

## Cell Processes and Energy ▪ Enrich

## History of Fermentation

People have known about and used fermentation for thousands of years. But it has been only in the past two hundred years that scientists have come to understand this important process. In 1854, the French chemist Louis Pasteur determined that fermentation is caused by yeast. His work was influenced by the earlier work of Theodor Schwann, the German scientist who helped develop the cell theory. Around 1840, Schwann concluded that fermentation is the result of processes that occur in living things. In 1907, a German chemist named Eduard Buchner received the Nobel prize for showing that enzymes in yeast cells cause fermentation. About two decades later, two other scientists determined exactly how enzymes cause fermentation. Their names are Arthur Harden and Hans Euler-Chelpin, and they won the Nobel prize for their work in 1929. By the 1940s, technology was developed to use fermentation to produce antibiotics.

Why is understanding fermentation so important that it has led to the awarding of Nobel prizes? Fermentation is a very useful process. Today it is used to produce industrial chemicals, medicines such as antibiotics, and alcoholic beverages, as well as to make bread rise and to preserve many types of food. Some of these uses have been known for thousands of years. For example, the Chinese used fermented soybean curd to treat skin infections 3,000 years ago, and they started using fermented tea to treat a variety of illnesses as early as 220 B.C. The use of fermentation to make bread rise and to produce alcoholic beverages is as old as the development of agriculture itself, which most scholars date to about 8000 B.C.

*Answer the following questions on a separate sheet of paper.*

1. Use the information provided in the passage above to make a timeline of the history of fermentation.
2. What contribution did Louis Pasteur make to the understanding of the process of fermentation?
3. What are two of the oldest uses of fermentation?
4. How is fermentation used in medicine today?