

Glycolysis and the hexosamine biosynthetic pathway as novel targets for upper and lower airway inflammation

Young Hyo Kim, author

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Glycolysis is a process that rapidly converts glucose to lactate to produce adenosine triphosphate (ATP) under anaerobic conditions and occurs in all eukaryotic and prokaryotic cells. On the other hand, the hexosamine biosynthetic pathway (HBP) converts glucose to intermediate products like UDP-N-acetylglucosamine, which is critical for post-translational modifications of proteins, such as protein glycosylation. These 2 pathways are well known to contribute to glucose metabolism, but recent studies indicate modulation of these pathways can alter immune system function. In this review article, the authors present results suggesting how cellular metabolism, including glycolysis and the HBP, occurs in immune cells, and the immunologic significances of such activities. In addition, they provide a review of the literature on the effects of glycolysis and the HBP on various autoimmune, immunologic, and allergic diseases. Finally, the authors briefly introduce the results of their research on the immunologic effects of HBP supplementation (glucosamine) in animal models of allergic disease.