



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.

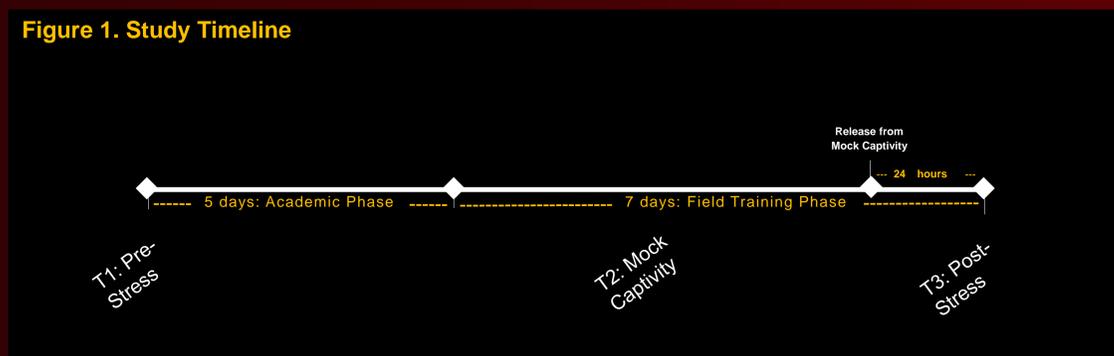
BACKGROUND & PURPOSE

- ◆ Ample evidence links stress to neurological, psychiatric, and chronic diseases.
- ◆ 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 \pm SD age = 25.2 \pm 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.

Figure 1. Study Timeline



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 $p > .05$).



Figure 2. Neurotrophic Response to Intense Stress

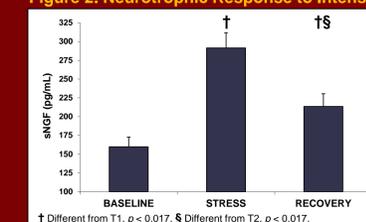


Figure 3. Neurotrophic Response: Effect of Sex

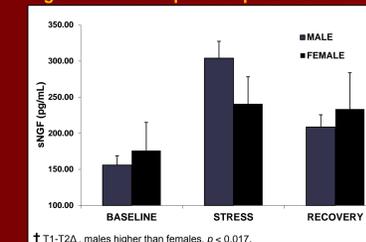
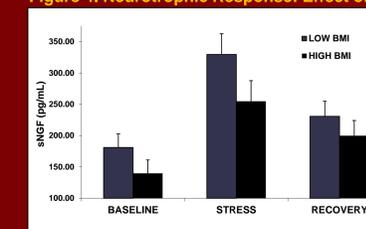


Figure 4. Neurotrophic Response: Effect of BMI



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

Laurent, H. K., Laurent, S. L., & Granger, D. A. (2014). Salivary nerve growth factor response to acute psychosocial stress: A new frontier for stress research. *Psychosomatic Medicine*, 129, 130-134.

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