

# Bacteria show promise in fending off global amphibian killer

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First in a petri dish and now on live salamanders, probiotic bacteria seem to repel a deadly fungus being blamed for worldwide amphibian deaths and even extinctions. Though the research is in its early stages, scientists are encouraged by results that could lead the way to helping threatened species like mountain yellow-legged frogs of the Sierra Nevada mountains of southern California.

The research, conducted by biology Professor Reid N. Harris at James Madison University, Harrisonburg, Va., and funded by the National Science Foundation, is being presented May 23, 2007 at the 107th General Meeting of the American Society for Microbiology (ASM) in Toronto.

Experiments have shown that *Pedobacter cryoconitis*, bacteria found naturally on the skin of red-backed salamanders, wards off the deadly chytridiomycosis fungus. In late 2004, Australian researchers cited chytridiomycosis as one of the main factors imperiling up to one third of the world's amphibian populations.

"The exciting aspect is that we identified at least one bacterium from the skin that in both the dish and on the salamander aids the healing process ... one species of bacteria which you could tentatively view as a probiotic," says Harris.

Harris hatched the idea of using the bacteria to fight the skin fungus while researching another amphibian killer, a fungus that attacks their

eggs and embryos. Research by other scientists indicated bacteria on some amphibians produced compounds that were active against the egg fungus.

"So we were starting to work on that and then it suddenly clicked that the emerging fungus killing adults was a chytrid fungus and that the skin bacteria producing antibiotics against the egg fungus could do the same against the chytrid fungus," says Harris.

Working with another scientist at Duke University, Harris was able to create the petri dish experiment, which clearly shows the skin bacteria fending off the fungus. Harris then secured funding from the National Science Foundation. He also has repeated the petri dish experiment on live salamanders.

With the help of postdoctoral assistant Antje Lauer and his students, Harris is continuing work to isolate the most effective antifungal bacteria and grow them in the lab. Of the two he has tested so far, one (*Pedobacter cryoconitis*) has speeded the recovery of infected animals while the other (*Pseudomonas reactans*) has tended to slow the process, at least on the salamanders.

"There will have to be careful testing," say Harris. "Just because on the Petri plate you find a species of bacteria that is anti-chytrid doesn't mean it's going to be anti-chytrid on the amphibian. So we're going to have to do some tests to make sure which ones are actually most effective on the organism. But we did find one."

Eventually, the research could lead to procedures for "vaccinating" endangered populations, Harris said. Other questions, such as whether bacteria from one species could be used to help another, also could be addressed with future research.

Source: American Society for Microbiology

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