

Newly discovered photosynthetic bacteria is surprisingly abundant

January 20 2016



Researchers sampling bacteria in freshwater lake in the Gobi Desert. Credit: Yonghui Zeng/University of Southern Denmark

A bacterium found in the remote Gobi Desert has shown talents for using the sun's light as energy, and now researchers reveal that it can be

found in surprisingly many different places, including water treatment plants. The bacterium may become a valuable partner for researchers working with environmentally friendly biofuels.

Photosynthesis is one of the most fundamental biological processes on Earth. Normally photosynthesis is performed by plants, but a few bacterial phyla also have the talent.

To date, species capable of performing photosynthesis have been reported in six bacterial phyla, and recently researchers have reported that the talent can be observed in a species belonging to the rare and understudied phylum *Gemmatimonadetes*. The investigated species was isolated from a freshwater lake in the Gobi Desert.

When the researchers studied the bacteria in the lab, they were surprised to discover that the genes responsible for the photosynthesis are nicely ordered in a cluster rather than scattered in the whole genome. This makes it possible to remove the gene cluster.

Using sunlight to produce biofuel

"This is highly interesting because it allows you to transfer the gene cluster to another [bacterium](#) that can use the genes for a desired purpose. An example is to transfer the [gene cluster](#) to the bacterium *E. coli* and thus make *E. coli* capable of using sunlight to produce biofuel", explains postdoc Yonghui Zeng, Nordic Center for Earth Evolution, University of Southern Denmark, who has lead the investigations.

The newly found bacterium gives a perfect example as how to turn a bacterium photosynthetic. After Zeng and colleagues described the bacterium in *Proceedings of the National Academy of Sciences* last year, he set out to learn more about it.

A new paper in *Environmental Microbiology Reports* now describes the abundance of the bacterium.

Also found in water treatment plants

With the help of computational biologist Jan Baumbach's group in Dept. of Mathematics & Computer Science, University of Southern Denmark, Zeng trawled a large number of databases and learned that the bacterium can be found almost everywhere, especially in soil and in [water treatment plants](#). It cannot, however, be found in marine environments.

"Now we know that this bacterium has a talent for [photosynthesis](#), we know it is abundant and we know that the relevant genes can easily be transferred to other organisms. That makes it very relevant for future work with focus on, i.e., figuring out a way to turn the biotechnology workhorse *E. coli* photosynthetic and thus capable of producing biofuels in a more economic way", says Zeng.

More information: Yonghui Zeng et al. Metagenomic evidence for the presence of phototrophic Gemmatimonadetes bacteria in diverse environments, *Environmental Microbiology Reports* (2015). [DOI: 10.1111/1758-2229.12363](#)

Provided by University of Southern Denmark

Citation: Newly discovered photosynthetic bacteria is surprisingly abundant (2016, January 20) retrieved 26 April 2024 from <https://phys.org/news/2016-01-newly-photosynthetic-bacteria-surprisingly-abundant.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is

provided for information purposes only.