2 FIRST SYNTHETIC ORGANISM CREATED

NO ONE COULD ACCUSE HUMAN genome pioneer J. Craig Venter of lacking chutzpah. In May 2010 he made good on another of his audacious goals, creating an artificial living cell by synthesizing the entire genome of a bacterium and transplanting it into another.

At a news conference, Venter hailed the new organism as "the first self-replicating species...on the planet whose parent is a computer."

The breakthrough, which took 15 years and consumed $40 million, involved building the genome of *Mycoplasma mycoides* (a bacterium that infects goats) from chemicals in the laboratory and then tagging it with a gene that turns the organism blue. Venter's team transplanted the fabricated genome into a closely related bacterium that had been stripped of its own DNA, and after many attempts to jump-start the combination, managed to create an organism that morphed, over the course of a single weekend, into a blue bacterium that displayed all the characteristics of the implanted DNA.

Algae strains for biofuels are under study within photobioreactors at Venter's company, Synthetic Genomics.

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A few environmental watchdog groups voiced concern that artificial life might somehow escape the laboratory and become an invasive species or pose dangers as yet unforeseen, and President Obama asked the Presidential Commission for the Study of Bioethical Issues to explore the implications of Venter's work.

Scientists have already synthesized the genomes of the poliovirus and the 1918 influenza strain, and molecular biologist Anthony Forster of Vanderbilt University acknowledges that safety is always a concern. But with proper safeguards in place, he believes that synthetic life can provide enormous benefits. "The success brings us closer to altering genomes in a much more designed manner—for example, creating microbes that can help produce drugs or churn out biofuel," he says.

Venter himself has declared these applications to be his primary commercial goals. In October he started a new company that will work with the pharmaceutical giant Novartis to create next-generation flu vaccines. And Synthetic Genomics, the company he founded in 2005, aims to create fuel-producing microbes, including algae biofuels in a $300 million agreement with ExxonMobil.

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