ABSTRACT

PURPOSE: To determine the acute response of appetite and appetite regulating hormones after exposure to simulated altitude in resting conditions. METHODS: Seven male and six female recreationally active subjects (height 178 ± 8.1cm, weight: 77.3 ± 24.8kg, body fat: 18.4 ± 5.7%) participated in two, three-hour trials in an environmental chamber with one trial simulating 5000 m altitude (hypoxic) and the other simulating 350 m altitude (control). Blood samples from the antecubital vein were collected prior to entering the environmental chamber and immediately following the three hours of seated rest. Blood samples were analyzed for serum leptin, adiponectin, and ghrelin concentrations via enzyme-linked immunosorbent assay kits. Subjective feelings of acute mountain sickness and perceived appetite were also assessed. Heart rate, blood oxygenation, tissue oxygenation, respiration rate, and whole body gases were also analyzed throughout the trials. RESULTS: Satiety decreased over time in both trials (p = 0.001) but was not different between trials (p = 0.347). Symptoms of acute mountain sickness were higher in hypoxia compared to control (p = 0.023) but did not reach clinical levels. Blood oxygenation was higher in control compared to hypoxia (p < 0.05). HR was higher in hypoxia compared to control (p = 0.01). Hypoxia did not affect oxygen utilization (p = 0.494). Analysis of appetite related hormones is currently being conducted but not yet complete. CONCLUSION: Subjective appetite does not appear to be affected with acute hypoxic exposure despite alterations in oxygen transport. However, acute hormonal response may not be immediately apparent from subjective measures of appetite, and thus analysis of these hormones remains paramount to this project.

INTRODUCTION

• Weight loss is observed in hypoxic environments and may be related to loss of appetite.
• However, it is unknown whether the loss of appetite occurs with hypoxia alone or if other conditions (exercise, temperature, food availability, etc.) inherent to field environments are the major factors.
• Leptin, adiponectin, and ghrelin work to regulate appetite and maintain energy homeostasis through receptors in the hypothalamus and pituitary gland.
• Conflicting research currently exists on the effects altitude has on leptin, adiponectin, and ghrelin.
• The purpose of this study is to determine the acute response of appetite and appetite regulating hormones after exposure to simulated altitude in well controlled resting conditions.

RESULTS

Table 1. Participant descriptive data

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>Body Fat (%)</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.6 ± 2.3</td>
<td>178.9 ± 8.1</td>
<td>77.3 ± 24.8</td>
<td>18.4 ± 5.7</td>
<td>24.8 ± 2.3</td>
</tr>
</tbody>
</table>

Data are mean ± SD

CONCLUSION

• Subjective appetite does not appear to be affected with acute exposure despite alterations in oxygen transport.
• However, acute hormonal response may not be immediately apparent from subjective measures of appetite.
• Funded by NASA Nebraska Space Grant Fellowship.