The Effects of a Two-Week Cold Exposure Program on Body Composition and Resting Metabolic Rate in College-Aged Males

Presenters: Jimmy Ferretti, Veronica O’Neill, Dani DeGregory, David Parra, and Jood Ani

Advisor: Professor T. H. Reynolds and Jacob DeBlois

I. Abstract

Obesity is the most common metabolic disorder in humans and occurs when an imbalance of caloric intake and caloric expenditure is present. Within the human organism, there are two known types of adipose tissue: white adipose tissue (WAT) and brown adipose tissue (BAT) (2). WAT participates in energy storage, organ protection, and functions as an insulative layer, while BAT’s primary role is thermogenesis. The purpose of this study was to determine if a less time intensive cold acclimation protocol (30 minutes at 10°C [50°F], 3 times per week for 2 weeks) would increase resting metabolic rate (RMR) as well as reduce body fat percentage. Fourteen moderately active, college-aged males between the ages of 19-23 years attended a total of 8 sessions (2 data collection sessions and 6 acclimation sessions) over the span of 2.5 weeks. Resting metabolic rate in both the thermoneutral (TN) and cold conditions as well as body composition were both measured before and after acclimation. A trend was observed that participants had a lower RMR in the cold after acclimation (p=0.076). A trend of increased body fat percentage in participants after the acclimation period was also observed (p=0.068). Increased body fat acts as insulation providing more subdermal heat to be produced, thus explaining the decrease in RMR. It is likely that since the cold condition was not harsh enough, the body adapted to the acute cold by increasing WAT instead of increasing BAT activity.