



Recuperation of Cometary Microorganisms from the Stratosphere

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The Hoyle-Wickramasinghe theory of cometary panspermia posits that terrestrial life was introduced by comets, and predicts that this process can be tested by the detection of an ongoing incidence onto the Earth of biological entities. Searching the stratosphere for microorganisms began tentatively in the 1960's but more serious attempts to recover microorganisms from the stratosphere commenced after 2001. Since this time evidence for a continuing microbiological input from space has accumulated but such evidence has tended to be either overlooked or dismissed as contaminants. Our most recent balloon flight of July 2013 to a height of 22-27 km above Wakefield, West Yorkshire, England led to the collection of several types of microorganisms directly onto electron microscope stubs, some leading to the formation of micro-craters and so confirming infall at high speed as well as their extraterrestrial origin. In one instance a sphere of diameter 30 μm was isolated and found to be mainly composed of titanium in its outer layers (with smaller amounts of vanadium). Nano-manipulation and EDX analysis showed that the titanium sphere contains a carbonaceous non-granular interior material which we suggest is a biological protoplast. Other isolates include distinctly biological filaments, a diatom frustule and a few unidentified biological entities. The relatively large sizes of the particles point decisively to their extraterrestrial origin.