



STUDYING THE EFFECTS OF ALTITUDE ON MIGRAINE
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SPUR Program Summary

Introduction

Migraine affects a large portion of the global population. People living at moderate and high altitude (~3,000 ft to >8,000 ft) are more likely to suffer from migraine compared to low altitude. Our aim is to try and understand how and why more people suffer from migraine at higher altitudes.

Summer Program Work

To research altitude's effect on migraine, we developed a way to produce a mouse model. To do this we needed a simulated environment at different altitudes (differences in air pressure and PPO₂). We built low-cost homemade altitude chambers (diagram on right) to acclimatize groups of test mice at: Sea Level (0 ft); Mid Altitude (SLC altitude) (~4500 ft); and High Altitude (~15,000 ft). The graphs on the right are examples of the sensor readouts of pressure and oxygen (%) inside our chambers. After 10 days in these chambers, we took the mice out and measured their hematocrit to ensure we prompted the desired blood changes.

Results

After our first experiments we were able to see physiological changes from our simulated altitude, leading to an average ~25% difference in hematocrit percentage in our High-Altitude group vs our Sea Level group. Our hematocrit changes show good promise that we will have the physiological changes needed for other experiments.

Next Steps

Our future experiments will focus on continuing our investigation using these same methods to produce our altitude mouse models, and we will add other experiments to further investigate the mechanisms behind migraine. Through these future experiments, we hope to understand how increases in altitude lead to increase in migraine frequency.

