Salivary Nerve Growth Factor Response to Intense Stress: Effect of Sex and Body Mass Index

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This study characterized salivary nerve growth factor (sNGF) responses to intense stress exposure in healthy military members undergoing survival training.

- sNGF increased 137% from baseline to intense stress. During recovery, sNGF remained elevated an average of 67% above baseline (i.e., residual elevation).
- Males showed greater sNGF reactivity than females (p < 0.017). A noteworthy trend of higher sNGF concentrations in low body mass index (BMI) participants was observed (p = 0.058).
- This study shows substantial reactivity and residual elevation of sNGF in response to intense stress exposure in healthy humans.

BACKGROUND & PURPOSE

- Although many studies examine stress hormone secretion and receptor activity, exciting new developments signify a shift in focus to neuromodulatory systems influencing neural development, survival, and neuroplasticity (Laurent et al., 2014).
- Military survival school provides an ideal setting to examine military stress responses under standardized and highly realistic conditions.

The purpose of this study was to characterize sNGF responses to intense stress exposure in healthy military members undergoing survival training. A second purpose was to evaluate the roles of sex, age, BMI, and education.

METHODS

- Participants: 116 (80% male) healthy, active-duty military personnel attending military survival school (mean ± SD age = 25.2 ± 4.4 years).
- Measures: sNGF was collected at three time points: T1) first day of the academic phase of survival training, T2) directly after a stressful mock-captivity event, and T3) approximately 24 hours after release from mock captivity (see Figure 1 for timeline).
- Analysis: Descriptive statistics, repeated measures Analysis of Covariance (ANCOVA); reactivity, recovery, and residual elevation were computed. Bonferroni corrections were implemented for all comparisons at 0.5/3 = 0.017.

RESULTS

- sNGF increased 137% from baseline to intense stress.
- During recovery, sNGF remained elevated an average of 67% above baseline (i.e., residual elevation).
- Males showed greater sNGF reactivity than females, quantified by larger absolute T1–T2Δ (+148.1 pg/mL vs. +64.9 pg/mL, p < 0.017).
- A noteworthy trend of higher sNGF concentrations in low BMI participants was observed (p = 0.058).
- Neither age nor education associated with the sNGF trajectory (both p > 0.05).

CONCLUSIONS

- This study shows substantial reactivity and residual elevation of sNGF in response to intense stress exposure in healthy humans, as well as noteworthy sex differences.
- These findings may inform our understanding of individual differences in stress resilience (Ter Horst et al., 2009).
- Further research is needed to fully characterize this response, delineate correlates and mechanisms, and validate therapeutic applications.

REFERENCES
