The Relationship Between the Special Operators Hardiness Resilience Guide (HRG) and Interleukin Biomarkers

Heather Martin Lt, USAFR; Rebecca Ryznar, PhD, Erin Onat BS; Sagar Patel, BS; Ryan Shelton, Lt; K. Dean Gubler, DO FACS CAPT Ret USN; Anthony J. LaPorta, MD FACS FACOS Col Ret; Rocky Vista University, South Metro Fire and Emergency

INTRODUCTION

Trauma and catastrophes seen by military personnel and first responders put them at high risk for developing depression, anxiety, PTSD and associated suicide. Both exaggerated/high and blunted/low stress reactivity (HPA) axis has been shown to correlate with poor mental health, along with a pro-inflammatory state[1,2,3]. However, while there is evidence suggesting that immune dysregulation and inflammation is implicated in stress related disorders, it is unclear if there is a relationship between immune markers and mental disorder risk. We hypothesize that cytokine levels correlate with mental disorder risk and traumatic life experiences - as determined by HRG and LEC-5 scores, respectively.

METHODS

- Prospective cohort analysis
  - 32 first responders in the Colorado South Metro Fire Rescue Academy, ages 19-48
- Stress response assessed by measuring salivary steroid-thyroid hormones and cytokines with saliva samples taken at T1 (baseline) and T2 (stress test 1). For T2, samples were taken a) Immediately before stressful event b) Immediately after stressful event c) One hour after stressful event
- Biomarkers were compared with LEC-5 (Life Events Checklist) results
- Resilience scores determined by Bartone Hardiness Resilience Gauge – used by special operations groups

Table 1. ***Cytokines that Correlate Significantly with LEC-5 Severity Scores.***

Biomarker	r value	p value	n
GCSF	0.45	0.02	32
IL6	0.38	0.04	32
IL8	0.38	0.05	32

RESULTS

Correlations were demonstrated between LEC-5 results and cytokine levels measured in the cohort experiencing physical and psychological stress. Specifically, Granulocyte Colony Stimulation Factor (GCSF), IL6 and IL8 showed the strongest correlation with LEC-5 scores, p values: 0.02, 0.04, 0.05 correlation coefficients: 0.45, 0.38, 0.38 respectively.

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DISCUSSION AND CONCLUSION

- Numerous studies suggest an immune dysregulation component to stress disorder susceptibility. This study attempts to characterize which immunologic markers are correlated with mental disorder risk, thus beginning to answer the question of whether there is a protective immunophenotype to stress.
- Our results support that
  - Salivary GCSF, IL6 and IL8 levels are predictive of cortisol reactivity to stress
  - They play a role in the regenerative recovery following stress, potentially serving a neuroprotective effect
  - This continues the process of identifying protective treatment for PTSD

FUTURE DIRECTIONS

Future directions include investigating how certain immune markers may have a neuroprotective effect following stress, investigating these same immune markers in an acute vs. chronic stress paradigm, and investigating immune markers seen in non-healthy individuals (i.e. those with a pre-existing stress disorder).