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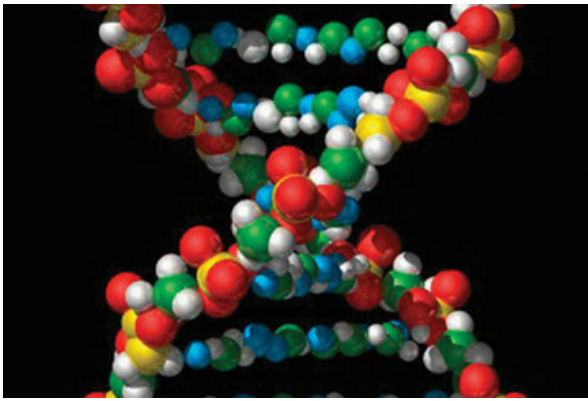


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Origin of Life Needs a Rethink, Scientists Argue

Tia Ghose, LiveScience Staff Writer
Date: 11 December 2012 Time: 06:11 PM ET

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Scientists trying to unravel the mystery of life's origins have been looking at it the wrong way, a new study argues.

Instead of trying to recreate the chemical building blocks that gave rise to life 3.7 billion years ago, scientists should use key differences in the way that living creatures store and process information, suggests new research detailed today (Dec. 11) in the *Journal of the Royal Society Interface*.

"In trying to explain [how life came to exist](#), people have been fixated on a problem of chemistry, that bringing life into being is like baking a cake, that we have a set of ingredients and instructions to follow," said study co-author Paul Davies, a theoretical physicist and astrobiologist at Arizona State University. "That approach is failing to capture the essence of what life is about."

Historically, scientists have defined living creatures by the presence of DNA, but how living creatures process information may be a better hallmark of life, a new study argues

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Living systems are uniquely characterized by two-way flows of information, both from the bottom up and the top down in terms of complexity, the scientists write in the article. For instance, bottom up would move from molecules to cells to whole creatures, while top down would flow the opposite way. The new perspective on life may reframe the way that scientists try to uncover the [origin of life](#) and hunt for strange new life forms on other planets. [[7 Theories on the Origin of Life](#)]

"Right now, we're focusing on searching for life that's identical to us, with the same molecules," said Chris McKay, an astrobiologist at the NASA Ames Research Center who was not involved in the study. "Their approach potentially lays down a framework that allows us to consider other classes of organic molecules that could be the basis of life."

Chemical approach

For decades, scientists have tried to recreate the [primordial events that gave rise to life](#) on the planet. In the famous Miller-Urey experiments reported in 1953, scientists electrically charged a [primordial soup](#) of chemicals that mimicked the chemical makeup of the planet's early oceans and found that several simple amino acids, the most primitive building blocks of life, formed as a result.

But since then, scientists aren't much further along in understanding how simple amino acids could have eventually morphed into simple, and then complex, living beings.

Part of the problem is that there isn't really a good definition of what life is, said Sara Walker, study co-author and an astrobiologist at Arizona State University.

"Usually the way we identify life on Earth is always by having DNA present in the organism," Walker told LiveScience. "We

don't have a rigorous mathematical way of identifying it."

Using a chemical definition of life — for instance, requiring DNA — may limit the hunt for extraterrestrial life, and it also may wrongly include nonliving systems, for instance, a petri dish full of self-replicating DNA, she said. [[5 Bold Claims of Alien Life](#)]

Information processing

Walker's team created a simple mathematical model to capture the transition from a nonliving to a living-breathing being. According to the researchers, all living things have one property that inanimate objects don't: Information flows in two directions.

For instance, when a person touches a hot stove, the molecules in his hand sense heat, transmit that information to the brain, and the brain then tells the molecules of the hand to move. Such two-way information flow governs the behavior of simple and complex life forms alike, from the tiniest bacteria to the giant humpback whale. By contrast, if you put a cookie on the stove, the heat may burn the cookie, but the treat won't do anything to respond.

Another hallmark of living beings is that they have different physical locations for storing and reading information. For instance, the alphabet of letters in DNA carries the instructions for life, but another part of the cell, called the ribosome, must translate those instructions into actions inside the cell, Davies told LiveScience.

(By this definition, computers, which [store data](#) on a hard drive and read it off using a central processing unit, would have the hallmarks of life, although that doesn't mean they are alive per se, Walker said.)

The new model is still in its infancy and doesn't yet point to new molecules that could have spawned life on other planets. But it lays out the behavior needed for a system to be considered living, Walker said.

"This is a manifesto," said Davies. "It's a call to arms and a way to say we've got to reorient and redefine the subject and look at it in a different way."

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[Add a comment](#)**rickcastro756** (signed in using yahoo)

It totally amazes me when I see stories like this. The answers are all in the bible. Science has been proving in recent years that there is a God and that the idea of creationism is true, not evolution. More and more science is providing this creation theory but yet people stick their heads in the sand. This creation evidence that's scientific is just pushed aside and instead you see schools still teaching evolution. My daughter who's in college and majoring in Biology has to hear this evolution theory. Sad thing is she's a strong Christian and this is totally against her beliefs but yet she wants to major in Biology. Oh well. Sad Sad Sad.

[Reply](#) · [Like](#) · [Follow Post](#) · 13 hours ago**Dark Sinfonie**

How exactly has science proven that there is a god? Science relies on physical evidence and the last time I checked, there wasn't a shred of physical evidence to support any god.

[Reply](#) · [1 Like](#) · 12 hours ago**El Flesh** (signed in using Hotmail)

It totally amazes me that there are people alive in this modern age of science who really have NO CLUE what Science is. They think it's some kind of belief system that has no more validity to it than their delusions. I agree that its totally sad sad sad a 'strong christian' is going to do what christians do best - LIE in the face of hard empirical evidence and go on believing their dogma. Absolutely NOWHERE has science given even a SHRED of evidence to support any god of any sort. That includes the ludicrous "idea" of creationism. Pick up a science book and actually LEARN something. Maybe you can start with "Oasis in Space: Earth history from the very beginning" by Preston Cloud.

[Reply](#) · [Like](#) · 3 hours ago**Dennis Pederson**

Rickcastro - It's sad when people close their minds to overwhelming evidence for evolution. I suppose the Pope, who believes in evolution, has his head in the sand.

[Reply](#) · [Like](#) · 51 minutes ago**Ammar Haider Shah** · Melbourne, Victoria, Australia

The example of a cookie vs a human being is silly. You can place a plant on the stove and it will react exactly like the cookie. Burn.

[Reply](#) · [1 Like](#) · [Follow Post](#) · 17 hours ago**Gary Katz** · Top Commenter · University of Illinois at Urbana-Champaign

It's a fascinating question, but we're never going to know the answer.

[Reply](#) · [Like](#) · [Follow Post](#) · 18 hours ago**Roy Niles** · Top Commenter

The information that flows is meaningful and intelligent. It's teaching every organism through the results of an expectational choice making trial and error process. Otherwise a simple flow of information through a physical formation is relatively useless for survival and evolutionary purposes.

[Reply](#) · [2 Likes](#) · [Follow Post](#) · 19 hours ago**Stephen Smith** · Justin-Siena High School

Me thinks 2-way information flow vindicates vitalism, hinting of an ineffable core (middle-term) that holds the 2-way flow in synthesis, and implying that life (and everything) emerged from the middle-term unless its a puppet hung up on a one-sided geometric surface.

[Reply](#) · [1 Like](#) · [Follow Post](#) · Yesterday at 4:03pm**me** (signed in using yahoo)

"Information flows in two directions" and having "different physical locations for storing and reading information" sounds MORE like a computer than a living being, at least to me. Why not use both a chemical and an informational perspective (and others?) to define life?

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