BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Conner, Justin Lawrence

eRA COMMONS USER NAME (credential, e.g., agency login): JUSTINCONNER

POSITION TITLE: Postdoctoral Fellow

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, including postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Oregon State University	BS	12/2015	Zoology
The University of North Texas	PhD	12/2021	Cardiovascular Physiology
The University of Nevada Las Vegas	Postdoc	Present	Physiology
University of California, Berkeley	Postdoc	Starting 10/2023	Physiology

A. Personal Statement

I am a current NSF Postdoctoral Fellow in the Department of Biology at the University of Nevada Las Vegas. My academic training up to this point has prepared me to research the mechanisms that allow vertebrates to be tolerant of hypoxemia and oxidative stress. My PhD work primarily focused on the effect of embryonic exposure to hypoxia and hypercapnia on the adult phenotype in non-model vertebrates (reptiles). Our work implies that in other vertebrates, phenotypic changes associated with hypoxia during ontogeny are not necessarily pathological. During my PhD, I gained micro-surgical skills and other skills relevant to physiological phenotyping. To become more integrative, I pursued a postdoc experience that would allow me to develop a skill set in 3D cell culture.

For my current NSF postdoc, I am studying metabolic plasticity in a novel mammalian model (*Tenrec ecaudatus*) that promises to upend previous assumptions about metabolism within mammals. To understand metabolism in these organisms (at a tissue level), I was trained in the development of adult stem cell (ASC)-derived 3D organized organoids. This skill has led to two fruitful collaborations during my postdoc. One of which is with the biotech startup Fauna Bio. Fauna Bio utilizes functional genomics to identify the protective physiological mechanisms that enable survival in extreme animal models in the hope of developing novel treatments for human diseases. This has led to our current collaboration where I received funding for research expenses related to developing organoids and they will have access to organoids developed from disease-resistant mammalian species. The second of which is with Dr. Allyson Hindle on a project funded by Translation Research Institute for Space Health (TRISH). TRISH works towards addressing the human health challenges that come with deep space exploration. For this project, I am developing liver organoids from hibernating ground squirrels and humans in order to determine the dynamics of body temperature in relation to metabolic suppression, with a major goal of understanding how temperature affects proteome stability and metabolic flexibility in organoid models. For my next postdoc, I wish to expand my training in oxidative stress and redox signaling in order to combine all of my previous research experience to study ischemia/reperfusion injury.

Dr. José Vázquez-Medina has decades of experience studying redox stress within mammalian systems. Dr. Vázquez-Medina is currently in possession of a MIRA R35, funding the investigation of Prdx6, a multifunctional enzyme with both glutathione peroxidase activity and calcium-independent phospholipase A2 (PLA2) activity. This project provides me with the best opportunity to further develop my understanding of redox homeostasis. Dr. Vázquez-Medina is also an amazing mentor because he is the first ever Latinx faculty member in the history of UC Berkeley's Integrative Biology Department. He will provide insight into navigating a department as a minoritized scientist. By combining my unique research background with that of the world-class expertise of the Vázquez-Medina lab, I can pave my unique research path; establishing my independent research lab using a comparative biology approach to understand the basic mechanisms involved in ischemia/reperfusion injury.

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2023-Present
2022-2023 NSF Postdoctoral Fellow in Biology, the University of Nevada Las Vegas, Las Vegas, NV
2015-2021 Graduate Research Fellow, the University of North Texas, Denton, TX
2012-2015 Undergraduate researcher, Oregon State University, Corvallis, OR

Honors

2022-American Physiological Society, Martin Frank Diversity Travel Award.
2022-Invited speaker, Iowa State University, College of Veterinary Medicine Biomedical Sciences Seminar. "Kidney function during hibernation in ground squirrels".
2021- Invited speaker, Oregon State University, "Navigating to Excellence: Finding Success as a Minority within STEM". OR-AMP/Pacific Northwest-LSAMP Conference.

C. Contributions to Science

1. **Implications of embryonic exposure to hypoxia in non-model vertebrates**. Chronic hypoxia has been important in understanding phenotypic plastic periods during ontogeny. mound nesting reptiles are a great model for this question because their eggs are subjugated to fluctuations in environmental conditions, including changes in atmospheric oxygen concentrations. Our studies have found that chronic hypoxic incubation results in cardiac enlargement, changes in blood flow regulation, and metabolic plasticity. These studies imply that hypoxia during ontogeny in some vertebrate species may not result in a pathological adult phenotype.
    a. Crossley, D. A., Ling, R., Nelson, D., Gillium, T., **Conner, J**., Hapgood, J., Elsey, R., Eme, J. (2012). Metabolic responses to chronic hypoxic incubation in embryonic American alligators (Alligator mississippiensis). *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology*, *203*, 77-82.
    b. Wearing, O. H., **Conner, J**., Nelson, D., Crossley, J., & Crossley, D. A. (2014). Embryonic hypoxia programs postprandial cardiovascular function in adult common snapping turtles (Chelydra serpentina). *Journal of Experimental Biology*, *220*(14), 2589-2597.
    c. Crossley, D. A., Smith, B., Crossley, J., **Conner, J**., Elsey, R., and Wang, T. (2023). Development Affects Blood Flow Patterns and Heart Rate in Juvenile American Alligators During Digestion. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* (just accepted).
2. **Does the left aorta of crocodilians serve to aid in digestion?** In reptiles, the pulmonary and systemic circulation are not completely separated. Systemic venous blood can bypass the pulmonary circulation (R-L shunt). In crocodilians, it has been hypothesized that the R-L shunt serves to deliver CO_2-rich blood to donate protons for gastric acid secretion. This hypothesis was based on the unique crocodilian anatomy where a left aorta appears to preferentially supply the GI system. My goal was to determine the blood gas composition in the Left Aorta (LAo) and Right Aorta (RAo) during digestion. My work provided evidence that the LAo does not aid in digestion. This data put to rest a long-standing hypothesis behind the cardiovascular anatomy of crocodilians.

   a. **Conner, J**., Crossley, J., Elsey, R., Nelson, Wang, T., Crossley, D. A (2019). Does the left aorta provide proton-rich blood to the gut when crocodilians digest a meal? *Journal of Experimental Biology*, *222*(7), jeb201079.

3. **Convergent evolution of atrioventricular conduction systems.** Both mammals and birds possess atrioventricular conduction systems that allow for rapid activation of both ventricles. The evolutionary benefit of this is that it allows for the dynamic cardiac outputs required to sustain endothermy (being warm-blooded). Crocodilians are unique in that they are ectothermic (cold-blooded) yet are monophyletic with birds. This study aimed to characterize the conduction system of crocodilians to determine if the atrioventricular conduction is a consequence of convergent evolution imposed by endothermy. We found that the ventricular Purkinje network was absent in crocodilians, suggesting that its evolution is strongly associated with endothermy.
   a. Jensen, B., Boukens, B., Crossley, D., **Conner, J**., Mohan, R., Duijvenboden, K., Postma, A., Gloschat, C., Elsey, R., Sedmera, D., Efimov, I., Christoffels, V. (2018). Specialized impulse conduction pathway in the alligator heart. *Elife*, *7*, e32120.

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

NSF-DBI 2109649 J. Conner (PI) 01/01/2022- 01/01/2024
Postdoctoral Fellowship
The goal of this project is to exploit a unique mammalian system to understand how body temperature influences nutrient extraction from food.

Fauna Bio, Strategic partnership J. Conner (PI) 09/01/2022-09/01/2023
The goal of this project is to develop organoids from novel mammalian models that can be used to better understand human disease.

Completed Research Support

Company of Biologist J. Conner (PI) 12/04/2018-05/01/2019
This fellowship funded my travel to Aarhus University, Aarhus, Denmark. Where I conducted experiments better understand the regulation of digestive capacity in Burmese pythons.