Biosynthesis Encyclopedia Article

Biosynthesis

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Biosynthesis

Biosynthesis is a process by which organisms create biologically important, complex molecules from simpler ones. This process involves chemical reactions which generally require an input of energy. Thus these reactions are called endergonic.

Within an organism biosynthesis, or anabolism, is a part of the cell's overall metabolism. It is used to produce a variety of materials. To make energy storing molecules, monosaccharides are biosynthetically polymerized into polysaccharides. For example, the process of gluconeogenesis converts a simple molecule, pyruvate, into glucose. This glucose may be further reacted through glycogenesis to produce glycogen. Another example of biosynthesis is protein synthesis. In this reaction large polymers are created from smaller amino acids. These proteins play a variety of essential roles in cell function. Certain amino acids are also produced biosynthetically. In addition to energy storage and protein synthesis, biosynthesis is also used in DNA synthesis. This process involves the production of nucleic acids from nucleotides.

To drive biosynthetic reactions enzymes are often required. These molecules act as catalysts to speed up reactions, and they do this by reducing the activation energy needed to drive reactions. In addition, cofactors such as vitamins and coenzymes may aid in catalytic activity.

Biosynthesis has become an important new industrial technology. Various products are made through biosynthetic processes including antibiotics, drugs, and food products. These processes typically involve isolating a desired microorganism, fueling its growth in a large container, and refining and isolating the final product. However, our knowledge about biosynthetic processes remains incomplete and new advances are discovered frequently. In the future, these advances will be used by industry to produce more useful products.