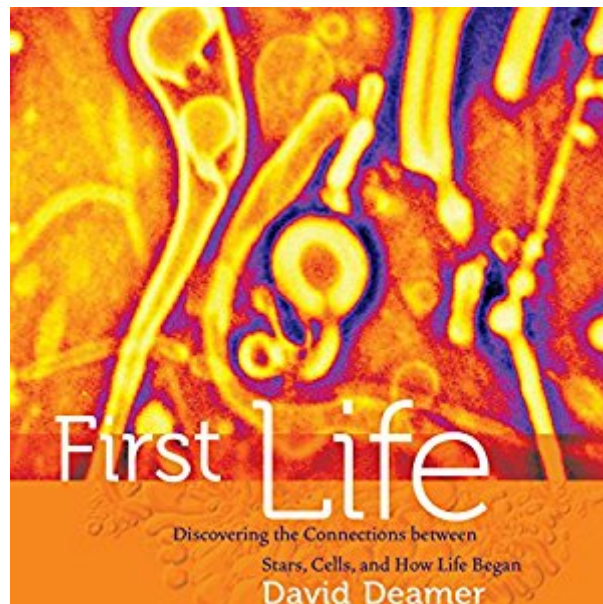


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# First Life: Discovering The Connections Between Stars, Cells, And How Life Began



## Synopsis

This pathbreaking book explores how life can begin, taking us from cosmic clouds of stardust, to volcanoes on Earth, to the modern chemistry laboratory. Seeking to understand life's connection to the stars, David Deamer introduces astrobiology, a new scientific discipline that studies the origin and evolution of life on Earth and relates it to the birth and death of stars, planet formation, interfaces between minerals, water, and atmosphere, and the physics and chemistry of carbon compounds. Deamer argues that life began as systems of molecules that assembled into membrane-bound packages. These in turn provided an essential compartment in which more complex molecules assumed new functions required for the origin of life and the beginning of evolution. Deamer takes us from the vivid and unpromising chaos of the Earth four billion years ago up to the present and his own laboratory, where he contemplates the prospects for generating synthetic life. Engaging and accessible, *First Life* describes the scientific story of astrobiology while presenting a fascinating hypothesis to explain the origin of life. The book is published by University of California Press.

## Book Information

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## Customer Reviews

\*\*\*\*\*"The history of science suggests that a continuous, focused effort to try to understand a problem, ... We will never know exactly how life began on early Earth, but we will know life can begin on a suitable planetary surface, because we will watch life emerge when just the right set of conditions come together." -- David Deamer  
Scientists who study the origin of life strive to discover

the chemical reactants and physical conditions that ignited the first forms of life on planet earth. One question they wrestle with peculiarly is how complex molecules such as amino acids, proteins, lipids, and DNA originated. All of these molecules are carbon based and are quite complex. Certainly, there was a ready supply of carbon on early Earth in the form of carbon dioxide and methane, but the synthesis process, from simple to complex, is still under debate. A popular origin-of-life proposition is that complex biological compounds assembled by chance, out of an organic broth, on the early Earth's surface. This proto bio-synthesis culminated in one of these bio-molecules being able to produce replicas of itself. The first laboratory tests conducted in response to this question was that known as the Miller-Urey experiment, simulated early Earth's atmospheric conditions and resulted in a spontaneous formation of organic compounds including amino acids. This evidence that complex organic molecules could have resulted from basic chemical reactants, cannot account for all complex amino molecules necessary for life, not even all 20 basic amino acids for living organisms. Despite hard efforts, scientists failed to create all the molecules needed for life in laboratory simulations of early Earth conditions.

Science will eventually unlock the secrets to the origin of life here on Earth and the universe as a whole. For those of us who wish to follow the progress toward the revelation of those secrets, David Deamer in his book, *First Life*, has provided a crucial and essential outline, a road map if you will, for understanding the extreme complexity of the problem of how life could spontaneously arise and possible routes to that event. Research into the origin of life on the early Earth is very much like analyzing the origin of an electromechanical mid-twentieth century clock. It is not enough to disassemble the mechanism determining the structure and function of each part. One must then figure out what kind of process was involved in designing and wiring the motor, calculating and fashioning the gears, molding the curved glass front, etc. As if that was not enough, one then must figure out how the metals for motor and gears were mined, smelted and forged, how the glass was created and shaped and most importantly how each part found itself in the same place at the same time for proper assembly. Our quest is further complicated by the fact the people, blueprints, instructions, equipment and factories involved are either gone or readapted to new processes. Truly this is a case for a Sherlock Holmes on steroids. Much of what Deamer covers is deep, very deep. Yet he amplifies the discussion with repetition and review and writes in such a way as to allow the reader to jump from mountain peak to mountain peak with little loss to the overall meaning of the subject under discussion rather the forcing one to slog through the jungles below. Deamer finds himself on the front lines of the quest for the origin of life and is pursuing his own very valuable line

of investigation.

\*\*I read Andreas Wagner's *Arrival*, John Tyler Bonner's *Randomness in Evolution*, and David Deamer's *First Life: Discovering the Connections between Stars, Cells, and How Life Began* subsequently, so my review is meant to be read relative to the other two as all three overlap in subject matter. (This paragraph appears in all three reviews). I am reading these books after reading several on cosmology.\* I wanted to move beyond what cosmologists say (with disagreement) about the formation of the universe to see how it could be compatible with what chemists and biologists say about the beginning of life. Alan Lightman writes in the *Accidental Universe* that "Science can never know how universe was created," and I find that to be echoed in these books -- science can never know or prove how exactly life began (Deamer states this outright). Exactly what chemicals were available on earth to mix in what quantities to randomly create a reaction between molecules that led bonds to form, information to be transmitted, and growth to begin? All of the hypotheses presented in the books require certain laws of physics and nature to hold but I have not found any who attempts to explain how those laws arose in the first place. Why are these laws what they are? Call this the Paul Davies critique.

[http://www.nytimes.com/2007/11/24/opinion/24davies.html?\\_r=0](http://www.nytimes.com/2007/11/24/opinion/24davies.html?_r=0)Deamer acknowledges that it's possible a creator put those laws into existence, but the other two avoid the subject. None of the three seem to recognize that chance is not a causal force, so time + chance cannot explain anything. Where did light come from and how did it contain information? How did cells know that it contained information and figure out a way to receive and decode it? How do "regulator cells" operate according to these laws?

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