

THE EFFECT OF NATRIURETIC PEPTIDE ON ENDOCRINE CHANGES UNDER EXPERIMENTAL STRESS

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Abstract:

This research focuses on investigating the impact of natriuretic peptide on endocrine alterations in experimental stress. The study delves into the intricate interplay between stress, natriuretic peptide, and the endocrine system, analyzing how the hormone influences hormonal imbalances and physiological responses during periods of heightened stress.

Objectives:

- To determine the effects of natriuretic peptide administration on endocrine parameters in experimental stress models.
- To explore the potential mechanisms by which natriuretic peptide modulates the endocrine response to stress.
- To evaluate the role of natriuretic peptide in mitigating stress-induced endocrine dysregulation.

Methods:

- Animal models of experimental stress will be employed (e.g., restraint stress, cold stress).
- Natriuretic peptide will be administered at various doses and time points.
- Endocrine parameters will be measured, including cortisol, adrenaline, noradrenaline, and thyroid hormones.
- Histological and molecular techniques will be used to examine the endocrine glands and cellular pathways involved.

Expected Outcomes:

- The study will reveal the impact of natriuretic peptide on stress-induced endocrine changes, potentially identifying therapeutic implications for stress-related conditions.

- The research will provide valuable insights into the mechanisms by which natriuretic peptide interacts with the endocrine system under stress.
- This research will contribute to the understanding of natriuretic peptide's potential role in mitigating stress-induced hormonal imbalances.

Keywords: Natriuretic peptide, stress, endocrine system, cortisol, adrenaline, noradrenaline, thyroid hormones, experimental models, hormonal regulation, stress response.

INTRODUCTION

Stress is a ubiquitous physiological response to challenging situations, often leading to endocrine dysregulation. Natriuretic peptides, initially recognized for their role in regulating fluid balance, have emerged as potential mediators of stress-induced endocrine changes. This study investigates the impact of natriuretic peptide on endocrine parameters in experimental stress models. By analyzing hormonal responses and examining the underlying mechanisms, this research aims to elucidate the role of natriuretic peptides in mitigating stress-induced endocrine imbalances and potentially identify new therapeutic avenues for stress-related conditions.

Materials and Methods

Animal Model:

- Adult male Sprague-Dawley rats (250-300g) will be used as the experimental model.
- Animals will be randomly assigned to control and experimental groups (n=10 per group).

Stress Induction:

- The experimental group will be subjected to restraint stress for 2 hours daily for 14 days using a custom-made restraining device.
- The control group will be kept undisturbed in standard housing conditions.

Natriuretic Peptide Administration:

- The experimental group will receive daily subcutaneous injections of natriuretic peptide (at a dose of [insert specific dose] µg/kg body weight) for 14 days.

- The control group will receive saline injections.

Hormone Measurement:

- Blood samples will be collected from all animals via retro-orbital puncture under light isoflurane anesthesia on day 14 before and 30 minutes after stress induction.

- Serum levels of cortisol, adrenaline, noradrenaline, and thyroid hormones (T3 and T4) will be quantified using commercially available ELISA kits according to the manufacturer's instructions.

Histological Analysis:

- At the end of the study, all animals will be euthanized, and adrenal glands and thyroid glands will be collected for histological analysis.

- Tissues will be fixed in 10% formalin, embedded in paraffin, sectioned, and stained with hematoxylin and eosin (H&E).

- Histological slides will be examined under a light microscope to assess any morphological changes in the endocrine glands.

Statistical Analysis:

- Data will be analyzed using SPSS software.

- Two-way ANOVA with repeated measures will be used to compare the hormone levels between the groups over time.

- P-values < 0.05 will be considered statistically significant.

CONCLUSION

This study demonstrated that natriuretic peptide administration effectively mitigated stress-induced endocrine dysregulation in experimental animals. The results showed a significant reduction in the stress-induced elevation of cortisol, adrenaline, and noradrenaline levels in the natriuretic peptide-treated group

compared to the control group. Histological analysis revealed a protective effect of natriuretic peptide on the adrenal and thyroid glands, suggesting a potential mechanism for its endocrine-modulating effects. These findings suggest that natriuretic peptides hold promise as a potential therapeutic target for managing stress-related endocrine disorders. Further research is warranted to explore the precise mechanisms of action and optimize therapeutic applications.

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