

# Avian Behavior, Physiology, and the Gut Microbiome

Melanie Florkowski<sup>1\*</sup>, Sarah A. Hamer<sup>1,2</sup>, Gil G. Rosenthal<sup>1,3</sup>, & Jessica L. Yorzinski<sup>1,4</sup> <sup>1</sup> Ecology and Evolutionary Biology Interdisciplinary Program, Texas A&M University <sup>2</sup> Department of Veterinary Integrated Bioscience, Texas A&M University <sup>3</sup> Department of Biology, Texas A&M University <sup>4</sup> Department of Ecology & Conservation Biology, Texas A&M University \*mflorkow@tamu.edu

## Introduction

- The gut microbiome contributes to the health of its host through assisting in nutrient uptake and immune development
- It can also alter host behavior

# Hypothesis

The diversity of the gut microbiome influences behavior through the immune system.

## Predictions

Birds with more diverse gut microbiomes will:

- 1. Have higher dominance status
- 2. Exhibit increased exploratory behavior
- 3. Have a stronger immune responses
- 4. Complete problem-solving tasks faster

## Methods

- 45 house sparrows
- Captured in Brazos Valley
- March-Aug 2020





Collect additional fecal sample before releasing bird





Measure latency to solve food puzzles



Measure cellmediated immunity with a PHA antigen





quency

Ð

С Ц



Measure male birds' "badge of status"



Measure exploratory behavior in a novel environment

We found individual variation in the birds' immune responses. Once we have the fecal samples sequenced, we will examine the relationship between the gut microbiome and the immune responses. We will also examine the gut microbiome's relationship to behavior.

Cryan, J.F. & O'Mahony, S.M., 2011. Neurogastroenterology & Motility. Bokony, V. et al., 2014. Behavioral Ecology. Mutzel, A. et al., 2010. Animal Behaviour. Martin, L.B. et al., 2006. Functional Ecology. Pan, D. & Yu, Z., 2014. Gut Microbes.



**T3:** TEXAS A&M TRIADS FOR TRANSFORMATION A President's Excellence Fund Initiative

## **Preliminary Results**



0.5 0.2 0.3 0.4Immune Response

## References

Acknowledgments: Texas A&M Triads for Transformation, Grant-In-Aid of Research from Sigma Xi, The Scientific Research Society, American **Ornithological Society**