What is the Krebs Cycle?

The Krebs cycle, also known as the tricarboxylic acid cycle (TCA), was first recognized in 1937 by the man for whom it is named, German biochemist, Hans Adolph Krebs. His highly detailed and extensive research in the field of cellular metabolism and other scientific endeavors gleaned him the Nobel Prize for Physiology or Medicine in 1953. In short, the Krebs cycle constitutes the discovery of the major source of energy in all living organisms.

The Krebs cycle refers specifically to a complex series of chemical reactions in all cells that utilize oxygen as part of their respiration process. This includes those cells of creatures from the higher animal kingdom, such as humans. The Krebs cycle produces carbon dioxide and a compound rich in energy, Adenosine triphosphate (ATP). This chemical provides cells with the energy required for the synthesis of proteins from amino acids and the replication of deoxyribonucleic acid (DNA).

Within the Krebs cycle, energy in the form of ATP is usually derived from the breakdown of glucose, although fats and proteins can also be utilized as energy sources. Since glucose can pass through cell membranes, it transports energy from one part of the body to another.

The Krebs cycle affects all types of life and is, as such, the metabolic pathway within the cells, which chemically converts carbohydrates, fats and proteins into carbon dioxide and converts water into serviceable energy.

The Krebs cycle concerns the second of three major stages every living cell must undergo in order to produce energy, which it needs in order to survive. The enzymes that cause each step of the process to occur are all located in the cell's "power plant." In animals this is the mitochondria, in plants it is the chloroplasts, and in microorganisms it can be found in the cell membrane.

The Krebs cycle is also known as the citric acid cycle because citric acid is the very first product generated by this sequence of chemical conversions.

CoA

Acetyl CoA
2C

Oxal
4C

NADH

NAD+

Citrate
6C

6C

NAD+

NADH

5C

CO_2

CoA

4C

4C

NAD+

NADH

FADH$_2$

4C

4C

Succinate

Succinyl CoA

CO_2

FAD+

ATP

ADP+P$_i$

Krebs Cycle
(Citric Acid Cycle)