

- The next two steps, the Krebs cycle and the electron transport chain, occur in the mitochondria. Both are aerobic respiration.
- Aerobic respiration generates thirty-six molecules of usable ATP per molecule of glucose metabolized.
- The structure of mitochondria is specialized to perform aerobic respiration efficiently.
- Mitochondria use the proton motive force to drive the enzymes which make ATP, called **ATP-synthase**.
- Oxygen is consumed and carbon dioxide is produced during aerobic respiration.
- Anaerobic respiration occurs in the cytoplasm and generates two molecules of usable ATP per molecule of glucose metabolized.

## 8.20 DEFINITIONS

### acetyl Co-A

A co-enzyme that carries the carbon atoms of pyruvate through the Krebs cycle, during which the bonds of pyruvate are broken and ATP, NADH, and FADH<sub>2</sub> are produced.

### acetyl group

The two-carbon molecule made from pyruvate during pyruvic acid oxidation (the transition reaction).

### ADP (adenosine diphosphate)

Two phosphate groups linked to an adenosine molecule. Converted by ATP-ase into ATP by the linking of another phosphate group onto ADP.

### aerobic respiration

The biological process in which ATP is made from glucose, using oxygen as the final electron acceptor.

### anaerobic respiration

The biological process in which ATP is made from glucose without oxygen. Oxygen does not serve as the final electron acceptor.

### ATP synthase

The enzyme that makes ATP from ADP.

### chemiosmosis

The process of the hydrogen flowing across the cristae and driving ATP synthase.

### citric acid cycle (or tricarboxylic acid cycle)

Other names for the Krebs cycle.

### co-enzyme A

The coenzyme that carries carbon molecules from pyruvate through the Krebs cycle.

### FAD

Flavin Adenine Dinucleotide, an energy capturing coenzyme. It captures energy in the form of electrons; an electron carrier.

### fermentation

Anaerobic respiration.

### glycolysis

The initial step in the metabolism of glucose in which glucose is broken into two pyruvate molecules.

### inner membrane

Refers to the inner membrane of mitochondria. It contains the molecules which produce most of the ATP.