

Marquette University: Biological sciences professor receives \$1.17 million NSF grant to study sex chromosome evolution in lizards and snakes

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MILWAUKEE — [Dr. Tony Gamble](#), associate professor of biological sciences in Marquette University's Klingler College of Arts and Sciences, has received a \$1.17 million grant from the National Science Foundation to study sex chromosome evolution in lizards and snakes.

The main objective of this research project is to fill gaps in knowledge by identifying sex chromosomes in lizards and snakes, which are under-studied, and subsequently use this data to characterize some general properties of their evolution. Comparative studies of such chromosomes in natural groups with repeated transitions among sex-determining mechanisms, like the lizards and snakes, can help answer longstanding questions about the evolution of these chromosomes.

"Sex chromosomes play an important role in developmental and evolutionary biology, but the sex chromosomes of most vertebrate species remain unidentified," Gamble said. "This lack of data has prevented a thorough understanding of the broad evolutionary patterns of sex chromosome evolution. Lizards and snakes are an excellent model to study sex chromosomes because they have a variety of sex-determining systems with numerous transitions among them."

Gamble's research will integrate comparative genomics, transcriptomics and phylogenetics to enhance the utility of lizards and snakes as a model to investigate

chromosome evolution. This research will address questions such as whether sex chromosomes are an evolutionary trap; whether some chromosomes are preferentially recruited as sex chromosomes than others; how gene expression changes on the chromosomes over time; and the relative role of rearrangements vs. sex-biased recombination in suppressing recombination between the chromosomes.

“This grant offers a unique opportunity for Dr. Gamble and his lab. It will provide valuable insights into sex chromosome evolution and establish foundational knowledge in a crucial area of study,” said [Dr. Heidi Bostic](#), dean of the Klingler College of Arts and Sciences. “His research is an example of the pursuit of transformational knowledge through excellence and innovation that is at the heart of what we seek to do at Marquette.”

Upon completion, this project will enable subsequent investigations into the mechanisms that drive sex chromosome evolution in lizards and snakes and establish a framework for comparative analyses of sex chromosome evolution across the tree of life.