Journal of Biochemistry and Cell Biology

Book Review Open Access

An effective study on Protein breakdown during Glycolysis and Krebs's Cycle

Ian Migwan*

Beijing Advanced Innovation Center for Food Nutrition and Human Health, Beijing Engineering and Technology Research Center of Food Additives, National Soybean Processing Industry Technology Innovation Center, Beijing 100048, China

Abstract

A crucial metabolic pathway in the mitochondria of eukaryotic cells is the Krebs cycle, also known as the citric acid cycle or the tricarboxylic acid cycle. The acetyl-CoA molecules produced by the breakdown of proteins, carbohydrates, and fats are further metabolized during this cycle to produce ATP, which is the energy source. In this article, we will zero in on the breakdown of proteins during the Krebs cycle. Amino acids make up the complex macromolecules known as proteins, which are necessary for the development and upkeep of the body's tissues. Proteins must be broken down into their individual amino acid components for the body to use them as a source of energy. Protein catabolism is the name given to this process. Enzymes in the stomach and small intestine break down dietary proteins into smaller peptide chains and individual amino acids, which is where protein catabolism begins. After that, these amino acids are brought to the liver, where they undergo additional processing and may enter the Krebs cycle [1, 2].

Introduction

In the Krebs cycle, the first step in the breakdown of amino acids is to remove the amino group from the amino acid. Deamination is the process that results in the production of keto acid and ammonia (NH3). The liver converts the ammonia into urea, which is then excreted in the urine. The leftover keto corrosive can then be changed over into an acetyl-CoA particle or one of the Krebs cycle intermediates, contingent upon the particular amino corrosive [3]. The amino acid alanine, for instance, can undergo transformation into pyruvate, which can then undergo transformation into acetyl-CoA and enter the Krebs cycle. Alpha-ketoglutarate, another intermediate in the Krebs cycle, can also be produced from the amino acid glutamate. Through the electron transport chain, the amino acids can be metabolized to generate ATP after being converted into acetyl-CoA or Krebs cycle intermediates. A variety of cellular processes, including muscle contraction, cell division, and protein synthesis, are powered by the energy generated by this process [4, 5].

Discussion

Glycolysis is a metabolic cycle that happens in the cytoplasm of cells, where glucose is separated into pyruvate through a progression of enzymatic responses. Because it produces ATP, the cell's energy currency, glycolysis is essential to the production of energy in cells. However, glycolysis also plays a crucial role in the breakdown of proteins, in addition to ATP. Because it is necessary for the recycling of amino acids, which are the building blocks of proteins, protein breakdown is an important process that takes place in cells. Proteins are broken down into their individual amino acids during glycolysis, which can then be used to make new proteins or other molecules the cell needs [6]. During glycolysis, a number of steps are taken to break down proteins. The hydrolysis of proteins into their individual amino acids is the first step. Proteases are enzymes that break down proteins by severing the peptide bonds that connect amino acids. They carry out this process. The glycolytic pathway can utilize the proteins once they are transported into the cytoplasm and broken down into their individual amino acids [7, 8]. Depending on their structure, the amino acids produced during protein breakdown can enter the glycolytic pathway at a variety of points. Some amino acids, like glucose-6-phosphate and fructose-6-phosphate, can be converted into the end product of glycolysis, pyruvate, while others can enter the pathway earlier in the process. There are a number of significant implications for cellular metabolism from the breakdown of proteins during glycolysis. First, it makes it possible for cells to recycle amino acids, which are necessary for making new proteins. Cells can ensure that they have a sufficient supply of amino acids to support protein synthesis by breaking down existing proteins. Moreover, the breakdown of proteins during glycolysis can likewise give an elective wellspring of energy for cells. While glucose is the primary substrate for glycolysis, the pathway can also generate energy from other molecules, such as amino acids. Cells are able to adapt to changing conditions like fasting or starvation, when glucose may not be readily available, thanks to this [9, 10].

Conclusion

The Krebs cycle is a crucial metabolic pathway that enables the body to break down and use proteins as a source of energy. This concludes the discussion. Through a progression of intricate biochemical responses, amino acids are changed over into acetyl-CoA and Krebs cycle intermediates, which are then used to create ATP. For an understanding of the role that nutrition plays in overall health and wellbeing, it is essential to comprehend the breakdown of proteins during the Krebs cycle. During glycolysis, proteins are broken down, which is a crucial step in the metabolism of cells. Cells can recycle amino acids and provide a different source of energy for the glycolytic pathway by breaking down existing proteins. In order to guarantee that cells have a consistent supply of energy and the building blocks necessary for protein synthesis, this process is tightly regulated and coordinated with other metabolic pathways.

***Corresponding author:** Ian Migwan, Beijing Advanced Innovation Center for Food Nutrition and Human Health, Beijing Engineering and Technology Research Center of Food Additives, National Soybean Processing Industry Technology Innovation Center, Beijing 100048, China, E-mail: IanMigwan@gmail.com

Received: 02-Mar-2023, Manuscript No. jbcb-23-91645; **Editor assigned:** 06-Mar-2023, PreQC No. jbcb-23-91645 (PQ); **Reviewed:** 20-Mar-2023, QC No. jbcb-23-91645; **Revised:** 27-Mar-2023, Manuscript No. jbcb-23-91645 (R); **Published:** 30-Mar-2023, DOI: 10.4172/jbcb.1000177

Citation: Migwan I (2023) An effective study on Protein breakdown during Glycolysis and Krebs's Cycle. J Biochem Cell Biol, 6: 177.

References

1. Uitterlinden EJ, Jahr H, Koevoet JL, Bierma-Zeinstra SM, Verhaar JA, et al. (2007) Glucosamine reduces anabolic as well as catabolic processes in bovine chondrocytes cultured in alginate. Osteoarthritis Cartilage 15: 1267-74.
2. Jones IA, Togashi R, Wilson ML, Heckmann N, Vangsness CT Jr, et al. (2019) Intra-articular treatment options for knee osteoarthritis. Nat Rev Rheumatol 15: 77-90.
3. Reginster J-Y, Bruyere O, Neuprez A (2007) Current role of glucosamine in the treatment of osteoarthritis. Rheumatology 46: 731-735.
4. Leffler CT, Philippi AF, Leffler SG, Mosure JC, Kim PD et al. (1999) Glucosamine, chondroitin, and manganese ascorbate for degenerative joint disease of the knee or low back: a randomized, double-blind, placebo-controlled pilot study. Mil Med 164: 85-91.
5. Reginster JY, Neuprez A, Lecart MP, Sarlet N, Bruyere O, et al. (2012) Role of glucosamine in the treatment for osteoarthritis. Rheumatol Int 32: 2959-2967.
6. Houpt JB, McMillan R, Wein C, Paget-Dellio SD (1999) Effect of glucosamine hydrochloride in the treatment of pain of osteoarthritis of the knee. J Rheumatol. 26: 2423-30.
7. Scholtissen S, Bruyère O, Neuprez A, Severens JL, Herrero-Beaumont G, et al. (2010) Glucosamine sulphate in the treatment of knee osteoarthritis: cost-effectiveness comparison with paracetamol. Int J Clin Pract. 64: 756-62.
8. Golani P, Pandit M (1999) Evidence of Epithermal Activity and Gold Mineralization Newania Carbonatite, Udaipur District, Rajasthan. J Geol Soc India 54: 251-257.
9. Veizer J, Plumb KA, Clayton RN, Hinton RW, Grotzinger JP, et al. (1992) Geochemistry of Precambrian carbonates: V Late Paleoproterozoic seawater. Geochim Cosmochim Acta 56: 2487-2501.
10. Nothdurft LD, Webb GE, Kamber BS (2004) Rare earth element geochemistry of Late Devonian reefal carbonates, Canning Basin, Western Australia: confirmation of a seawater REE proxy in ancient limestones. Geochim Cosmochim Acta 68: 263-283.