

Effects of Chronotype and Social Jetlag on Blood Biomarkers During WLFF 2-Week Critical Training Period

ELIAS M. MALEK, JOSEPH SOL, KATHERINE CHRISTISON, CHARLES DUMKE, JOHN QUINDRY, FACSM, & GRAHAM R. MCGINNIS

University of Nevada, Las Vegas; Las Vegas, NV
Cardioprotection and Exercise Biochemistry Lab; University of Montana; Missoula, MT

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Advisor / Mentor: McGinnis, Graham (graham.mcginnis@unlv.edu)

ABSTRACT

Chronotype, an individual's natural preference towards activity during certain times of the day, influences the interaction between one's internal circadian rhythms and the external environment. When this is disrupted, it can result in social jet lag (SJL), the misalignment between our sleep/wake schedule on work days and free days. Wildland firefighters grapple with unpredictable and intense demands of their job, making them vulnerable to the challenges posed by SJL. Their duties necessitate abrupt changes in active hours, pushing against their body's inherent circadian preferences. SJL is a behavioral trait that may alter an individual's ability to respond to high stress environments and situations. **PURPOSE:** To analyze the relationship between chronotype and social jet lag on blood biomarkers during a WLFF 2-week Critical Training period. **METHODS:** Participants underwent baseline testing which included the Morningness-Eveningness Questionnaire and the Munich Chronotype Questionnaire. Anthropometric measurements were recorded alongside body composition via skinfold measurements. A comprehensive blood draw was conducted to analyze Complete Blood Count. Following baseline assessments, participants entered a 12-day CT period. During this period, daily activity and HR were monitored. Participants maintained a daily training log, sleep log, and completed a Visual Analog Scale for sleep quality and muscle soreness. Upon completion of the CT period, the same measurements as the baseline testing were completed. **RESULTS:** 25 participants completed the study. Chronotype analysis showed a ME of exercise in lactate dehydrogenase (LDH) and creatine kinase (CK) with both increasing post-CT in intermediate (INT) and morning-types (MT) ($p < 0.01$). SJL analysis showed the same ME of exercise with LDH and CK increasing after exercise in both < 1 h and > 1 h of SJL ($p < 0.01$). SJL was also positively correlated with muscle damage markers (LDH, $p < 0.05$; CK, $p = 0.067$) with higher levels of SJL leading to increased muscle damage. **CONCLUSION:** This data shows that chronotype and SJL had modest effects on blood biomarkers in response to a 2-week CT period but the magnitude of SJL does influence the increase in muscle damage biomarkers. Strategies to mitigate SJL among WLFFs may be necessary to manage the effects of hard training.