

# Modern microbialites may be endemic remnants of ancient ecosystems

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Viruses and bacterial viruses (known as phages) are among the most abundant life forms on the planet. Two papers published recently in *Nature*, March 2 and 12, 2008, analyse the geographical distribution of viral communities in modern organosedimentary structures (sedimentary features, built by the interaction of organisms and their environment) known as microbialites, the living analogues of the oldest fossils on Earth, and come up with some surprising nuggets of information.

Microbialites first appeared in the geological record, 3.5 billion years ago, and for more than 2 billion years they are the main evidence of life on Earth. A team of scientists from US and Singapore used a comparative metagenomics approach to show that phages associated with such structures are very different not only from each other but also from those found in any other ecosystem so far. The team's findings indicate that modern microbialites are endemic remnants of ancient ecosystems.

Dr Ruan Yijun, Senior Group Leader at the Genome Institute of Singapore (GIS), said, "Using DNA sequencing technology, we were able to identify unknown viruses in various environments relevant to human health. This collaboration is the first ever large-scale effort to analyse biodiversity and biogeography of viruses in the environments around humans."

"We have been interested in this kind of analysis since the SARS (severe acute respiratory syndrome) outbreak in 2002," added Dr Ruan. "In

pursuit of this interest, we established a virus discovery programme at GIS, resulting in the discovery of abundant viruses in the human gut (PLoS Biology, 2006) and different variants of dengue viruses. Now, with more viral metagenomic data accumulated, we are able to summarise the biodiversity and biogeography on a global scale.”

Microbialites are organosedimentary structures accreted by sediment trapping, binding and in situ precipitation due to the growth and metabolic activities of microorganisms.

Stromatolites and thrombolites are morphological types of microbialites classified by their internal mesostructure: layered and clotted, respectively.

Source: Agency for Science, Technology and Research, Singapore

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