Research & Reviews: Research Journal of Biology ISSN: 2322-0066

Different Metabolic Pathways and Their Role in Carbohydrate Metabolism

Tarun Krishna*

Department of Biotechnology, Annamalai University, Chidambaram, Tamil Nadu, India

Commentary

Received: 23-May-2023, Manuscript No. JOB-23- 99684; **Editor assigned:** 25-May-2023, Pre QC No. JOB-23- 99684 (PQ); **Reviewed:** 12-Jun-2023, QC No. JOB-23- 99684; **Revised:** 15-Jun-2023, Manuscript No. JOB-23-99684 (R); **Published:** 22-Jun-2023, DOI: 10.4172/2322-0066.11.2.008

***For Correspondence:**
Tarun Krishna, Department of Biotechnology, Annamalai University, Chidambaram, Tamil Nadu, India
E-mail: krishnat468@gmail.com

Citation: Krishna T. Different Metabolic Pathways and Their Role in Carbohydrate Metabolism. RRJ Biol. 2023;11:008

ABOUT THE STUDY

The entire collection of biochemical procedures involved in the metabolic synthesis, disintegration, and interconversion of carbohydrates in living things is known as carbohydrate metabolism. Many important metabolic pathways depend on carbohydrates. Through the process of photosynthesis, plants create carbohydrates from carbon dioxide and water, which enables them to internally store solar energy. Cellular respiration is a process that occurs when animals and fungi consume plants to release energy into the cells. For utilization in numerous cellular activities, both plants and animals temporarily store the released energy in the form of high-energy molecules like Adenosine Triphosphate (ATP). The several types of carbohydrates that humans can eat are broken down by digestion into simple monomers like glucose, fructose, mannose, and galactose.

Glycolysis

The process of glycolysis involves splitting a glucose molecule into two pyruvate molecules and storing the energy produced as Nicotinamide Adenine Dinucleotide (NADH) and Adenosine Triphosphate (ATP). Glycolysis is used by almost all species that metabolise glucose. The two main ways in which these pathways vary between organisms are in how glucose is regulated and how products are used. Glycolysis is the only way for some tissues and organisms to produce energy. Both anaerobic and aerobic respiration use this route.

Gluconeogenesis

Gluconeogenesis (GNG) is a metabolic mechanism that generates glucose from specific carbon sources other than carbohydrates. All living organisms, including fungi, bacteria, and other microbes, go through this fundamental process. In vertebrates, the liver and, to a lesser extent, the kidney cortex are where gluconeogenesis primarily takes place. It is one of the two main mechanisms used by humans and many other animals to regulate blood sugar levels and prevent low levels (hypoglycemia). The second mechanism is the breakdown of glycogen (glycogenolysis). Ruminants experience gluconeogenesis regardless of fasting, low-carb meals, activity, etc. because rumen organisms have a propensity to break down dietary carbohydrates. When they fast, starve, consume foods low in carbohydrates, or exercise a lot, many other animals experience the same thing.

Glycogenesis

The process of creating glycogen is known as glycogenesis. This is how glucose is turned to glycogen in humans. Glycogen is a highly branching structure made up of the core protein Glycogenin, which is encircled by branches of connected glucose molecules. Glycogen is more soluble because of its branching, which also makes more glucose molecules available for simultaneous breakdown. Main sites of glycogenesis include the kidney, skeletal muscles, and liver. Like most synthetic processes, the glycogenesis pathway uses energy since each glucose molecule requires the use of an ATP and a UTP.

Hormonal regulation

The pancreas secretes hormones that control how glucose is metabolised throughout the body. The main hormones responsible for regulating the blood's level of glucose are insulin and glucagon, and the availability of nutrients affects how much of each is released at any given time. The amount of glucose that cells break down depends on both the amount of insulin released in the circulation and the sensitivity of the cells to the insulin. The enzymes that catalyse glycogenolysis are activated by increased glucagon levels, while the enzymes that catalyse glycogenesis are inhibited. In contrast, when blood insulin levels are high, glycogenolysis is blocked and glycogenesis is boosted.