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Effect of Calorie Restriction on Circadian Rhythms of Glycolytic Enzymes in Mice

College of Sciences and Health Professions

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Abstract

Multicellular and unicellular organisms have all proven to exhibit circadian rhythms which persist over approximately 24 hours. This internal time keeping system is responsible for regulating the body's biological functions. It has been known that calorie restriction effects circadian rhythms by causing a response in clock gene expression. These clock genes react to food intake and become either upregulated or downregulated accordingly. With glycolysis being a biological pathway that occurs in most organisms, measuring glycolytic gene expression in the liver tissue of young male mice becomes of interest. More specifically, hexokinase, PFK-1, and pyruvate kinase are the enzymes of interest. By analyzing the expression of key regulatory glycolytic genes in the liver tissue of mice, the importance of how diet effects circadian rhythm will be revealed. Results have shown that calorie restriction has some effect on circadian rhythms of glycolytic gene expression. We propose that if calorie restriction effects the circadian rhythms in the expression of glycolytic genes, then a down regulation in the profiles of ad libitum mice will be seen and an upregulation of calorie restricted mice's genes will be shown.

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