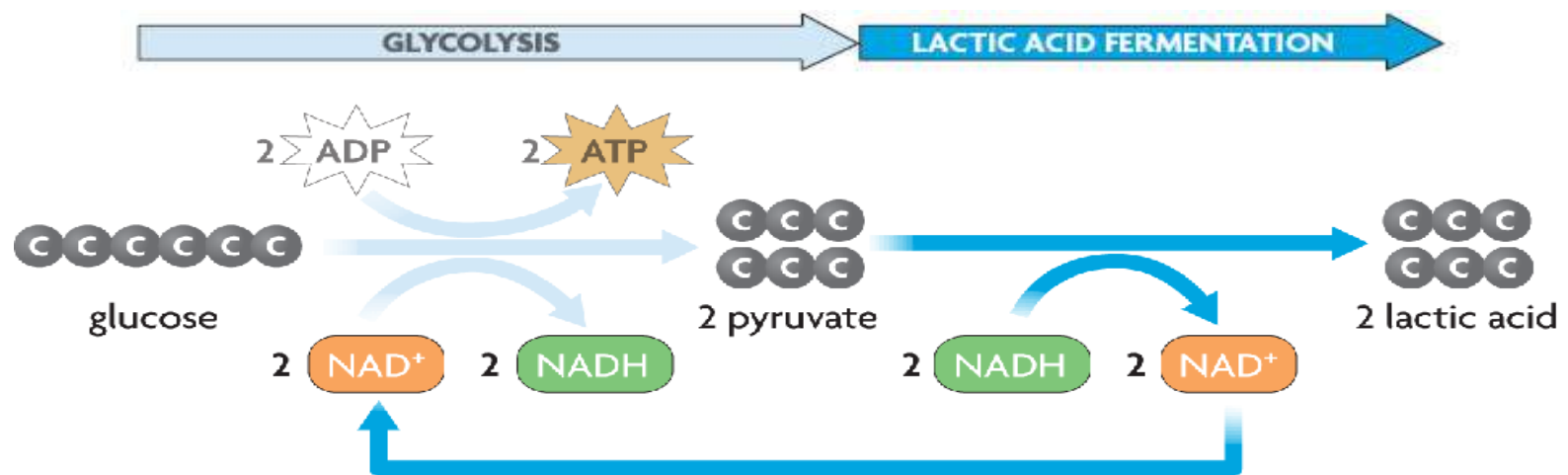
There are 2 types of fermentation

- Named for the products produced
 - Lactic acid fermentation
 - Alcoholic fermentation

4.6 Fermentation

Lactic acid fermentation occurs in muscle cells.

glycolysis splits glucose into two pyruvate molecules
pyruvate and NADH enter fermentation
energy from NADH converts pyruvate into lactic acid
NADH is changed back into NAD^+



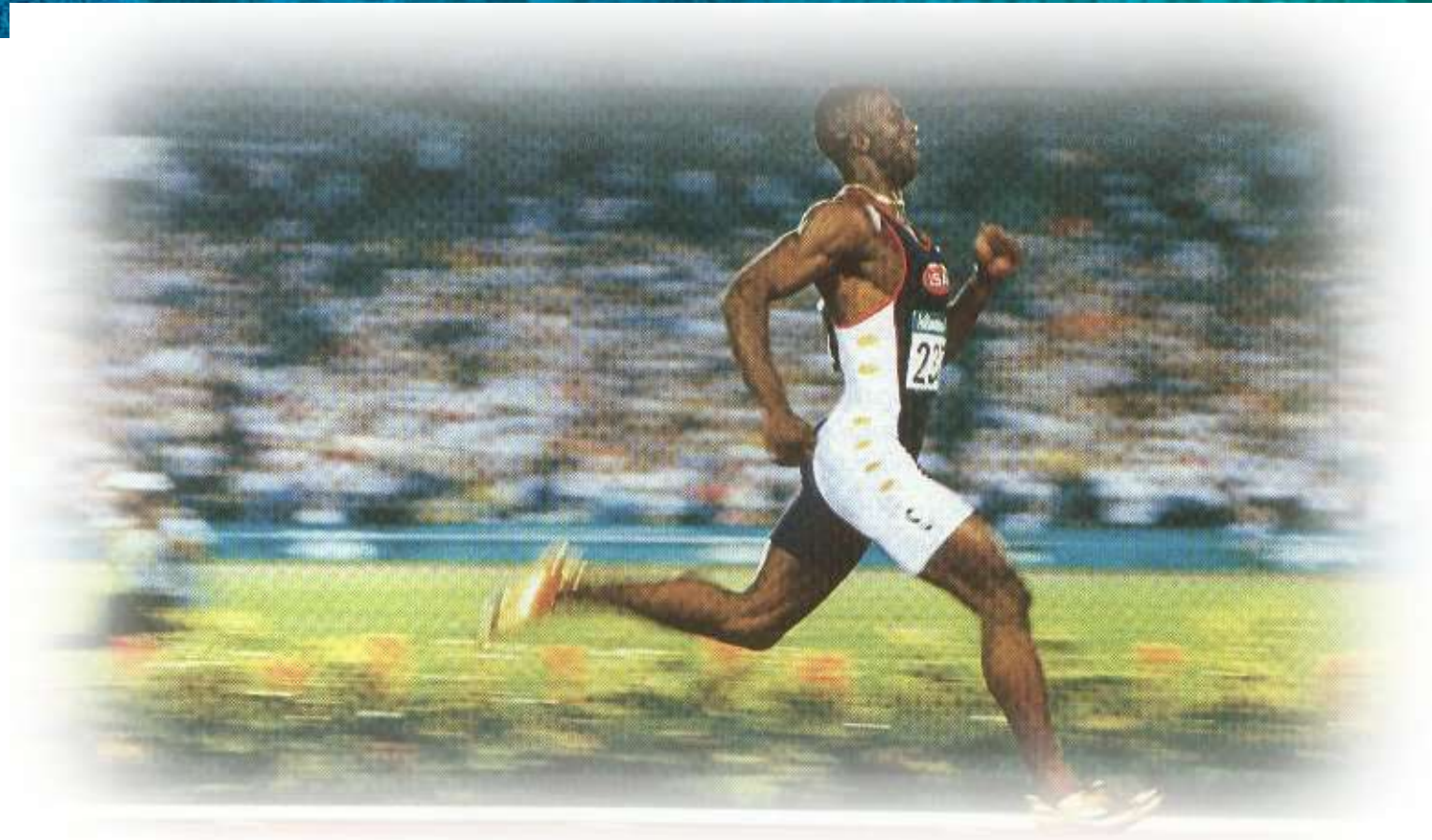
4.6 Fermentation

Energy and Exercise

Quick Energy

1. Cells contain only enough ATP for a few seconds of intense activity
2. Then cells rely on lactic acid fermentation (can supply for about 90 seconds)
3. Lactic acid build-up causes burning in muscles. Only way to get rid of lactic acid is chemical pathway that requires oxygen (why you breathe heavy after heavy exercise.)

4.6 Fermentation



Build up of lactic acid in muscles cause
burning sensation

4.6 Fermentation

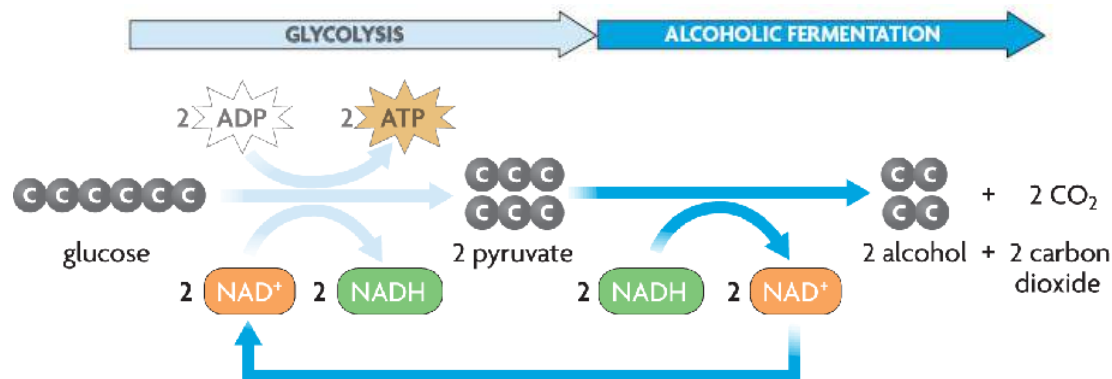
Fermentation and its products are important in several ways.

- Alcoholic fermentation is similar to lactic acid fermentation.
 - glycolysis splits glucose and the products enter fermentation

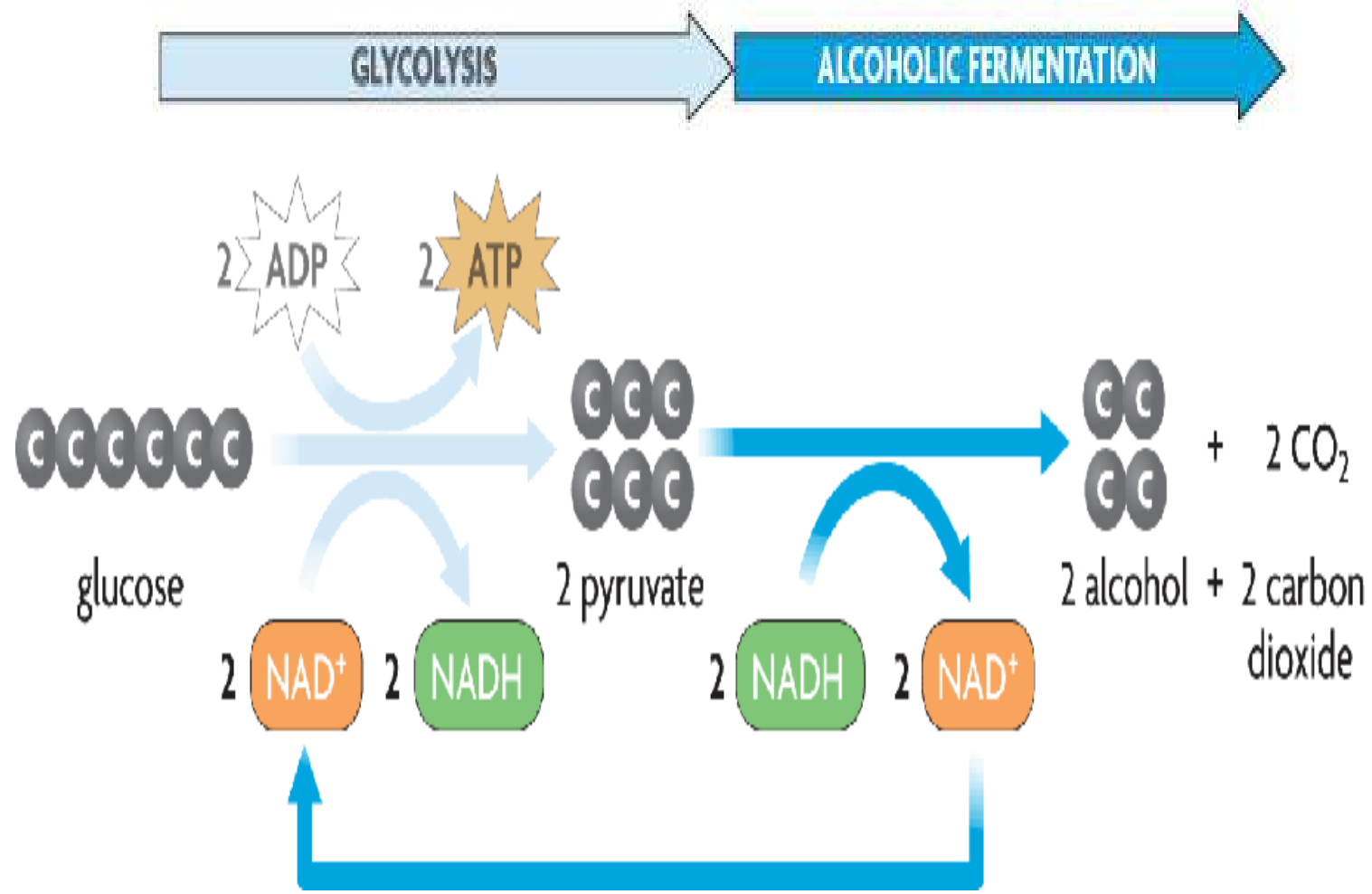
energy from NADH is used to split pyruvate into an alcohol and carbon dioxide

NADH is changed back into NAD⁺

NAD⁺ is recycled to glycolysis



4.6 Fermentation



4.6 Fermentation

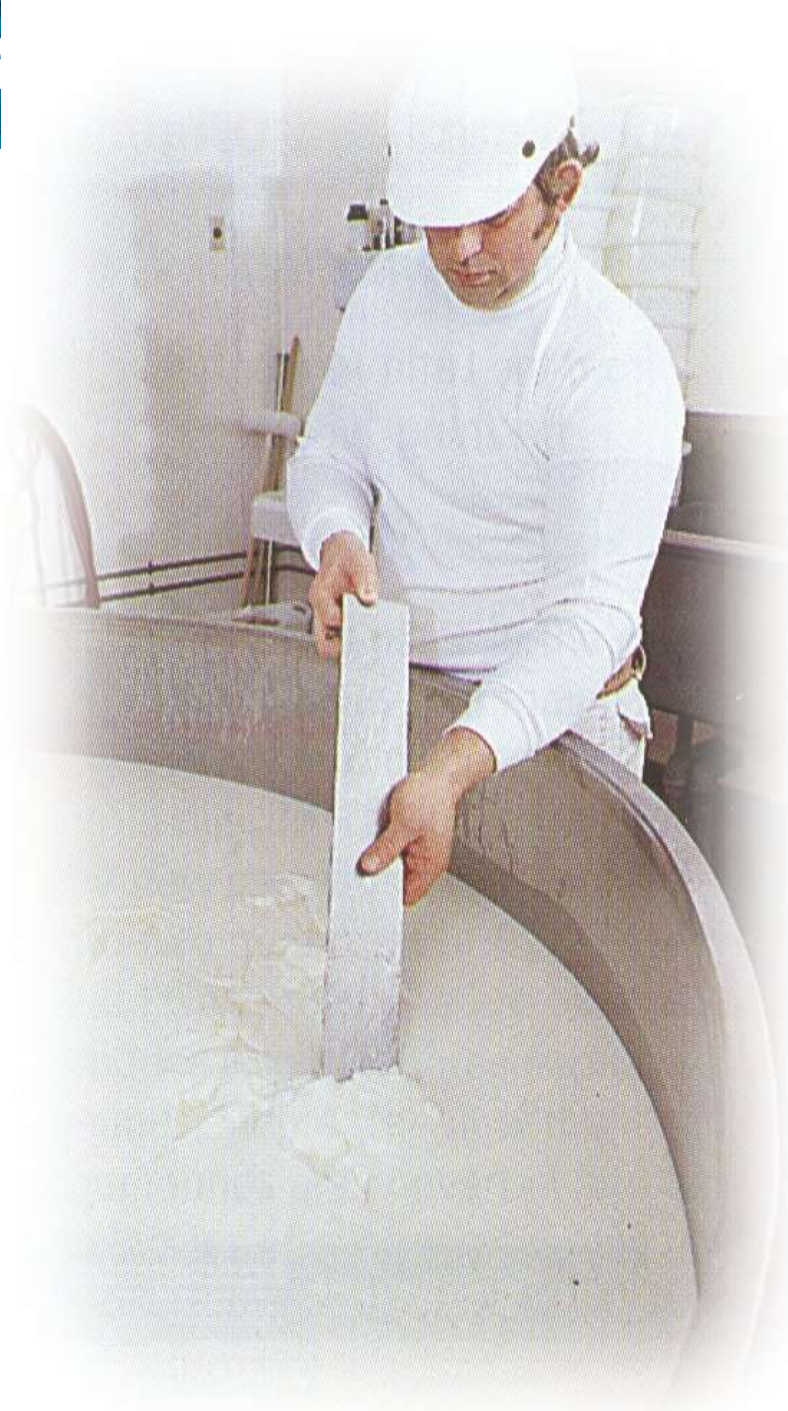
- Yeast do alcoholic fermentation
- Fermentation is used in food production.

yogurt

cheese

bread





In cheese making, fungi or bacteria are added to large vats of milk. The microorganisms carry out lactic acid fermentation, converting some of the sugar in the milk to lactic acid.