Researchers discover new microbial life in the Mediterranean

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Researchers from the University of Essex have discovered a deep-sea oasis with new microbial life forms that could have significant implications for biotechnology. The findings have been published this week in the journal *Nature*.

The researchers have found that microbial activity, biomass and diversity are greatly increased at the interface between seawater and a salt-saturated brine lake, 3.3 kilometres below the surface of the Mediterranean. These life forms could have significant biotechnological applications such as the development of drugs, the use of enzymes in the manufacture of chemicals and the use of metabolites in the food industry.

The Essex team have been working with researchers from across Europe on the BIODEEP (Biotechnologies from the Deep) project. In order to investigate the depths of the Mediterranean, they employed high-precision sampling equipment including a 4,000m length of cable containing an optical fibre string for a remote-controlled camera.

Dr Terry McGenity, the lead scientist on the Essex team, explained: ‘The hypersaline brine lake, in a depression on the seafloor known as Bannock Basin, was formed many thousands of years ago by dissolution of rock salt that became exposed to seawater as a result of earth movement. Because of the density difference and lack of turbulence at these depths, seawater lies on top of the brine without mixing. It is in this 2.5 metre interface, where there is the change from oxygen-rich seawater to

anoxic, salt-saturated brine that microbial life flourishes.'

'The dramatic increase in microbial activity that we have found may seem perverse given that high concentrations of salt are thought to inhibit life. However, although high salt concentrations do make life more stressful for most microbes, many have adapted to tolerate or even thrive in such environments. The density difference actually serves to trap particles containing organic matter while microbes are also supplied from below with gaseous methane, generated in the anoxic hypersaline brine. Particulate organic matter and methane are food for microbes and so encourage growth.'

The BIODEEP consortium consists of researchers from Groningen, Milan, Messina and Braunschweig as well as those from Essex. Exploratory cruises, led by Drs Cesare Corselli (Milan) and Michael Yakimov (Messina) were conducted in 2001, 2002 and 2003.

Source: University of Essex