

NEXT YEAR PREVIEW 19 December 2017

2018 preview: Thousands of mystery lifeforms to be revealed



Colin Monteath/Hedgehog House/Minden Pictures

By **Alice Klein**

Get ready for an explosion of life. Next year, thousands of previously unknown microbes will be revealed.

Bacteria and other microbes are all around us, but we know only about 1 per cent of them. The rest are “microbial dark matter”.

It is hard to study these mystery microbes because most can’t be grown in labs. They need the conditions of their natural habitat – be it a hydrothermal vent or our intestines – to survive.

Metagenomics gets around this by taking a sample from a habitat, reading all the DNA in it – its metagenome – then using computers to painstakingly reassemble the genomes of all the organisms.

Metagenomics has already made big finds. In September, Philip Hugenholtz and his team at the University of Queensland, Australia, used it to identify 1749 novel microbial species. But that was just the tip of the iceberg.

Hughenoltz's team is set to unveil another 382 microbial species in 2018. Other groups say they have found thousands of new species in permafrost, geothermal springs, our guts and other places.

Nikos Kyrpides and his team at the US Department of Energy Joint Genome Institute are leading the biggest metagenome project. Next year, they will publish the genomes of more than 100,000 microbial species from a range of environments. They don't yet know how many are new to science, but they expect thousands to be.

Once the genomes have been published, we will be able to study them to find out what each species does. For example, we could scan for patterns that resemble genes in microorganisms known to produce methane or oxygen.

There are many reasons why these findings will be important. A new species may prove useful in medicine or industry, perhaps helping to develop different antibiotics or turn sewage into clean water.

Filling in the microbial family tree will also provide clues to our oldest evolutionary history. For example, we may be able to trace the origins of basic life processes such as respiration and photosynthesis. "This is just the beginning," says Kyrpides.

This article appeared in print under the headline "Life's hidden realm revealed"

Magazine issue 3157, published 23 December 2017

