Idaho State Board of Education
Higher Education Research Council
Undergraduate Research Fellows

Academic Year 23-24
Summary

Institutional Research and Effectiveness
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Introduction

The Office of Institutional Research and Effectiveness, in collaboration with the Office of the Provost & Executive Vice President for Academic Affairs, oversaw the Higher Education Research Council (HERC) undergraduate research fellows' program.

The HERC funds provided undergraduates students with research opportunities in the Science, Technology, Engineering or Math (STEM) fields under the guidance of a faculty mentor. Lewis-Clark State College (LC State) students were selected based on a competitive application process. Fifteen (15) students received a HERC research fellowship. All participating students presented posters at either the LC State Research Symposium in May 2024 or at the Idaho Conference for Undergraduate Research (ICUR) in Boise, July 2024.

Thank you to the Idaho State Board of Education and HERC for their generous allocation of $30,000 in support of advancing STEM student learning. LC State expended the funds as follows:

EXPENSE CATEGORY	AMOUNT
Stipends	$6,855.00
Travel	$2,086
Materials and Supplies	$1,608.82
Miscellaneous Expenses	$270.00
TOTAL	$12,770.72*

*Received approval to utilize remaining balance to purchase needed materials and supplies in support of undergraduate research in FY25.

Following are the student project abstracts:

Fellowship Recipients: Sara Hathaway, Abigail Brown, Ava Hasenoehrl, Tesla Presnell & Jayden Youngren
Faculty Mentor: Dr. Eric Stoffregen, LC State, Division of Physical, Division of Physical Life, Movement & Sport Sciences
Title: *Metabolic dysfunction following early embryonic DNA damage in Drosophila melanogaster*
Abstract: Blm DNA helicase is essential for proper DNA replication during early Drosophila development. Progeny from Blm-null mothers die as embryos due to lack of Blm protein. However, a few progeny survive to adulthood. We hypothesized that survivors of Blm-deficient development would display alterations in metabolic function due to DNA damage incurred during development. Our data suggest metabolic processes, particularly those related to nutrient storage, are altered by development without Blm.

Fellowship Recipients: Conner May, Chris Denny, Abby Gorton & Ike Hopper
Faculty Mentors: Dr. Clay Robinson & Dr. Jessica Savage LC State, Athletics and Division of Physical, Life, Movement & Sport Sciences

Title: *Vitamin C's Effect on Iron Absorption & Aerobic Capacity in Female Cross-Country Athletes*
Abstract: The purpose of this study was to determine the effects that Vitamin C has on rates of Iron absorption and whether supplementation of vitamin C and Iron will improve Ferritin, Hemoglobin, Hematocrit levels, and V02 Max in female cross-country athletes. Six female cross-country athletes participated in pretesting including, V02 max, and blood draws to analyze iron absorption rates & posttest after eight-week Iron & Vitamin C supplementation intervention. All data was analyzed and was shared at the research symposium.

Fellowship Recipients: Rubina Jayden Martin & Kirsten Miller
Faculty Mentor: Dr. Leigh Latta, LC State, Division of Physical, Life, Movement and Sport Sciences
Title: *Effects of Temperature Increase on Behavior in C. elgens*
Abstract: For this experiment, behavioral analysis was completed to determine if temperature impacts the behavior of C. elegans. Specifically, various aspects of velocity (maximum velocity, mean velocity, and the standard deviation of velocity) were quantified using behavioral tracking and analysis software in two temperature treatment groups (18°C and 23 °C). We hypothesized that an increase in temperature would increase the speed at which these organisms move. Indeed, the results demonstrated that as temperature increased, the velocity of the C. elegans did as well. This may be due in part to the temperature increase stimulating greater metabolic activity in ectothermic species such as C. elegans. Because these nematodes have a specific temperature range at which they function properly, these results may also suggest that exceeding or failing to fall within their typical temperature range of 15°C to 25°C will result in a velocity decline initiated by their stress responses.

Fellowship Recipient: Rubina Jayden Martin & Kirsten Miller
Faculty Mentor: Dr. Leigh Latta, LC State, Division of Physical, Life, Movement and Sport Sciences
LC State, Physical, Life, Movement & Sport Sciences
Title: *Effect of Temperature on C. elegans Acceleration*
Abstract: This study examined the effects of temperature on aspects of the acceleration of Caenorhabditis elegans. Three generations of C. elegans were reared in two different temperature treatments (18°C and 23°C) and their behavior was measured using WormTracker software. Results indicated that maximum acceleration, mean acceleration, and the standard deviation of their acceleration were impacted. Specifically, the acceleration of C. elegans was higher for individuals in the high temperature group. Because C. elegans are ectothermic organisms, their behavior is dependent on temperature. C. elegans function best within a certain temperature range (typically between 15°C to 25°C), so the increase in acceleration in response to increased temperature is likely due to an increased metabolism. Although untested, it seems likely that when the threshold of this range is crossed, behavior may go down due to a stress response.

Fellowship Recipients: Tesla Presnell, Ava Hasenoehrl, Abigail Brown, Sara Hathaway, Jayden Youngren
Faculty Mentor: Dr. Eric Stoffregen, LC State, Division of Physical, Life, Movement & Sport Sciences
Title: *In Drosophila, survivors of Blm-deficient development exhibit a neurodegenerative phenotype that includes sleep and circadian rhythm disruption*
Abstract: Drosophila embryos that lack maternally loaded Blm protein experience DNA damage, leading to high embryo mortality. We hypothesized that the few embryos that survived to adulthood would experience neurodegeneration phenotypes. Progeny that developed with or without maternally loaded

Blm were studied. Those lacking maternal Blm exhibited reduced motor function, disrupted sleep, and altered circadian rhythms, suggesting increased neurodegeneration in the absence of accelerated aging.

Fellowship Recipient: Clayton Beachy, Chloe Shumaker, Joel Mullikin & Bonolo Molefe
Faculty Mentor: Dr. Jessica Savage, LC State, Division of Physical, Life, Movement & Sport Sciences
Title: *Effects of Stroboscopic Vision Impairment on Lower Quarter Balance*
Abstract: To determine the effect of stroboscopic vision on the Y Balance Test Lower Quarter (YBT-LQ) in ball sport collegiate male and female athletes.
METHODS: Male (n=1) and female (n=6) participants completed six trials of familiarization with all three reach directions: anterior (A), posteromedial (PM), and posterolateral (PL), for both right (R) and left (L) legs. Following familiarization, participants completed three trials in each direction and reach scores were recorded. Limb length measurements were used for calculation of composite scores for both right and left legs. Paired t-tests were used to identify significant ($p < .05$) differences between composite and anterior reach scores for right and left legs.
RESULTS: Significant differences were identified between R leg composite scores with (M = 87.08; SD = 5.97) and without stroboscopic vision (M = 93.93; SD = 6.31), $p < 0.01$, and R leg. A reach scores with (M= 53.16; SD = 6.40) and without stroboscopic vision (M = 63.91; SD =14.86), $p = 0.05$.