

# *Biology Laboratory Manual 11th Edition Vodopich Solutions Manual*

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## ***Exercise 12***

### **RESPIRATION: AEROBIC AND ANAEROBIC OXIDATION OF ORGANIC MOLECULES**

This lab stresses the various reactions collectively termed respiration. Compare and contrast photosynthesis and respiration, and stress the significance of releasing energy in an efficient way that allows for its biological utilization. Also note that respiration is a defined sequence of complex reactions, and discuss the significance of aerobic vs. anaerobic respiration.

#### **SUGGESTED ELEMENTS FOR AN INTRODUCTORY LECTURE**

- Cellular respiration is the breaking of carbon bonds and the capture and storage of the released energy. This energy is stored primarily in the terminal phosphate bond of ATP and the high-energy electron carrier NADH.
- Reactions of glycolysis and the Krebs's cycle break carbon bonds and produce ATP and NADH as a cell's primary energy "currency."
- Fermentation uses NADH to reduce pyruvate and therefore regenerate NAD and recycle it to glycolysis reactions. Fermentation generates energy in the absence of oxygen.
- In the presence of oxygen NADH and FADH passes high-energy electrons to the Electron Transport System which generates ATP and H<sub>2</sub>O.
- Aerobic organisms require oxygen to accept the electrons that have passed through the ETS and whose energy was sapped to phosphorylate ADP during the ETS.
- Anaerobes do not require oxygen. However, they can only produce small amounts of ATP (from glycolysis) because they cannot conduct the Krebs's Cycle and ETS in order to break all of the carbon bonds in a glucose molecule.
- Pyruvate is the final product of glycolysis. Fermentation is an anaerobic process that converts pyruvate to carbon dioxide and ethanol, or to lactic acid.

# Biology Laboratory 11th Edition Answers

**LL Leslie**



## **Biology Laboratory 11th Edition Answers:**

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