

three-step evolution of primordial life

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It is assumed that the environmental changes of the Hadean Earth drove a series of prebiotic chemical evolution to emerge first life, which should have been a passive response of primitive life to the forcing effects of environmental change. This concept is consistent with Charles Darwin' s idea explaining “no environmental change, no evolution of life” . This leads us to propose a three-step model for life' s emergence, based on perspectives derived from Hadean geological history.

First, proto-life appears underground as ectosymbiotic biofilms, facilitated by high-energy aqueous electrons from a natural nuclear reactor. Second, proto-life evolves by utilizing solar energy to survive on Earth' s Hadean surface in lacustrine environments. Finally, third proto-life, which is the first life on the Earth, emerges after struggling against the effects of a toxic Hadean ocean.

These stepwise evolution was the result of environmental changes through time. First proto-life born underground could survive with abundant energy from a natural nuclear reactor, however, they need to fit to the Hadean surface environment through splashing of nuclear geyser, resulted in the evolution to second proto-life. Finally, second proto-life encounter the toxic ocean as a result of function of plate tectonics, then first prokaryote was born. Thus, the birth and evolution of life is a response against these environmental changes, and life' s evolution is closely interlinked with the environment.

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