

Researchers attempt to stop the kiss of death

December 2 2015, by Evelyn Perez



Rhodnius prolixus. Credit: Erwin Huebner

Researchers at Florida International University are on a mission to control and eliminate [Chagas disease](#), which affects about 7 million people worldwide and can cause premature heart failure or gastrointestinal issues.

Chagas disease is spread by *Rhodnius prolixus* and other kissing bug species.

Not as sweet as it sounds, the kissing bug earned its name because it bites people's faces, usually around the mouth, and feed on their blood at night. The insects typically defecate after feeding and can pass the *T. cruzi* parasite that causes the disease if the person accidentally rubs the infected feces into the bite wound. The Centers for Disease Control and Prevention (CDC) has reported infections in Arkansas, Arizona, Tennessee and Texas and is warning Floridians about the potentially deadly disease.

Biologists Fernando G. Noriega and Marcela Nouzova are part of the international research team who sequenced nearly all of *Rhodnius prolixus'* DNA, completing a comprehensive analysis of its genetic material. Understanding an organism's genetic makeup helps understand how its genes work together to direct the growth, development and maintenance of the entire organism. The researchers found large and unique expansions—or duplication of genes followed by the gradual transformation of one gene into a different gene—related to feeding, digestion and stimuli detection. Each of these expansions may have facilitated the kissing bug's strict blood-feeding lifestyle. The study, led by Universidade Federal do Rio de Janeiro, was recently published in the scientific journal *PNAS*.

"DNA sequencing is a dynamic process that never ends," Noriega said. "There will always be gaps of information that are either filled or corrected with time. But this is the first, complete DNA sequence of a blood-sucking insect that is not a mosquito nor a fly that transmits an important parasitic disease affecting humans."



Rhodnius prolixus. Credit: Erwin Huebner

The researchers also found a peculiar relationship between the kissing bug and *T. cruzi* where the parasite is either not detected or is tolerated by the bug's immune system, allowing it to successfully live and survive within it and be transmitted to a person or animal. This insight provides a new starting point for further studying the kissing bug's evolutionary

adaptations.

"Having access to the complete annotated DNA sequence of the kissing bug completely changes our understanding of it and its relationships with the parasite and human hosts," Noriega said. "We hope this information will allow for the development of novel strategies to control this important Chagas disease vector."

Kissing bugs are mostly nocturnal and suck the blood of mammals, reptiles and birds. They are common in Mexico, Central America and South America, as well as in the southern U.S., as far west as Hawaii and as north as Pennsylvania. They are typically found under porches; under cement; in rock, wood, brush piles or beneath bark; in rodent nests or animal burrows; and in outdoor chicken coops and dog houses or kennels. Because most indoor structures in the U.S. are made of plastered walls and sealed entryways, [kissing bugs](#) rarely infest indoor areas of houses, but they may be found in areas of rodent infestation; near pet areas; and in bedrooms, especially under or near mattresses or night stands.

To keep kissing bugs away from your home, the CDC recommends:

- Sealing cracks and gaps around windows, walls, roofs and doors
- Screening windows and doors
- Cleaning up piles of rock, wood and brush near the home
- Bringing pets indoors to sleep
- Placing lights, which may attract the bugs, away from the home.
- Keeping your house and pet areas clean and checking for the presence of bugs

Chagas disease affects about 7 million people worldwide and can cause premature heart failure or gastrointestinal issues. If you suspect you may have contracted the disease, you should see a health care professional

right away since the [disease](#) can be life-threatening if left untreated. If you find a kissing bug, the CDC says not to touch or squash the bug. Instead, place a container on top of the bug, slide the bug inside, and fill it with rubbing alcohol or freeze the [bug](#) in the container. Then, you may take it to your [local extension service](#), health department or a university laboratory for species identification, or contact the [CDC's Division of Parasitic Diseases and Malaria](#) for identification or testing.

More information: R. D. Mesquita et al. Genome of *Rhodnius prolixus*, an insect vector of Chagas disease, reveals unique adaptations to hematophagy and parasite infection, *Proceedings of the National Academy of Sciences* (2015). [DOI: 10.1073/pnas.1506226112](https://doi.org/10.1073/pnas.1506226112)

Provided by Florida International University

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