Study first to show transgenerational effect of antibiotics

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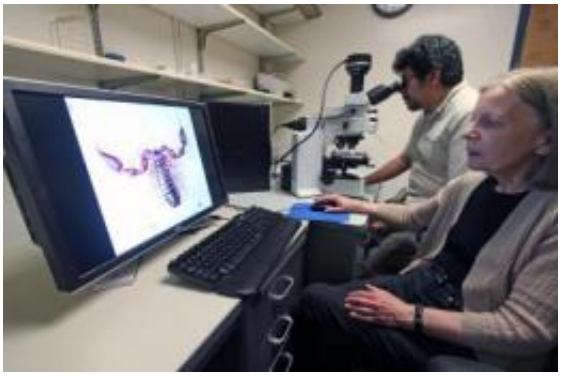

Jeanne Zeh, lead author of a paper published in Nature's open access journal *Scientific Reports* today, examines a pseudoscorpion using a microscope operated by graduate student, and one of the co-authors, Melvin Bonilla. Zeh is an assistant professor in the Department of Biology in the University of Nevada, Reno's College of Science. The paper is the first to report the transgenerational effects of tetracycline. Credit: Photo by Mike Wolterbeek, University of Nevada, Reno.

In a paper published today in Nature's open access journal *Scientific Reports*, researchers at the University of Nevada, Reno report that male pseudoscorpions treated with the antibiotic tetracycline suffer significantly reduced sperm viability and pass this toxic effect on to their untreated sons. They suggest that a similar effect could occur in humans and other species.

"This is the first research to show a transgenerational effect of antibiotics," David Zeh, chair of the Department of Biology in the College of Science, said. "Tetracycline has a significant detrimental effect on male reproductive function and sperm viability of pseudoscorpions – reducing viability by up to 25 percent – and now we know that effect is passed on to the next generation. We didn't see the effect in subsequent generations."

The research involved a three-generation study of the pseudoscorpion, *Cordylochernes scorpioides*, a small scorpion-like arachnid. To control for genetic influences, in the first generation, brothers and sisters from each of 21 broods were either treated with weekly doses of tetracycline from birth to adulthood or were reared as untreated controls. Subsequent generations were not treated with tetracycline. The antibiotic had no effect on male or female body size, sperm number or female reproduction, they found.

In the article, lead author and assistant biology professor Jeanne Zeh surmises that tetracycline may induce epigenetic changes in male reproductive tissues that may be passed to sons — changes that do not alter the sequence of DNA but rather alter the way genes are expressed.

The broad-spectrum antibiotic tetracycline is commonly used in animal production, antimicrobial therapy, and for curing arthropods infected with bacterial endosymbionts such as Wolbachia. Despite more than six decades of therapeutic and agricultural use that has resulted in the evolution of widespread bacterial resistance, tetracycline is still commonly used as an additive in animal feed and as an accessible antimicrobial therapy in developing countries.

Provided by University of Nevada, Reno