Google Researchers Say They Simulated the Emergence of Life

A experiment that simulated random interactions for millions of generations led to the emergence of a digital form of life.

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Crazy cool.

Tiny Trailblazers

Life, uh, finds a way — and apparently, so does a jumble of little strings of simple code.

In an experiment that simulated what would happen if you left a bunch of random data alone for millions of generations, Google researchers say they witnessed the emergence of self-replicating digital lifeforms. And their

findings, published as a yet-to-be-peer-reviewed study, could mirror — or at least shed light on — the emergence of actual biological life.

"Managing to evolve self-replicating programs from random starting points is a great achievement," Susan Stepney at the University of York, UK, who was not involved in the study, told *New Scientist*. "This is definitely a great step towards understanding potential routes to the origin of life, here in a medium quite removed from the standard 'wetware' of biology."

Soup de Grace

Life on Earth likely began in a "primordial soup." Over billions of years and countless more tiny interactions, a random mixture of water and organic compounds eventually brewed the first organisms. What that exactly looked like is unclear, and it's a tricky idea to wrap your head around. How did chaos give birth to order?

"I don't think anything magic happened," study co-author Ben Laurie, a software engineer at Google, told *New Scientist*.

"Physics occurred, and it just occurred a lot over a very long time, and it gave rise to some very complicated things."

Laurie and his team's simulation is a digital primordial soup of sorts. No rules were imposed, and no impetus was given to the random data. To keep things as lean as possible, they used a funky programming language called Brainfuck, which to use the researchers' words is known for its "obscure minimalism," allowing for only two mathematical operations: adding one or subtracting one.

The long and short of it is that they modified it to only allow the random data — stand-ins for molecules — to interact with each other, "left to execute code and overwrite themselves and neighbors based on their own instructions."

And despite these austere conditions, self-replicating programs were able to form.

Not Adding Up

Laurie told *New Scientist* that he believes the findings show that there are "inherent mechanisms" that allow life to

form. But self-replication in itself is not life — we should also be seeing an increase in the complexity of the organisms, according to experts.

"The complexity, as they measure it, goes up after the onset of the self-replicator. But it's not clear that it 'takes off' in an interesting way," Richard Watson at the University of Southampton, UK, who was not involved in the study, told *New Scientist*. "Self-replication is important, but it would be a mistake to believe it's a magic bullet from which everything else that's exciting about life follows automatically".

Some of that may be due to practical limitations. Laurie believes that, given enough computing power — they were already pushing it with billions of steps per second on a laptop — they would've seen more complex programs pop up. Give it another go with beefier hardware, and we could well see something more lifelike come to be.

More on life's beginnings: *Scientists Say Textbooks Are Wrong About How Life Exploded on Earth*