

High-fat Diet Increases Sprague-Dawley Corticosterone Blood Levels with Nominal Change in Adrenocorticotrophic hormone (ACTH) Level with Signs of Increased Mesenteric Adiposity

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Abstract

BACKGROUND: Corticosterone is a common hormone in research involving rodents as it is used to indicate and measure stress levels. It was widely reported that certain dietary habits and components induce Hypothalamic-Pituitary-Adrenal (HPA) axis activity, with corticosterone found in the bloodstream. Chronic corticosterone presence can portray signs and symptoms of certain endocrine. Certain food and chemicals were found to alter HPA axis activity leading to dysregulation of the HPA axis. Earlier studies have shown enhancement of the HPA axis to produce more glucocorticoids by an unbalanced diet. This study aims to shed more light on this subject.

METHODS: Sprague Dawley rats were divided into five groups of seven each and were fed five respective diets (control, high-fat, high-protein, high-sugar, and high-starch), with tap water as drinking water *ad libitum*. After eight weeks, the rats were euthanized, blood was collected, and serum harvested and kept for analysis. Mesenteric fat was identified, harvested, and stained with hematoxylin and eosin (H&E) and set for viewing under light microscope. The hormones of interest which is adrenocorticotrophic hormone (ACTH) and corticosterone was extracted from the blood, to be processed accordingly and quantified using the High-Performance Liquid Chromatography (HPLC) with photodiode array (PDA) analysis technique.

RESULTS: The results showed an increase in Sprague-Dawley corticosterone blood levels with a nominal change in ACTH level. Advanced hypertrophy was observed in mesenteric adipose tissue in the high-fat diet group compared to the other diet groups.

CONCLUSION: This study confirms the negative effect of a high-fat diet on health from a hormonal and adipocyte perspective. A high-fat diet was found to instigate the HPA axis and influence blood corticosterone level.

KEYWORDS: adrenocorticotrophic hormone, ACTH, corticosterone, mesenteric fat, diet

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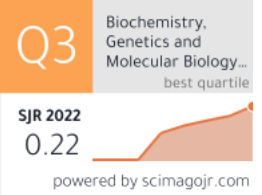
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