Microbes answer more questions collectively

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Studying whole microbial communities rather than individual micro-organisms could help scientists answer fundamental questions such as how ecosystems respond to climate change or pollution, says Dr Jack Gilbert writing in the May issue of *Microbiology Today*.

Marine microbes are responsible for 99% of the cycling of the world's gases and nutrients and 50% of the world's primary productivity. "Given the vital role of ocean microbes in maintaining life, getting to grips with the impact of environmental change such as increasing ocean acidity on them is extremely important," explained Dr Gilbert who works at the Plymouth Marine Laboratory.

To realistically assess the environmental impact on microbial communities, all the interactions between different organisms within an ecosystem must be taken into consideration. "This is not possible by simply examining changes in gene expression of individual microbial cells, which is the traditional approach. We need to look at gene expression of a whole community at once," suggested Dr Gilbert.

Dr Gilbert's group studied how populations of microbes in the North Sea responded to increased acidity by bubbling carbon dioxide through seawater and monitoring the change in gene expression of the whole microbial population. The group found an overall increase in genes that would help cells to maintain a constant pH inside the cell under stressful conditions. "This clearly demonstrated that the system was sensitive to change and was able to respond to it accordingly".

The team is planning on repeating the same experiment in the Arctic Ocean. "Microbial communities are more fragile in the Arctic Ocean and by comparing the results we can work out whether the impact of ocean acidification will actually threaten the function of these communities," explained Dr Gilbert. "This kind of research will help us discover how our actions will affect the functioning of an ecosystem. This is vital if we are to act as responsible stewards of the Earth's natural resources," he said.

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