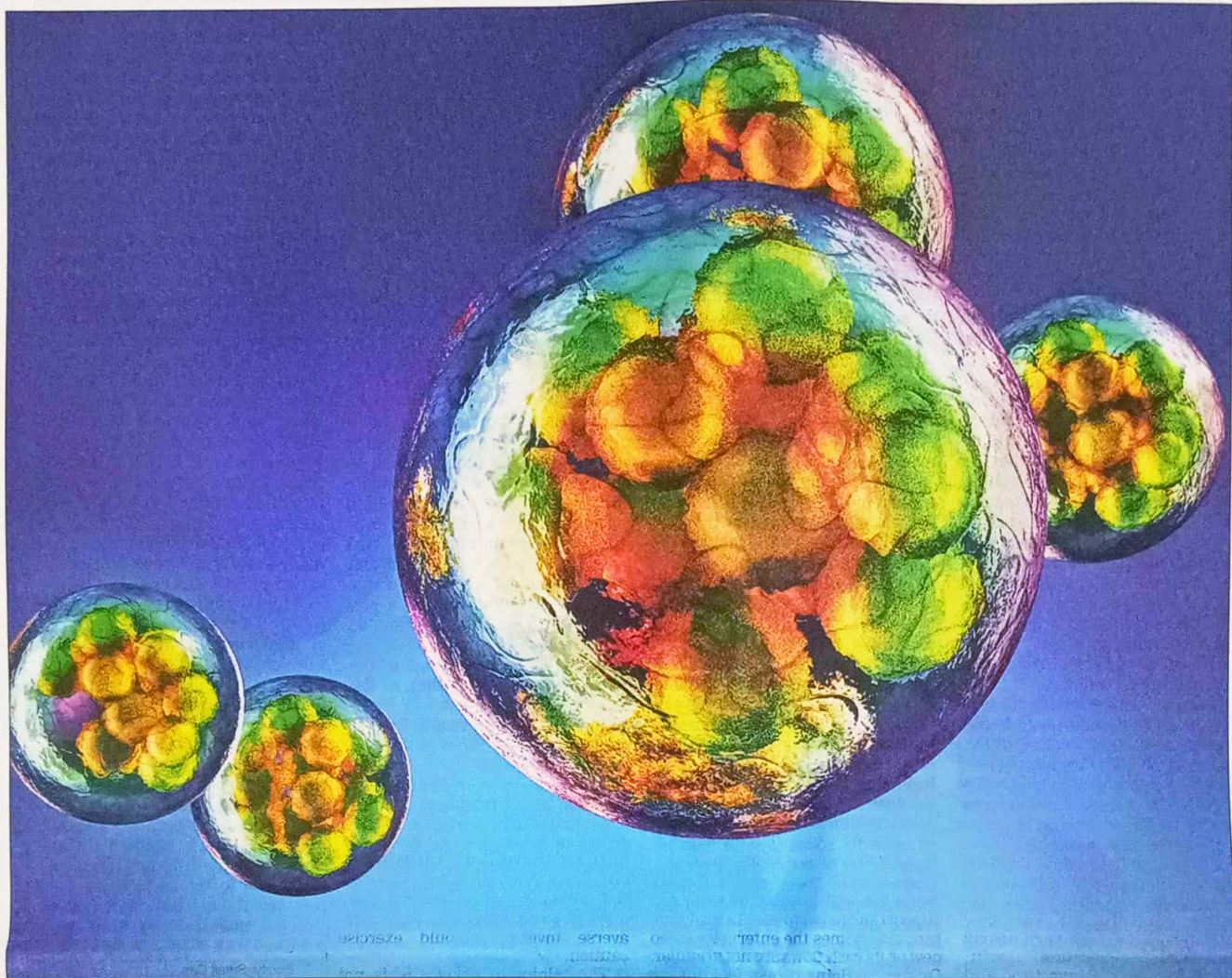


A lot like life

Scientists made a cell with most of the hallmarks of life.
K.R. Callaway on some things to know



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SpodCell is a synthetic cell made by scientists at the University of Minnesota in the US. It was created in a lab from lifeless chemicals but can perform most of the same functions as living cells. It eats, grows and reproduces, passing along its genetic material to future generations.

Although it's not the first synthetic cell ever created, SpudCell is the first to complete a full life cycle — from birth to division into next-generation cells — after having been created from the “bottom up” using laboratory chemicals. It's a pared down version of a living cell, revealing the basic genetic and structural components necessary for the functions of life.

So, is it alive?

No. Or maybe! The researchers behind SpudCell do not claim to have created life, though they note that there is “no single agreed definition” of life and that their cell-like system acts similarly to living cells.

“SpudCell performs the behaviours often used to tell the living from the inert — it feeds, grows, replicates its genome, divides and undergoes selection — yet it is far simpler than any natural cell and was assembled, part by part, by hand,” the project researchers wrote in a statement.

Unlike most natural cells, SpudCell is not self-sufficient. Because it can't build its own ribosomes — the parts of the cell responsible for building new proteins — scientists have to feed it crucial proteins and enzymes, and each lineage lasts only 5 to 10 generations.

SpudCell's genome is also smaller than most living cells.

It contains just 90,000 base pairs, compared with humans' three billion, and this genetic information is split across seven DNA molecules, instead of being consolidated into just one. This fragmentation means that important genetic material isn't always passed in its entirety to the next generation.

Why are scientists doing this?

Even though SpudCell is a new development, it builds on decades of work on what scientists call “minimal cells”.

These are synthetic cells that contain only the most basic genetic and structural architecture needed to perform the functions of life.

Synthetic cells help researchers fully understand the essential functions of a living cell — what is and isn't needed for life.

Advances in understanding the connections and mechanisms of life could, in turn, aid medical research,

space exploration and many other areas of study.

Are there other synthetic lifelike cells?

For over a century, scientists have been trying to mimic the processes of life — from attempts to create inner parts of cells in the lab for medical research to attempts at creating full cells.

The world's first artificial “cell” was created in 1957 by Thomas Ming Swi Chang, a Canadian physicist and inventor. While this first attempt didn't work like biological cells do, it paved the way for medical advances that relied on biological materials being transported within the body — such as in the treatment of organ failure and drug poisoning.

Since then, the field of synthetic biology has flourished.

In 2010, researchers at the J. Craig Venter Institute, which has facilities in La Jolla, California, and Maryland in the US, created “minimal cells” — made from stripped down natural cells — that had a synthetic genome and could divide on their own. Now, SpudCell demonstrates a new path forward in synthetic biology.

“Kate Adamala's team designed and built a nonliving synthetic cell that is much closer to being

“alive” than anything else produced by the bottom-up synthetic cell field,” said John Glass, who leads synthetic cell research at the J. Craig Venter Institute.

What's next?

It's a major advance, but researchers behind the SpudCell effort say there is still work to be done.

Next, researchers hope to create genetic instructions for building ribosomes so that future versions of SpudCell do not have to borrow ribosomes from living cells — which limits its reproduction ability. The researchers also hope to bring its function closer to natural cells by improving its ability to pass full genetic information to future generations and reduce its dependence on the enzyme-rich “food” provided by researchers.

Are there risks?

Creating synthetic cells brings age-old concerns about the ethics and security of lifelike creations.

“The SpudCell is an exciting proof-of-principle, but before it can be used for good or for bad, it will require more work,” said Becky Mackelprang, director of security programmes at the non-profit Engineering Biology Research Consortium.

NEW YORK TIMES NEWS SERVICE