MICROBES FROM SPACE: IGNORING FACTS TO OUR PERIL

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In 1981 when the most starting example of extremophilic microorganisms known was possibly *M radiodurans* (1) Fred Hoyle and I wrote thus in "Evolution from Space" (2):

"Bacteria are found occupying tiny specialised niches. Thus J.G. Zeikus and R.S. Wolfe(3) isolated a highly thermophylic methanogenic bacterium which required conditions for replication that were very peculiar, namely an atmosphere with a 4 to 1 mixture of free hydrogen to carbon dioxide and a temperature of at least 40°C. The optimum temperature for growth was 65°C and free oxygen had to be strictly absent. It may be wondered where on the Earth such conditions exist. The answer is in sewage sludge, a product of modern industrial society.

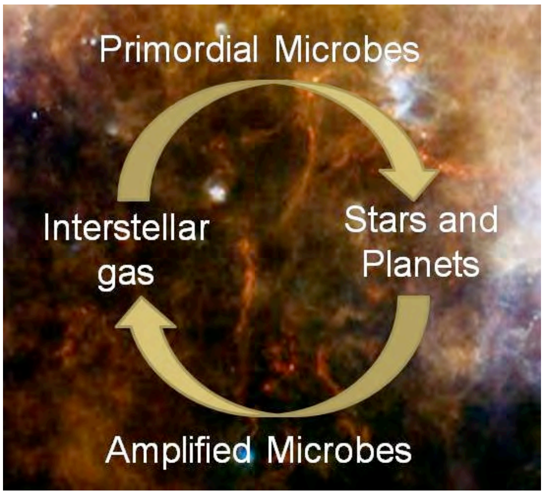

Fig.1 Cosmic Life Cycle

Such cases fit well with our picture. The cycle of Fig 1 contains bacteria with the ability to exist in a range of environments much wider than anything found on the Earth. Bacteria arrive here from space with the full range of cosmic properties, and terrestrial conditions simply filter out the restricted subset that can survive when they arrive at ground-level. The subset depends on available chemical – rocks, soils, ocean water with its dissolved contents, mine tailing, sewage sludge, volcanic hot springs, birds nest and so on. Whenever any new environment, however specialised or small it may be, arises either from natural or manmade causes, new bacteria from the wide spectrum of cosmic possibilities are available to take advantage of it."

The limited range of extremophillic bacteria known in 1978 (1) has now expanded enormously, and terrestrial microorganisms have been exposed to conditions of space and space travel precisely in order to test their space hardiness (4,5,6). The range of survival properties exhibited by microorganism continues to astonish investigators and begins to stretch further the credibility of an entirely Earth-based theory of life.

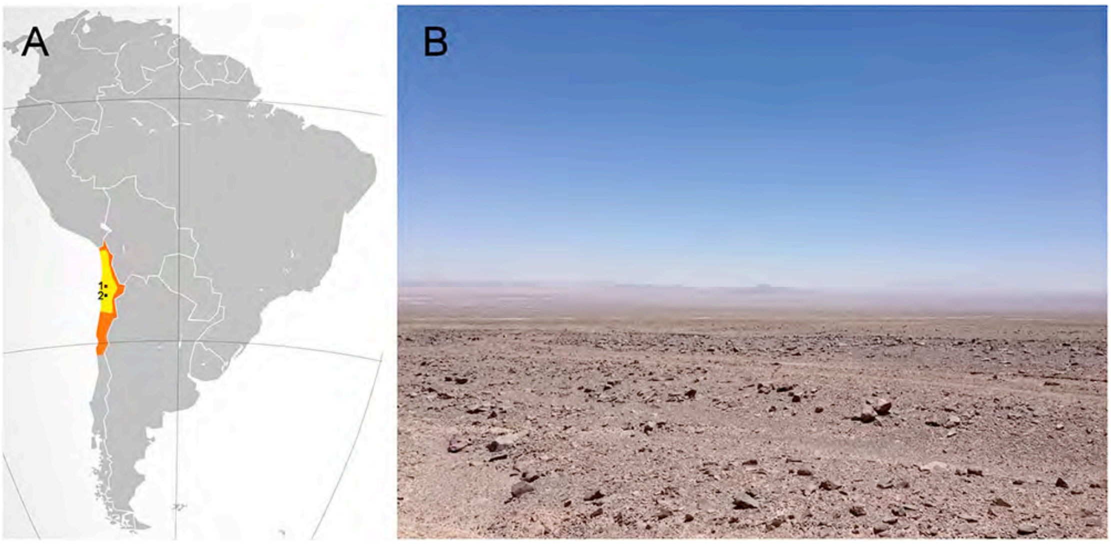

Fig. 2 Atacama desert where hyper-arid conditions can host species of bacteria (credit: https://doi.org/10.3389/fmicb.2017.00993)

Recently an astonishingly hardy species of microbes has been discovered in the Atacama Desert in Chile —one of the most arid and inhospitable places on our planet. Originally thought to be transient visitors blown over from another location it is confirmed that it is indigenous to the desert where it can survive for decades without water (7,8). Because the soil in this region resembles that on locations on Mars, the new discovery is claimed to give credence to the possibility of extant life on the Red Planet – a proposition that was prematurely dismissed after Levin and Straat's ground-breaking discovery in 1976 (8).

Now we have an astonishing array of microbes that have been discovered ringing out in the clearest terms that life is a truly cosmic phenomenon. Life on Earth is part of an interconnected biological system extending beyond Mars and our own solar system into a far distant cosmos. Accepting this simple fact would, in my view, open up vast new vistas of multidisciplinary research that would unquestionably benefit future generations. For a prevailing scientific orthodoxy to persistently ignore such facts and turn a blind eye to this clearest message will surely be to our peril.

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