

Researchers discover new producer of crucial vitamin

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(Phys.org) —New research has determined that a single group of microorganisms may be responsible for much of the world's vitamin B12 production in the oceans, with implications for the global carbon cycle and climate change.

Although vitamin B12 is an essential molecule required by most life on this planet, it is only produced by a relatively small group of microorganisms because it is so large and complex. For humans, vitamin B12 plays a key role in maintaining the brain and nervous systems, as well as DNA synthesis in cells throughout the body.

Professors Andrew Doxey and Josh Neufeld, from the Faculty of Science at the University of Waterloo, led a study that discovered that Thaumarchaeota are likely dominant vitamin B12 producers. This group from the Archea domain has never before been associated with vitamin B12 synthesis.

"We assumed that most major global sources of something as fundamental as vitamin B12 would have already been characterized, and so this finding changes how we think about global production of this important vitamin," said Professor Doxey.

The researchers, both of whom teach in the Department of Biology at Waterloo, used computational methods to search through vast amounts of sequenced environmental DNA for the genes that make vitamin B12, identifying the likely producers in marine and freshwater environments.

"Because Thaumarchaeota are among the most abundant organisms on the planet, especially in marine environments, their contribution to vitamin B12 production have enormous implications for ecology and metabolism in the oceans," said Professor Neufeld.

The availability of vitamin B12 may control how much or how little biological productivity by phytoplankton takes place in the oceans. Phytoplankton remove carbon dioxide from the atmosphere through photosynthesis, much like plants and trees, thus reducing the atmospheric concentration of this greenhouse gas, the largest contributor to global warming.

The research also found that proportions of archaeal B12synthesis genes increased with ocean depth and were more prevalent in winter and polar waters, suggesting that archaeal [vitamin](#) B12 may be critical for the survival of other species in both the deep and cold [marine environments](#).

The findings were recently published online in the *International Society for Microbial Ecology (ISME) Journal*.

More information: Paper - [www.nature.com/ismej/journal/v ... /ismej2014142a.html](http://www.nature.com/ismej/journal/v.../ismej2014142a.html)

Provided by University of Waterloo

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