

ECR SPOTLIGHT

ECR Spotlight – Igor Noll Guagnoni

ECR Spotlight is a series of interviews with early-career authors from a selection of papers published in Journal of Experimental Biology and aims to promote not only the diversity of early-career researchers (ECRs) working in experimental biology but also the huge variety of animals and physiological systems that are essential for the 'comparative' approach. Igor Noll Guagnoni is an author on 'Cardiovascular responses and the role of the neurohumoral cardiac regulation during digestion in the herbivorous lizard *Iguana iguana*', published in JEB. Igor conducted the research described in this article while a master's student in Luiz Henrique Florindo's lab at São Paulo State University (UNESP), São José do Rio Preto, Brazil. Igor is now a PhD student in the lab of Luiz Henrique Florindo at São Paulo State University, Brazil, and Tobias Wang's lab at Aarhus University, Denmark, investigating cardiorespiratory physiology applied to animal conservation and evolution.

How did you become interested in biology?

My interest in biology began at a very young age. I always had a natural fascination with the biodiversity of animals, which was fuelled by my teachers throughout my childhood and teenage years, who introduced a scientific perspective to nature. During these lessons, I was always fascinated by the physiological systems of animals and how these systems enabled them to live and survive in their respective habitats. I also developed a great interest in the evolutionary history that allowed these creatures to occupy their specific niches at that particular time.

Describe your scientific journey and your current research focus

I was introduced to the field of physiology by Professor Luiz Henrique Florindo and Dr Vinicius Araújo Armelin during my undergraduate degree (BSc) in Biology at São Paulo State University. There, I started my work in experimental biology, studying the cardiorespiratory responses of vertebrates during digestion, with a special focus on the autonomic control of the heart. After that, during my master's degree, I was fascinated by the strange and magnificent physiology of reptiles, continuing the theme of digestion but in herbivorous lizards – a project that resulted in the publication in JEB. During this time, I also had the opportunity to work with a variety of vertebrate species, which constantly challenged me in standardizing study protocols in experimental biology. This experience gave me the confidence and independence to explore a new topic in my PhD, a controversial topic of great importance for the conservation of aquatic ecosystems: the toxicological effects of pesticides on the physiology of aquatic organisms. Currently, I am investigating the impacts of fipronil contamination (an insecticide widely used in agriculture) on the cardiorespiratory function of fish in collaboration



Igor Noll Guagnoni

with Professor Tobias Wang in the Zoophysiology Section at Aarhus University, Denmark.

How would you explain the main findings of your paper to a member of the public?

The article investigates the cardiovascular and metabolic responses of green iguanas (*Iguana iguana*) during digestion, as well as the cardiac control in this process. Most studies on this topic in ectothermic vertebrates focus on snakes that fast for long periods and consume large prey. As a consequence, they exhibit a significant increase in metabolic rate and heart rate through the autonomic nervous system control and the presence of circulating factors that may be released into the bloodstream or directly target organs (non-adrenergic non-cholinergic factors, known as NANC factors). However, what about animals that do not follow this dietary pattern, such as herbivorous lizards? The mechanistic understanding of the factors influencing physiological responses during digestion and the comparison between the effects of animal- and plant-based diets are critically lacking. Therefore, we focused on a herbivorous lizard, which has a different diet from those typically investigated in other studies. Our results revealed that green iguanas experience a subtle but significant increase in metabolism and heart rate during digestion. However, in contrast to other reptiles studied so far, the

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Specimen of the green iguana (*Iguana iguana*) used in the recently published research in JEB on the cardiometabolic responses of iguanas during digestion. Photo credit: Carlos Eduardo de Souza, São Paulo State University, Brazil.

rise in heart rate during digestion was triggered only by autonomic control of the heart with no evidence of NANC factors, highlighting the need for future studies to not only explore the cardiac effects of various regulatory peptides but also identify these peptides and the reasons for their presence during digestion in some animals and their absence in others.

Why did you choose JEB to publish your paper?

JEB is a leading journal in the field of animal physiology and comparative physiology, which makes it an excellent choice for publishing my work. From the outset, I have aimed to contribute to

the knowledge I have developed in this prestigious journal. The decision to publish in the JEB is in line with my desire to share the discoveries we have made in our country, home to the world's greatest biodiversity, with an international and influential community in the field. In addition, I admire the remarkable initiative of the JEB to highlight the work of early career researchers and support them through various types of grants. These factors reinforced my desire to contribute to this community.

What are the potential implications of your current research for your field of study?

The project I have been developing for my PhD specifically focuses on the effects of acute exposure to the insecticide fipronil on the cardiorespiratory function of fish, using the lowest concentrations found in the aquatic environment. This approach is essential to replicate natural conditions and to understand the potential effects of fipronil on fish and vertebrates in general. In addition, this project will contribute to understanding the impacts of fipronil contamination on wildlife and the potential economic and social impacts associated with aquaculture. Given the presence of this insecticide in many water bodies around the world, it is crucial to understand its effects on the cardiorespiratory system, which is responsible for supplying the metabolic demands necessary for the proper development and growth of animals.

Reference

Guagnoni, I. N., Armelin, V. A., Braga, V. H. D. S., Monteiro, D. A. and Florindo, L. H. (2024). Cardiovascular responses and the role of the neurohumoral cardiac regulation during digestion in the herbivorous lizard *Iguana iguana*. *J. Exp. Biol.* 227, jeb247105. doi:10.1242/jeb.247105