

Study shows animal mating choices more complex than once thought

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When female tiger salamanders choose a mate, it turns out that size does matter - tail size that is - and that's not the only factor they weigh.

Findings of a Purdue University study show that animals make more complex decisions about choosing mates than once thought. The results of Andrew DeWoody's study, released Monday (June 8) in the journal *Molecular Ecology*, refute a theory that animals use major histocompatibility complex (MHC) genes as the sole basis for mate choice. Immunologists have long known that MHC genes play key roles in the [immune response](#), but more recently behavioral ecologists have postulated that animal mate choice is often based on MHC-type because of the function of those genes.

"Our data indicate that mate-choice decisions aren't solely dependent on MHC, tail length, body size or any other single factor," said DeWoody, a professor of genetics. "Mate choice is a complex process that takes many factors into account."

DeWoody and David Bos, a former postdoctoral assistant who is now a continuing lecturer at Purdue, set out to see how much MHC genes affected mate choice in wild animals. Most prior research showed that an animal would choose a mate with MHC that is the most divergent from its own so that offspring will have more effective immune systems.

Earlier studies in mice suggest that MHC diversity was the sole [genetic basis](#) for mate choice. But DeWoody said those studies used mice that

were genetically the same in every way except for MHC.

"Sure, mice might base mate-choice decisions wholly on MHC if there is no other consideration, if they don't have any other factors to choose from," DeWoody said. "But wild animals have a lot of different characteristics they can choose from, not just MHC."

Proteins encoded by MHC serve as the immune system's sentry. MHC proteins expressed on the cell surface bind and display small peptides (bits of protein) to T-cells. T-cells interrogate the peptides and determine if they are foreign. If so, the immune response is activated. The more MHC diversity a person or animal has, the more peptides it is able to bind and display over to [T-cells](#), making it less susceptible to infection.

DeWoody and Bos used tiger salamanders because of their unique mating habits in which females make the sole decision on choosing a mate. Males deposit spermatophores, or sperm packets, for females, who choose the ones that will be used to fertilize their eggs. The females are choosy because they want a mate whose attributes will increase the fitness of their offspring, DeWoody said.

Using wild tiger salamanders, DeWoody and Bos gave each female a choice between two males. They checked the offsprings' genotypes to identify parentage and found that the largest females chose the more MHC-similar mates, not the most divergent ones as expected under prevailing theory. The remaining females seemed to mate at random with regard to MHC.

In addition to MHC, tail length plays a role in reproductive success. Male salamanders with longer tails were twice as likely as those with shorter tails to be chosen as sires.

Bos said it's possible that other factors outweighed MHC for some of the

females.

"There may very well be trade-offs," Bos said. "Getting a mate with diverse MHC, large body size and other characteristics might be nice, but getting all of those characteristics might not be practical."

The National Science Foundation funded DeWoody's research. Both DeWoody and Bos would like to conduct similar tests on other MHC genes or on animals in more complex environments. Bos said understanding the factors used to determine [mate choice](#) could lead to better understanding of mating habits in all animals, including humans.

Source: Purdue University ([news](#) : [web](#))

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