Small and Mighty: Adaptation of the Superphylum Patescibacteria

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Video Byte

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Abstract

One-third of the Earth's fresh water comes from groundwater repositories. These terrestrial subsurface aquifers are an important source of our drinking water. Understanding the geochemistry and ecology of groundwater – including its microbial communities – is critical for keeping our water safe. A recent study sought to further understand a newly discovered superphylum – Patescibacteria. Patescibacteria is a very large superphylum, with more than 20 candidate phyla defined since 2015. This newly discovered class of bacteria is prevalent in groundwater environments and has limited genetic material. With such little genetic information to work from, the researchers wondered how these bacteria were able to adapt to changes and thrive in their aquatic environment. Using genome-resolved metagenomics, they evaluated sequence data from groundwater-residing Patescibacteria. They found that although these bacteria have extremely small genomes, functions essential to growth and reproduction were retained, while redundant and nonessential functions were sharply reduced. Although more study is needed, the results suggest that Patescibacteria have adapted by streamlining their functions to use minimal genetic information, showing that with these groundwater bacteria, small means big - and less is more.