



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Aditi T. Venkatesh	Project Number 38378
Project Title The Effect of Exercise on Thermogenesis in Brown Adipose Tissue	
Abstract Objectives/Goals This study was performed to understand the relationship between exercise and thermogenesis in Brown Adipose Tissue. Many researchers believe that studying BAT in addition with other energy expenditure processes, such as exercise, could lead to a cure or a better understanding of obesity. Methods/Materials Six mice were used and randomly split into two groups: interscapular and mid back. Temperature of interscapular was measured to find temperature of the Brown Adipose Tissue and temperature of the mid back was measured to find core body temperature. Temperature was measured using the Anipill, a novel telemeter, or temperature reading device. Mice were acclimated on an exercise treadmill for three days, staying at rest for twenty minutes and then exercising for two minutes at 5 m/min on Day 1, 7.5 m/min on Day 2, and 10 m/min on Day 3. On the fourth day the SPRINT protocol was executed. The mice were placed on the unmoving treadmill for twenty minutes and then speed was increased by 1 m/min starting at 10 m/min per minute until the mouse was deemed exhausted. Results During the SPRINT protocol, the temperature of the Brown Adipose Tissue decreased as the temperature of the mid back region increased and stayed above baseline. After the average exhaustion point both regions returned to baseline temperature. Conclusions/Discussion Due to the role of Brown Adipose tissue in thermoregulation, it is likely that the increase in temperature of the surrounding muscle tissue caused the BAT to gradually decrease its thermogenesis to preserve thermal homeostasis in the mouse. It is also most likely that the BAT was selectively downregulated by the sympathetic nervous system during exercise.	
Summary Statement During exercise the reduced thermogenesis in Brown Adipose Tissue shows that lipolysis is decreased in BAT during exercise.	
Help Received Used lab equipment and IACUC and Animal Care facilities at the University of Iowa under the mentorship of Dr. Benson, Participant of the SSTP Iowa Program.	