

Inflammatory Response Following High-Intensity Interval Training (HIIT) Across Different Exercise Modalities: A Pilot Study

BAILEY MCLAGAN, JARED MOORE, & GEORGE SALEM, FACSM

Musculoskeletal Biomechanics Research Laboratory; Department of Biokinesiology and Physical Therapy; University of Southern California; Los Angeles, CA

Category: Masters

Advisor / Mentor: Salem, George (gsalem@pt.usc.edu)

ABSTRACT

Exercise-related muscular contractions produce and release numerous myokines, namely interleukins (IL) 6, 8, and 10. Most studies have focused on longer duration (>60 minutes) exercise and suggest that the IL-6 response to running is greater than that of cycling. However, to date, the effect of 4x4 High-Intensity Interval Training (HIIT) and modality on the inflammatory response to exercise have not been reported. **PURPOSE:** This pilot investigation characterized the inflammatory biomarker response to HIIT 4x4 running and cycling protocols. **METHODS:** Five young, recreationally active volunteers (1 female, 4 males; 27.20 ± 3.42 years) completed a heart rate max (HR_{max}) test monitored with a Polar HR chest strap. This was followed by randomized completion of a 4x4 HIIT protocol (4-minute 85-95% HR_{max} active; 3-minute 60-70% HR_{max} recovery) on a treadmill and a stationary bike. A licensed phlebotomist collected blood before and after exercise. Samples were centrifuged at 3000 RPM for 10 minutes before plasma was aliquoted and frozen at -80°C. Circulating levels of IL-6/8/10 from baseline and post-exercise were analyzed using a multiplexed Luminex system. Data are presented as fold changes ((post-baseline)/baseline), and are shown as mean ± SD. **RESULTS:** All inflammatory myokines had a positive fold change following the cycling protocol (IL-6: $\Delta = 0.57 \pm 1.30$; IL-10: $\Delta = 0.15 \pm 0.36$; IL-8: $\Delta = 0.16 \pm 0.29$). Only IL-6 and IL-10 had positive fold changes following the running exercise ($\Delta = 0.07 \pm 0.12$; $\Delta = 0.05 \pm 0.08$, respectively), while IL-8 had a negative fold change ($\Delta = -0.01 \pm 0.17$). **CONCLUSION:** The results of this pilot study suggest that the IL-6-driven inflammatory response to HIIT exercise may be higher in cycling compared to running. This finding may be important when prescribing exercise interventions for clinical populations. The shorter duration of HIIT exercise and the lower impact associated with cycling may prove beneficial for those less trained. This response to HIIT differs from previous studies in long-duration exercise that have shown increased responses to running versus cycling. Therefore, further research should continue to investigate inflammatory responses to HIIT in order to inform exercise prescription for various populations.