Effects of Hypobaric and Normobaric Hypoxia on Myogenic and Proteolytic Gene Expression in Humans
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INTRODUCTION
- It is well known that prolonged stays at altitude will decrease body mass.
- This decline is attributed to an increase in basal metabolic rates, reduction of food intake, impairments in protein synthesis, and potential changes in gene expression from hypoxia.
- Recent literature suggests simulating high altitude through normobaric hypoxia is physiologically different from hypobaric hypoxia.
- It is unknown, however, if these differences extend to the cellular level within skeletal muscle tissue.
- Myogenic and proteolytic responses to these different forms of hypoxia may give insight into potential physiological differences.
- The purpose of this research was to determine the differences in key myogenic and proteolytic gene expression between hypobaric and normobaric hypoxia after acute, aerobic exercise.

METHODS
- 8 recreationally trained male and 7 recreationally trained female subjects completed 3 trials in a randomized, counter-balanced order.
- Subjects cycled for 1 h on an electronically braked cycle ergometer (Velotron, RacerMate, Seattle, WA) followed by 4 hours of recovery at simulated altitudes.
- Recovery altitudes consisted of ambient conditions (975 m), hypobaric hypoxia (4,420 m), and normobaric hypoxia (4,420 m).
- Participants rested supine in an altitude tube (Engineering Innovations, LLC, Littleton, CO) capable of lowering the barometric pressure.
- The altitude tube was located inside a hypoxic chamber (Tescor, Warminster, PA) capable of lowering the percentage of oxygen in the air.
- Muscle biopsies were taken from the vastus lateralis before exercise and after each recovery period for analyses of myogenic and proteolytic gene expression.

RESULTS
Table 1. Participant descriptive data (n = 15)

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>Body Fat (%)</th>
<th>VO2 Peak (L · min⁻¹)</th>
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<tbody>
<tr>
<td>24 ± 4</td>
<td>178 ± 12</td>
<td>72.47 ± 13.84</td>
<td>14 ± 7</td>
<td>3.6 ± 0.8</td>
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Data are mean ± SD.