



How Cells Release Chemical Energy

Chapter 7

Learning Objectives:

1. What is the relationship between cellular respiration and breathing?
2. List the balanced chemical equation that summarizes the complete oxidation (aerobic breakdown) of glucose.
3. List and describe the major characteristics of the 4 subpathways in the oxidation of glucose (Where do they occur in the cells, what goes in, what comes out, are the steps aerobic or anaerobic, and what is the net production of ATP?)
4. List and describe the roles of coenzymes used in the respiratory pathway (NAD, FAD, CoA).
5. Describe how a concentration gradient is used to generate ATP in mitochondria, and compare this process with the function of chloroplasts.
6. What is fermentation and what are the possible products (for animal cells and yeast)? How is fermentation accomplished, and why is it performed?
7. List the food molecules that may be oxidized for energy (using the same metabolic machinery) if glucose is not available. Describe, in general terms, how this happens.

Producing ATP: the Universal Currency of Life

All energy-releasing pathways...

- require characteristic starting materials
 - Including unstable molecules, and in some cases ATP itself!
- yield predictable products and by-products
 - These chemical reactions are organized by _____.
- yield a net production of ATP

*What food molecule is your
'best' source of chemical
energy? Why?*

