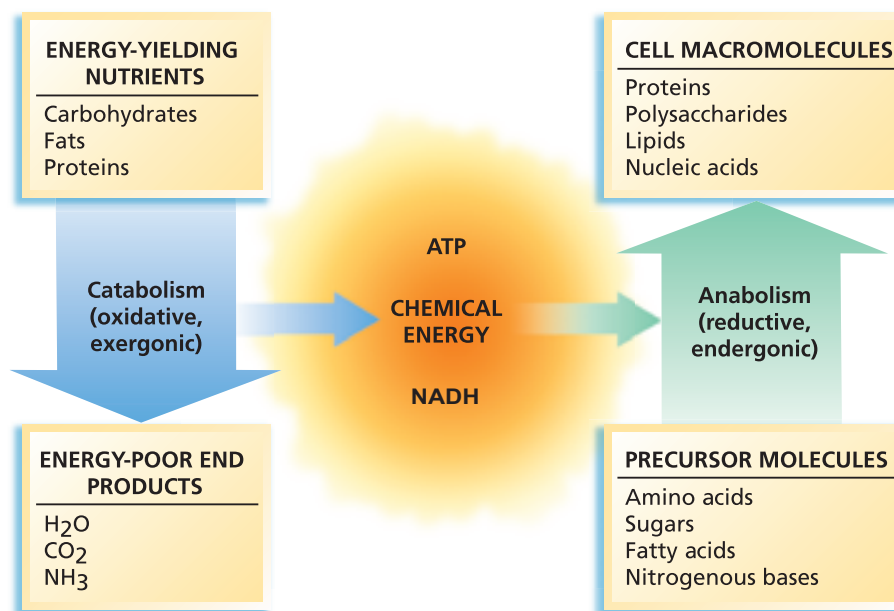


FIGURE 19 Catabolic pathways release free energy in the form of ATP and NADH. Anabolic pathways consume energy released by catabolic pathways.



Catabolism

The energy that your body needs to maintain its temperature and drive its biochemical reactions is provided through *catabolic* processes. **Figure 19** illustrates the relationship between the pathways of catabolism and anabolism. **Catabolism** is the part of metabolism in which complex compounds break down into simpler ones and is accompanied by the release of energy. First, enzymes break down the complex compounds in food—carbohydrates, fats, and proteins—into simpler molecules.

Carbohydrate digestion begins in the mouth, where the enzyme *amylase* in saliva begins to break down polysaccharides. The food then passes through the esophagus, then the stomach, and into the small intestine. Here, additional enzymes are secreted to complete the hydrolysis of carbohydrates to form glucose and other monosaccharides.

Digestion of fats occurs only in the small intestine. Protein digestion begins in the stomach and is completed in the small intestine. During the digestion of both fats and proteins, complex molecules hydrolyze into simpler ones. Fats are broken down into fatty acids and glycerol. Proteins are broken down into amino acids.

These products are absorbed across the wall of the small intestine into the blood and are transported to cells. Once in the cells, each glucose molecule is broken down through glycolysis into two molecules of pyruvate, which enter the mitochondria and feed into a complex series of reactions called the *citric acid cycle*, or *Krebs cycle*. The citric acid cycle produces carbon dioxide and other molecules, such as NADH and ATP. This NADH and ATP then move through another set of reactions to produce more ATP and water.

