# Science pic: Kiss me deadly [1]

From Our Labs [2]
**Author:** K.C. Swanson

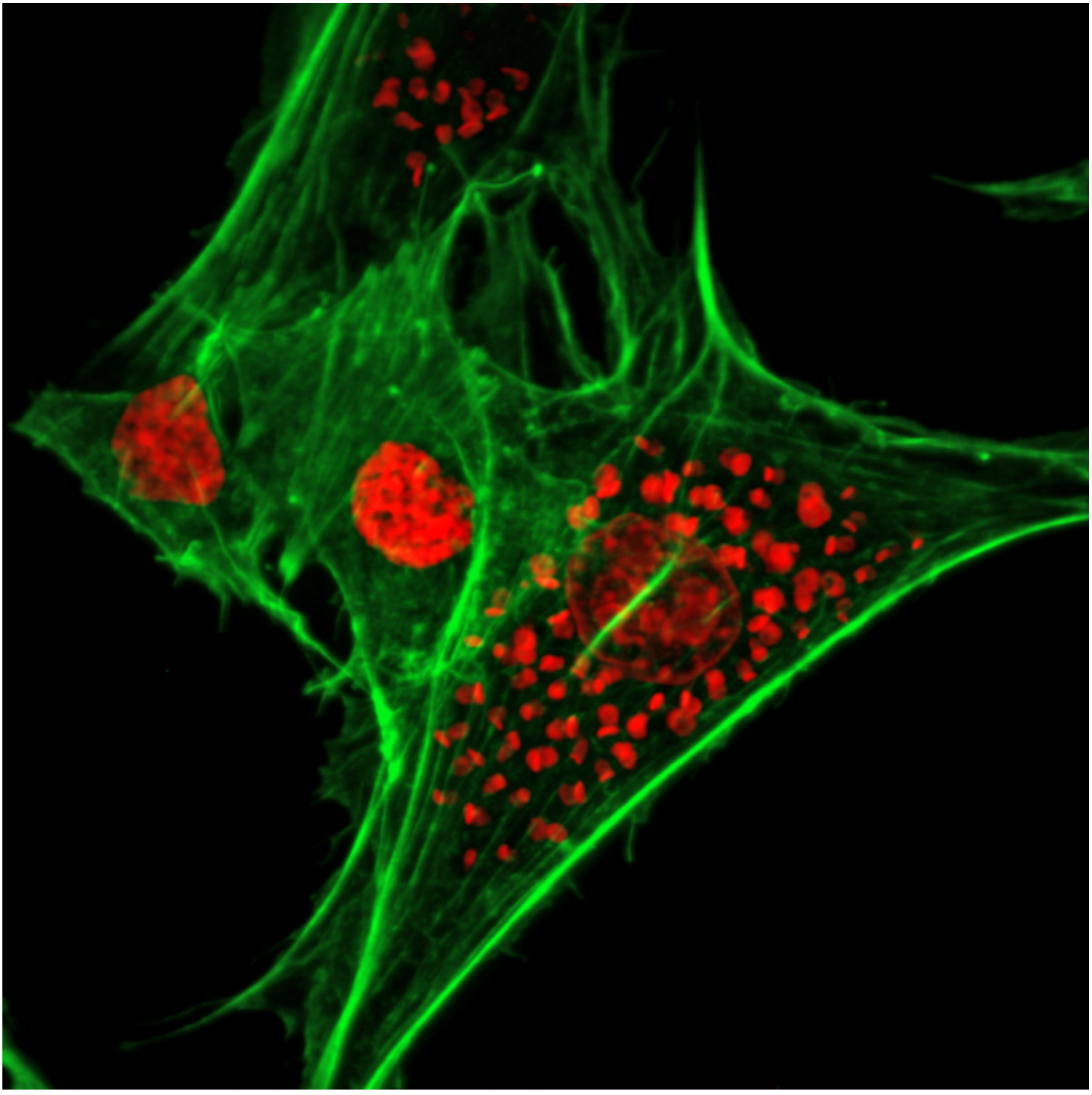

Photo by Doug Quackenbush and Jaime Ballard/GN

Kissing and parasites shouldn't mix. But Chagas disease, spread by so-called "kissing bugs," or triatomine insects, unfortunately combines the two. The trouble starts when bugs harboring Trypanosoma cruzi (T. cruzi) protozoa emerge at night from cracks in the walls of homes in Central and South America made of affordable materials such as mud or adobe. The insects bite sleeping human victims, often on the face – that's the "kiss."

Then – to cement the nasty reputation that led to the insects' other nickname, "assassin bugs" – they leave behind infected waste that people unwittingly brush into the wound. The resulting illness can eventually lead to serious heart and gastrointestinal problems, in some cases death.

Researchers at the Genomics Institute of the Novartis Research Foundation (GNF) [3] are searching for ways to cripple the parasite. Using an approach called chemical genomics, they're homing in on proteins that the parasite relies on for survival. The team recently reported one such protein—cytochrome *b*, a promising target for drug discovery—in *PLoS Pathogens* [4].

An estimated eight million people are infected with *T. cruzi*, with another 40,000 becoming infected each year. In fact, Chagas disease is one of a group of five parasitic illnesses that the U.S. Centers for Disease Control and Prevention has named as a public health priority, given the number of people afflicted, severity of the illness, and lack of effective treatments.

"There's an urgent need to discover new drugs that comply with modern standards," says Fero Supek, the corresponding author on the *PloS Pathogens* paper and a senior investigator at GNF.

His team is on the case. First, the researchers conducted a massive screen, dousing *T. cruzi*-infected cells with hundreds of thousands of compounds and monitoring the results. They identified a compound that stunted the growth of the parasite without harming host cells. But they were puzzled as to how it was working.

The next step was to identify the target of the compound. The researchers spent 11 months developing a new strain of *T. cruzi*, allowing it to evolve resistance to the compound. They used whole genome sequencing to search for fresh mutations in the DNA of the compound-resistant parasite. What they discovered is that a change had occurred in the gene for cytochrome *b*, a protein that plays a major role in energy production.

"It's very advantageous to know not only that a given compound can kill a parasite, but also how it happens," says Supek. "This helps us understand how to optimize the compound through medicinal chemistry and makes it easier to predict toxicity."

Further testing confirmed that the compound does not interfere with the mammalian form of cytochrome *b*. But it might disable the form produced by parasites related to *T. cruzi*, including the protozoan that causes a disease called leishmaniasis, which is spread by infected sand flies. The GNF compound provides a starting point for a potential drug against multiple diseases.

In the image above, taken by fluorescence microscopy, the cell on the right is infected with *T. cruzi* parasites. Large numbers of parasites appear as red elongated objects with adjacent circular shapes; they surround the cell nucleus, also in red.

**Tags:**
Biomedical Research [5]
Drug Discovery [6]
Novartis Institutes for BioMedical Research [7]
New Scientific Discoveries [8]

---



**Links**
[1] https://www.novartis.com/stories/from-our-labs/science-pic-kiss-me-deadly
[2] https://www.novartis.com/stories/from-our-labs
[3] https://www.gnf.nibr.com/
[4] http://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1005058
[5] https://www.novartis.com/tags/biomedical-research
[6] https://www.novartis.com/tags/drug-discovery
[7] https://www.novartis.com/tags/novartis-institutes-biomedical-research
[8] https://www.novartis.com/tags/new-scientific-discoveries