

THE EFFECTS OF BODY COMPOSITION ON IMMUNOLOGICAL AND
THERMOREGULATORY RESPONSES DURING COLD WATER IMMERSION IN
HEALTHY MALES (187 pp.)

Co-Directors of Dissertation: Ellen L. Glickman, Ph.D.
Jacob Barkley, Ph.D.

The purpose of this study was to evaluate the physiological, immunological, and thermal responses of low fat versus high fat males in 18, 22, and 26°C water immersion for 120 minutes. Six low fat (LF, $10.1 \pm 1.4\%$ BF) and 5 high fat (HF, $28.1 \pm 3.5\%$ BF) males volunteered for this study who underwent three separate trials, 18, 22, or 26°C cold water immersion (CWI)). Body composition was determined via dual energy x-ray absorptiometry (DXA). Each trial consisted of a 10 min baseline period, 120 min of 18, 22, or 26°C CWI, and 15 min of re-warming on a cycle ergometer. Blood draws were taken following baseline, 60 and 120 min of CWI, and 15 min recovery. Rectal temperature (T_{re}) was recorded throughout each trial and subjects were removed from the tank if T_{re} fell to $\leq 35.0^{\circ}\text{C}$. Oxygen consumption (VO_2) was assessed during baseline and every thirty minutes thereafter during CWI and REC using indirect calorimetry. During CWI, LF subjects exhibited greater decreases in T_{re} and greater increases in VO_2 over time compared to HF subjects at all temperatures. These results suggest that the HF individuals are able to withstand cold-water immersion more effectively (i.e. maintain a greater T_{re}) and efficiently (i.e. at a lower metabolic cost) than their leaner counterparts. The present investigation demonstrated significance for IL-6 over all trials and both

groups ($p=0.05$). IL-17, IFN- γ , and cortisol were all found to be non-significant, however IL-17 and IFN- γ were able to demonstrate a trend towards significance ($p=0.09$ and $p=0.06$ respectively). All of the immune blood variables demonstrated similar patterns of change. They all were shown to decrease at varying magnitudes from baseline during the 120 min CWI followed by an increase during recovery. The results demonstrated in the present investigation suggest that cold-water immersion may alter the immune response within a given individual seen through an initial suppression of the immune system during cold-water immersion followed by a compensatory mechanism during recovery.