

Title: Microbial Memory and the Dawn of Communication

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Abstract:

The idea that the Last Universal Common Ancestor (LUCA) was a biofilm will be explored by discussing four hypotheses: 1) The earliest metabolic networks developed in “organic- and biochemical-films made up of RNA, lipids and proteins and referred to as “ribofilms”, 2) The first living entity was a consortium of obligate mutualistic “precells” that used hydrogen as the energy source, 3) Horizontal gene transfer in the earliest biofilms resulted in the “Unity of Biochemistry” through selection and homogenization of the most fit gene sets and eventually to the emergence of a “free-living” cell, and 4) Multicellularity and social behavior developed in early biofilms. These hypotheses will be discussed regarding our search for life elsewhere with particular emphasis on environmental settings and the emergence and implications of multicellularity as the ancient root to social interactions and communication from exchanging genes to the development of a chemical-based language to control community structure and behavior.