



# Arsenic-gate: Bacteria, Evolution, and Social Media

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## Background

“Has NASA discovered extraterrestrial life?” “Arsenic life found!” In 2010, a potentially ground-breaking article published in *Science* reported that specialized bacteria found in Mono Lake, California, could replace the phosphorus in its nucleic acids with arsenic. The findings were picked up by every major news outlet in the world and as fast as the headlines made the news, other scientists were expressing doubt, including Dr. Rosie Redfield, professor at the University of British Columbia.



Photo: Ben Haller

## The Research

All organisms, from bacteria to humans, are derived from a common ancestor. Nucleic acids (RNA and DNA) are the building blocks of life and incorporate the same molecules in all species. An organism with arsenic instead of phosphorous implied that life-forms may be able to incorporate alternate elements into the building blocks of life (Wolfe-Simon et al. 2010). Dr. Redfield first reported her doubts on Twitter and on her blog, RRRResearch, expressing concerns about the controls and methods, which led her to attempt to replicate the experiment.

Unusually, Dr. Redfield very publically blogged about her study, requesting feedback from her colleagues and readers about her progress and results. At the same time, the authors of the 2010 *Science* paper did not feel it was their place to engage in public debate. “Any discourse will have to be peer-reviewed in the same manner as our paper was, and go through a vetting process so that all discussion is properly moderated.” Indeed, NASA also weighed in, stating that debate over scientist’s work should not be aired in public media. There were also questions of how science writers could (or should) contribute to the discussion. Ultimately, Dr. Redfield was unable to replicate the results, and her refutation is now also being published in *Science*, after peer-review. These events have raised important questions regarding several pillars of scientific research, including the process of peer-review, the sensationalism of news releases, and the involvement of social media in scientific debate.

## Why This is Important

With the advent of social media and public forums, the intersection between peer-reviewed research and public debate needs to be explored by both the public and scientist.

## To learn more

Dr. Rosie Redfield’s blog: <http://rrresearch.fieldofscience.com/>

Wolfe-Simon et al. 2010. *Science*, 332(6034): 1163-1166 DOI: 10.1126/science.1197258

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