

Novel nano-organisms from Australian sandstones

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ABSTRACT

We report the detection of living colonies of nano-organisms (nanobes) on Triassic and Jurassic sandstones and other substrates. Nanobes have cellular structures that are strikingly similar in morphology to *Actinomyces* and fungi (spores, filaments, and fruiting bodies) with the exception that they are up to 10 times smaller in diameter (20 nm to 1.0 μm). Nanobes are noncrystalline structures that are composed of C, O, and N. Ultra thin sections of nanobes show the existence of an outer layer or membrane that may represent a cell wall. This outer layer surrounds an electron dense region interpreted to be the cytoplasm and a less electron dense central region that may represent a nuclear area. Nanobes show a positive reaction to three DNA stains, [4',6-diamidino-2 phenylindole (DAPI), Acridine Orange, and Feulgen], which strongly suggests that nanobes contain DNA. Nanobes are communicable and grow in aerobic conditions at atmospheric pressure and ambient temperatures. While morphologically distinct, nanobes are in the same size range as the controversial fossil nannobacteria described by others in various rock types and in the Martian meteorite ALH84001.