Abstract

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Title: The Origin of Cellular Life

The complexity of modern biological life has long made it difficult to understand how life could emerge spontaneously from the chemistry of the early earth. We are attempting to synthesize very simple artificial cells in order to discover plausible pathways for the transition from chemistry to biology. Very primitive cells may have consisted of a self-replicating nucleic acid genome, encapsulated by a self-replicating cell membrane. A chemically rich environment that provided the building blocks of membranes, nucleic acids and peptides, along with sources of chemical energy, could have led to the emergence of replicating, evolving cells. However, no process for the replication of a nucleic acid genome, independent of evolved enzymatic machinery, has yet been described. I will discuss our recent progress towards the realization of an efficient and accurate system for the chemical replication of RNA.