

Survival of humans and other complex life linked to natural gene transfer between ancient microorganisms

One of the most pivotal moments in Earth's history was the evolution of the photosynthetic life that suffused air with the oxygen on which virtually all complex life on the planet now depends. Now the mystery of how that moment happened is deepening: Scientists have found that the genes for such photosynthesis apparently came from a now-extinct mystery source.

Prior research suggested this rise in oxygen levels was likely due to cyanobacteria — so-called “blue-green algae” that generally are photosynthetic like plants, harvesting energy from the sun.

However, much remains unknown about when and how cyanobacteria evolved oxygenic photosynthesis.

Until recently, all known cyanobacteria were photosynthetic members of class Oxyphotobacteria.

But in 2013, researchers discovered a nonphotosynthetic class of cyanobacteria known as Melainabacteria. Now Fischer and his colleagues have discovered a second class of nonphotosynthetic cyanobacteria, the Sericytochromatia. The researchers suggest that both groups are clearly closely related to photosynthetic cyanobacteria, based on their genomes, but the two groups do not perform photosynthesis themselves.

The fact that Oxyphotobacteria possess the complex apparatus for oxygenic photosynthesis while their closest relatives do not suggests that Oxyphotobacteria may have imported the genes for photosynthesis from another organism via a process known as lateral gene transfer. It remains a mystery what the source of these genes was, “and because it happened long ago, it's pretty likely that the group may actually have gone extinct,” Fischer said.

The GLP aggregated and excerpted this blog/article to reflect the diversity of news, opinion, and analysis. Read full, original post: [Mystery Microorganism May Have Been the First to Produce Oxygen](#)

For more background on the Genetic Literacy Project, read [GLP on Wikipedia](#)