

Effects of High Salt and Fat Diets on Circadian Behavior and Physiology

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Summary

Salt is an essential nutrient; however, excessive salt intake is a prominent public health concern worldwide. Various physiological functions are associated with circadian rhythms, and disruption of circadian rhythms is a prominent risk factor for cardiovascular diseases, cancer, and immune disease. Certain nutrients are vital regulators of peripheral circadian clocks. However, the role of a high-fat and high-salt (HFS) diet in the regulation of circadian gene expression is unclear. This study aimed to investigate the effect of an HFS diet on rhythms of locomotor activity, caecum glucocorticoid secretion, and clock gene expression in mice. Mice administered an HFS diet displayed reduced locomotor activity under normal light/dark and constant dark conditions in comparison with those administered a normal diet. The diurnal rhythm of caecum glucocorticoid secretion and the expression levels of glucocorticoid-related genes and clock genes in the adrenal gland were disrupted with an HFS diet. These results suggest that an HFS diet alters locomotor activity, disrupts circadian rhythms of glucocorticoid secretion, and downregulates peripheral adrenal gland circadian clock genes.