

Dead Sea-dwelling microbes reveal roots of protein common to all higher life forms

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(PhysOrg.com) -- We have more in common with Dead Sea-dwelling microbes than previously thought. University of Florida researchers have found that one of the most common proteins in complex life forms may have evolved from proteins found in microbes that live in deadly salty environments.

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The protein ubiquitin is so-called because it is ubiquitously active in all higher life forms on Earth. The protein is essential to the life cycle of nearly all eukaryotic cells — those that are complex enough to have a nucleus and other membrane-bound structures.

Haloferax volcanii microbes, on the other hand, are unique creatures. One of the most [ancient species](#) on the planet, they long ago adapted to conditions far too salty for other organisms — even surviving for thousands of years in dried-out salt lakes.

As they report in the Jan. 7 issue of the journal *Nature*, researchers for UF's Institute of Food and Agricultural Sciences have found that two proteins in *Haloferax* are likely the simple evolutionary precursors of ubiquitin.

These two proteins, dubbed SAMP1 and SAMP2, seem to perform similar functions to ubiquitin without some of enzymes that are needed for ubiquitin to function in eukaryotes, said Julie Maupin-Furlow, the study's lead researcher and professor in UF's department of microbiology and cell science.

The finding not only lends insight into how ubiquitin evolved, but it also reveals that this seemingly complex [protein network](#) may have some simple mechanisms that can be examined for use as potential medical treatments, Maupin-Furlow said.

Researchers are currently investigating [ubiquitin](#)'s role in a broad range of diseases such as cancer, [viral infections](#), neurodegenerative disorders, muscle wasting, diabetes and various inflammatory conditions.

“This opens the door to a new avenue of study for this very important protein,” Maupin-Furlow said. “And it gives us a broader picture of some of the common aspects of life on Earth.”

Provided by University of Florida

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