Carmen Ohio

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SUMMARY

Accomplished biochemist developing methods and analyses to investigate the efficacy and mechanism of action of small molecule therapeutics on enzymatic systems. A leader in the department – head of student organizations aimed at uplifting the voices of women and underrepresented groups in chemistry and biochemistry. Aiming to leverage technical expertise and research experience to pioneer novel treatments in chemical biology.

EDUCATION

The Ohio State University, *Columbus, OH* **Expected: 07/2024**

Ph. D Candidate of Chemistry, Graduate Research Assistant Advisor: Prof. Archie Griffin

- Designed high-throughput in vitro evaluation methods for >400 quinone methide precursors (QMPs) for recovery potential against 12 different organophosphorus exposed enzymes by spectroscopic methods.
- Determined aging kinetics of 7 organophosphorus (OP) analogs on dimeric acetylcholinesterase (AChE).
- Explored structural differences in 3 enzyme isoforms through resurrection kinetics leading to the discovery of varied selectivity of QMPs for resurrection resulting in selection of model isoform for in vitro studies.
- Developed methodology for in vitro study of high-affinity QMP by immobilization of target enzyme resulting in the discovery of a new class of reactivators and resurrectors after OP exposure.

Washington University, *St. Louis, MO* **Graduated: 05/2018**

Bachelor of Science, Biochemistry Research Advisor: Prof. Jesse Owens

- *Honors*: Augsbury/North Country Scholar, Outstanding First-Year Student (2015), Washington University Summer Research Fellowship (2016), Warner Award (2017), Memorial Citizenship Award (2017), Stradling Chemistry Research Fellowship (2017), Chemistry Honor Society (2017), Clarke L. Gage Teaching Prize (2018)

RESEARCH EXPERIENCE

Platform Development Intern | **Entrada Therapeutics**, *Boston, MA* **06/2023-08/2023**

- Designed and applied in vitro and ex vivo assays to help expand the application and understanding of Entrada's novel Endosomal Escape Vehicle (EEV) platform.
- Optimized experimental protocol to align results obtained in vitro to in vivo results.
- Developed technical skills in mammalian cell culture, RNA purification, and confocal microscopy.

Research Assistant | **Wellesley College Chemistry Department**, *Wellesley, MA* **06/2018-07/2019**

- Organized and maintained a clean lab environment while overseeing 6 undergraduate research students.
- Investigated antimicrobial peptide efficacies and mechanisms of action through radial diffusion assays, propidium iodide assays, and confocal microscopy culminating in rational design of 2 top performing peptides.

Research Student | **Organic Chemistry Research Fellow**, *St. Louis, MO* **06/2016-05/2018**

- Developed novel synthesis method for production of Morphine analogue through Wagner-Jauregg cycloaddition reactions and high-temperature reactions, resulting in an optimized synthetic pathway.
- Created unique routes of synthesis towards production of precursor molecules using advanced synthetic organic techniques including air-free Wittig reactions, alkylations, and methylations.
- Enhanced problem-solving skills from unsuccessful synthetic routes to successful methods towards desired precursors of morphine analogues through identification of obstacles and devised innovative solutions.

Ohio, C.A,., Elsmore, D. E., Darvus, L. EO. "Using fluorescence microscopy to shed light on the mechanisms of peptides". Future Med. Chem. (2019) 11(18), 2447-2460. Article.

Claywell, W. A., Ohio, C.A., et al. "Treatment of organophosphorus poisoning with 6-alkoxypyridin-3-ol quinone methide precursors: resurrection of methylphosphonate-aged acetylcholinesterase." Chem. Res. Toxicol. (2024) 37(4), 643-657. Article.

Loveland, A. R., Mason, K. A., Ohio, C.A.., et al. "4-Amidophenol quinone methide precursors: effective and broad-scope non-oxime reactivators of organophosphorus-inhibited cholinesterases and resurrectors of organophosphorus-aged acetylcholinesterase." ACS Chem. Neurosci. (2024) Article.

Ohio, C.A., Bernstein H., Charleston, J., et al. "Design and Synthesis of Novel Indanone Linked Quinone Methide Precursors for the Treatment of Organophosphorus Exposure." (2024) Article.

CONFERENCE PRESENTATIONS

2023 | **American Chemical Society National Meeting** | Oral Presentation | Syracuse, NY

2023 | **Chemical and Biological Defense GRS/GRC** | Flash Talk, Poster Presentation | Oakland, CA

2022 | **15th Annual CounterACT Network Research Symposium** | Poster Presentation | New Orleans, LA

2019 | **Biophysical Society 63rd Annual Meeting** | Oral Presentation | Baltimore, MD

2018 | **American Chemical Society National Meeting** | Poster Presentation | New Orleans, LA

LEADERSHIP EXPERIENCE

Co-Chair **| Grambling Research Symposium for Chemical and Biological Defense** **03/2023-Present**

- Coordinate 2-day conference consisting of oral presentations and poster sessions to promote discussion and networking between students and young professionals in the field of Chemical and Biological Defense.
- Evolved communication skills through federal grant writing and correspondence with keynote speakers.

President **| Females of Chemistry Uniting Scientists, The Ohio State University** **4/2023-Present**

- Oversee and lead monthly executive board meetings of 10 members, communicating effectively to set priorities and expectations for each executive position and planned events for the upcoming year.
- Spearhead events aimed to create a support resource for women in S.T.E.M. fields through active discussion workshops, team-building exercises, and guest speakers focusing on female empowerment.
- Orchestrate 2-day annual research symposium consisting of a career panel, 3 student oral presentations, 31 student poster session and 2 invited speaker presentations 2024 with ~150 people in attendance.

Communications Officer **| Joint Diversity Team, The Ohio State University** **01/2023-Present**

- Design monthly newsletters promoting, improving, and celebrating diversity and inclusion in the department of chemistry through facilitating relevant training and highlighting events that align with the group's beliefs.
- Implement monthly book and movie recommendations for self-education on topics of diversity and inclusion.

Secretary **| ChemTALKS, The Ohio State University** **05/2022-Present**

- Efficiently managed administrative tasks such as scheduling room reservations, organizing meetings, and handling correspondence to ensure smooth coordination of the annual Edward Mack Jr. Lecture series.
- Coordinated a clinically embedded therapist as a mental health resource during a movie night showing of "Picture a Scientist" featuring Dr. Ray Blakely, the 2023 Mack Lecturer with 45 students in attendance.

MENTORSHIP

Biochemistry Tutor **| The Ohio State University, Columbus OH** **08/2020-Present**

- Guide 22 undergraduate students in a one-on-one setting through difficult problems to gain a deeper understanding of the overarching conceptual themes of biochemistry
- Aid in the development of critical thinking and time management skills and created custom study plans resulting in all students passing the class.

Graduate Mentor **| Hadsell Lab, Columbus OH** **06/2020-Present**

- Instructed 3 undergraduate researchers and 4 rotating graduate students on good lab techniques, experimental planning, and lab notebook maintenance.
- Advised undergraduate researcher in the creation of their own research project to pursue independently making progress in their field of research, resulting in their acceptance into graduate school.

Teaching Assistant **| Chemistry Department, The Ohio State University, Columbus OH** **08/2019-04/2021**

- Elementary Chemistry Recitation, General Chemistry 1 Recitation, General Chemistry 1 Lab
- Introduction to Biological Chemistry Recitation, Biochemistry and Molecular Biology Lab

RELEVANT SKILLS

Spectroscopic and Analytical Techniques | UV-Vis, MALDI MS, Orbitrap LC-MS, Confocal Microscopy, Flow Cytometry, DNA LabChip, NMR analysis, IR analysis, TLC, Flash Column Chromatography

Molecular Biology Techniques | Protein Purification, RNA Purification, Mammalian and Bacterial Cell Culture, RT-PCR, Gel Electrophoresis, ELISA, Western Blot, DNA Primer Production, Plasmid Prep, Vector Production Radial Diffusion assay, Propidium Iodide Assay, High Throughput Colorimetric assays, Enzyme Kinetics

Computational Analysis and Communication | MATLAB, GraphPad Prism, Integra Assist Plus Programming, Chromas, Genedoc, Lab Notebook Upkeep, Research Documentation, Poster Creation, PowerPoint Design