

## **Validation of A Non-Invasive Physiological Stress Assessment: Agreement of Salivary and Blood Cortisol Among Firefighters**

CAITI N. DODGE<sup>1</sup>, M. HUNTER MARTAINDALE<sup>2</sup>, STEVEN E. MARTIN<sup>1</sup>, LISA, C. COLVIN<sup>1</sup>, DREW E. GONZALEZ<sup>1</sup>, & MATTHEW J. MCALLISTER<sup>3</sup>

<sup>1</sup>Tactical Athlete Research Unit, Department of Kinesiology and Sports Management, Texas A&M University, College Station, TX

<sup>2</sup>ALERT Center, Texas State University, TX

<sup>3</sup>Metabolic and Applied Physiology Laboratory; Department of Health and Human Performance, Texas State University, San Marcos, TX

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*Advisor / Mentor: McAllister, Matthew J. (mjm445@txstate.edu)*

### **ABSTRACT**

Salivary cortisol has been used as an indicator of stress exposure among tactical personnel (i.e., firefighters). Assessing cortisol concentrations, whether via blood or saliva samples, can provide valuable insight into the physiological stress load placed upon the firefighter. Cortisol levels provide a reflection of the hypothalamic-pituitary-adrenal (HPA) axis activity. Salivary cortisol is unbound and has been suggested to provide a better reflection of HPA axis activity compared to blood cortisol, which is bound to soluble corticosteroid-binding globulin. Importantly, the use of salivary biosample collection also offers a more practical and non-invasive method to assess physiological stress biomarkers when blood sample collection is not possible. While there are studies demonstrating agreement between blood and salivary cortisol concentrations, no study to date has demonstrated this agreement among firefighters. Therefore, a direct comparison would provide important information regarding the validity of salivary cortisol biosample collection. **PURPOSE:** This study examined the relationship between blood and salivary concentrations of cortisol among firefighters. **METHODS:** Ninety-eight career, structural male firefighters (age = 35.1±9.6 yrs; weight = 94.3±15.4 kg; height = 178.4±13.2 cm) from a local fire department were studied. Fasted blood and saliva samples were analyzed for concentrations of cortisol. Bivariate Pearson correlations were used to assess the relationship between blood and saliva cortisol. **RESULTS:** Blood and saliva cortisol concentrations were highly correlated ( $r=0.607$ ;  $p<0.001$ ). **CONCLUSION:** The main finding of this analysis demonstrates that blood and saliva concentrations of cortisol are highly correlated with a cohort of career, structural firefighters. Importantly, this finding provides validation of assessing physiological stress (i.e., cortisol) via a non-invasive method, such as salivary biosample collection.