The Effects of Exogenous Testosterone on Cardiovascular Stress

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INTRODUCTION

- Stress is a risk factor for cardiovascular disease, so it is important to understand the mechanisms that underlie cardiovascular responses to acute stress.
- The steroid hormone testosterone is thought to play a key role in stress management.
- Whether or not steroid hormone testosterone acts almost exclusively as enhancer or buffer of cardiovascular stress response is unknown.

Testosterone

Cardiovascular Response to Stress

Research Questions

- Does testosterone indeed have an effect on cardiovascular responses to stress, and is this effect enhancing or acting as a buffer?
- Does anxiety act as a psychological moderator on this proposed relationship?

METHODS

Participants

N = 120 males (Mean age = 21.55 ± 3.49 years, Range = 18-39 years)

Protocol

- Testosterone. Topical administration of Androgel (containing testosterone/placebo), self-administered in morning.
- Stress. Trier Social Stress Test – Deliverance of speech & serial subtraction math task in front of 2 Judges (neutral affect) + video camera.

Measures

- Cardiovascular Activity. BioPac applied to participant to measure Heart Rate (HR) & High-frequency component of Heart Rate Variability (HRV) across 4 epochs: Baseline, TSST-Prep, TSST-Speech + Math, TSST-Recovery.
- Anxiety. State-Trait Anxiety Inventory (STAI) – Self-reported measures of anxiety.

Analyses

- HR & HRV subjected to 4 (Epoch) × 2 (T/P) Repeated Measures General Linear Model (GLM).
- State & Trait Anxiety Measures entered as continuous variable in 4 × 2 GLMs.

RESULTS

- HR increased & HRV dropped during exposure to the stressor.
- Testosterone did not influence cardiovascular stress responses.
- When looking separately at individuals with high vs. low levels of state/trait anxiety, testosterone still did not impact cardiovascular stress responses.

CONCLUSIONS

- Testosterone does not play a significant role in moderating HR or HRV changes during exposure to a stressor.
- Effects of testosterone on HRV were not moderated by individual levels of state or trait anxiety.
- Although testosterone does indeed play a role in the human stress response by influencing other factors (e.g. cortisol), there is no direct relation to the cardiovascular component of the stress reactivity.
- Despite null results, obtained outcomes will help encourage future important questions surrounding steroid hormones and their interplay with stress and cardiovascular health.

Future Directions

- Gender & age differences to T/P response.
- Investigation of other possible moderators, such as negative/positive affect & social status.

REFERENCES


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