Everette Rhymer

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Research Experience:

CYTOSKELETAL CONTRIBUTIONS TO THE ASSEMBLY OF THE *DROSOPHILA* TESTIS STEM CELL NICHE

Master's Thesis Research – East Carolina University*, Greenville, NC*
August 2023 – June 2025

Significance – *Stem cells are highly important in tissue regeneration and homeostasis. Therefore, it is imperative to understand what regulates these cells. One major contributing factor to stem cell maintenance is a cellular microenvironment that regulates surrounding stem cells – the niche. This microenvironment is responsible for sending certain self-renewal signals to its neighbors, allowing them to maintain their undifferentiated state. Without proper assembly of the niche, these signals are not distributed properly, leading to tissue deformation and tumorigenesis. What remains elusive are cytoskeletal factors that are important for properly assembling a stem cell niche. My research primarily focuses on cytoskeletal components that contribute to properly assembling a stem cell niche.*

Developed Skills:

- *Experimental design using Drosophila as a model organism.*
- *Fluorescent, compound, and confocal Microscopy*
- *Drosophila husbandry and genetics.*
- *Molecular cloning techniques.*
- *Utilizing molecular optogenetics to make precise spatial and temporal manipulations in specific cells.*
- *In vivo spinning disk confocal live imaging of Drosophila embryos.*
- *Immunohistochemistry to observe subcellular protein localization.*
- *Use of statistical analysis software, including Prism-GraphPad.*

INVESTIGATING THE ACTIVITY OF CRUDE PLANT EXTRACTS ON AN MCF-7 BREAST CANCER CELL LINE

Independent Undergraduate Research – Catawba College, *Salisbury, NC*
August 2022 – May 2023

Significance – *Despite the major advances in biomedical technologies, cancer is amongst the leading causes of death worldwide, and while effective treatments and chemotherapeutics exist, many come with an exorbitant monetary cost and severe side effects. This research aims to identify potential medicinal remedies for cancer in hopes of combating these issues.*

Developed Skills:

- *Preparation & dilution of crude extracts for cell toxicity screen.*
- *Continuous cancer cell (MCF-7 line) culturing and cell counting for seeding appropriate concentrations in 96-well assay plates.*
- *Standardization of a resazurin-based viability assay to determine dose-dependent effects of crude ethanol extracts on MCF-7 cells.*
- *Conducting Zone-of-Inhibition (ZOI) assays to determine the antimicrobial effects of crude plant extracts.*

EVALUATING LARVICIDAL EFFICACY OF PLANT-BASED EXTRACTS ON VECTOR-ASSOCIATED MOSQUITOES

Independent Undergraduate Research, Catawba College*, Salisbury, NC*
January 2022 - November 2022

Significance – Although several mosquito species fulfill important ecological functions by serving as food sources and floral pollinators, controlling populations of those that harbor and transmit pathogens are of concern. As with antibiotics and other chemotherapeutics, insecticide resistance is a problem in mosquito vector population control. Furthermore, widely used synthetic insecticides may have detrimental effects on natural ecosystems. The use of natural plant extract alternatives in larvicidal control offers the ability to reduce mosquito populations with a compound that is biodegradable, target-specific, and less likely to develop resistance amongst mosquito populations.

Developed Skills:

- *Preparation & dilution of crude extracts for larvicidal assay.*
- Collected mosquito larvae using standard CDC practices (larval dips and morphological identification).
- Conducted larvicidal assay (various concentrations) to test the effectiveness of extracts on 2nd instar Culex larvae.

ANTIBIOTIC RESISTANCE & DRUG DISCOVERY

Plants for Human Health, NC State University*, Kannapolis, NC August 2021 – December 2021*

Significance – *Antibiotic resistance is a threat to modern medicines used to treat specific pathogens therefore, it is of utmost importance to continue to uncover new potential antibiotic sources. This research aims to identify the potential antimicrobial properties of capsaicin—a compound found in plants that contribute to spice – to aid in discovering alternatives to treat pathogens that may have developed resistance to antibiotic medications.*

- *Extraction & quantification of Capsaicinoids present in the capsicum (Pepper) powder.*
- Conducted genomic amplification to determine genetic variance of different peppers.
- Extraction of phenolics to determine total phenolic content.
- Conducting Zone of Inhibition to determine antibiotic resistance of peppers.

PRESENTATIONS:

- Fly Bayou Online Seminar. Virtual, June 2025 - **Talk**
- Triangle Fly Symposium. Duke University, May 2025 – **Talk**
- 66th Annual *Drosophila* Research Conference, GSA. San Diego, California, March 2025 – **Poster**
- Catawba College Genetics Course, October 2024 – **Guest Lecture**
- Triangle Regeneration Symposium. Duke University, October 2024 – **Poster**
- Triangle Fly Symposium. University of North Carolina at Chapel Hill, May 2024. – **Poster**
- Catawba College Creativity and Research Symposium (CRCS). Salisbury, NC, April 2023. – **Poster**
- Association of Southeastern Biologists (ASB). Winston Salem, NC, April 2023. – **Poster**
- State of North Carolina Undergraduate Research and Creativity Symposium (SNCURCS). Wilmington, NC, December 2022. – **Talk**
- Catawba College Creativity and Research Symposium (CRCS). Salisbury, NC, April 2022. – **Poster**
- Association of Southeastern Biologists (ASB). Little Rock, AR, April 2022. – **Poster**

PROFESSIONAL EXPERIENCE:

Graduate Teaching Assistant

East Carolina University, Fall 2023 – Present.

- *General Biology Laboratory – Fall 2023*
- *Principles of Biology Laboratory – Fall 2024*
- *Principles of Biology Laboratory II – Spring 2024*
- *Human Physiology & Anatomy Laboratory II – Summer 2024*

Community Outreach

- *Introducing elementary school students to fruit flies as a model organism.*
- *Guiding student observation of fruit flies under a microscope.*
- *Describing the importance of flies in scientific discovery.*
- *Teaching students the basic anatomy of the fruit fly.*

Science Night – Ridgewood Elementary School, Winterville, NC 02/22/24.

Cub Scout Science Outreach – River Park North, Greenville NC 06/10/24

Tar River Community Science Festival – Town Commons, Greenville NC 11/09/24

Shift Manager

Patriot Market, Lexington, NC Jan 2019 – Jun 2023

- Supervised and assigned tasks to staff effectively.
- Think/act logically and quickly.
- Showing an effective leadership role in a business and taking charge when needed.
- Having a high sense of organization with tasks throughout a shift.

EDUCATION:

Catawba College – Salisbury, NC – Bachelor of Science in Biology, Minor in Chemistry '2023

Awards & Honors:

- Dean's List, Fall 2021, Fall 2022, Spring 2023
- Association of Southeastern Biologists, First Generation College Student Award, Spring 2022
- Catawba College Impact Award – Undergraduate Research, Spring 2023

Extracurricular Activities:

- Track & Field/Cross Country (2019-2023)
- Beta Beta Beta (βββ**)** Biological Honor Society (2022-2023)

East Carolina University – Greenville, NC – Master of Science in Molecular Biology & Biotechnology '2025

NC State University, PHHI – Kannapolis, NC – *PhD Food Science (Expected graduation 2029)*

REFERENCES:

LAUREN ANLLO, Assistant Professor of Biology, East Carolina University – Greenville, NC
(848) 459-7888 – anllol22@ecu.edu – Principal Investigator & Advisor

CARMONY HARTWIG, Associate Professor of Biology and Biochemistry, Catawba College - Salisbury, NC
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