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Germans take part in contest to make new forms of molecular life

Researchers from Freiburg University are among the 110 teams taking part in an international competition to create new forms of biological life from a standard set of molecular biological parts.

A group of 14 students from Freiburg University's biology department have entered this year's International Genetically Engineered Machine competition (iGEM) at the Massachusetts Institute of Technology.

Equipped with pipettes and test tubes, the students began their work altering a standard set of biological parts over the summer to build biological systems and operate them in living cells.

"It's a little different from your average internship," Gerrit Gresch said, holding a pipette full of liquid over a plastic container.

Similar to a set of toy building blocks, the biological parts can be cut and rearranged to create new molecular structures. While some of the applications for such work seem frivolous - like the bacteria that blink like Christmas tree lights - others are more useful.

Restriction endonuclear... what?

The students in Freiburg set their sights on building a new set of chemical shears, called restriction endonucleases. The project combines parts of enzymes to create one that, with the help of an adapter, recognizes parts of DNA and is capable of separating it in an easier and more precise manner than existing methods that exist in nature and the field of genetic engineering.

If the shears work, they'll likely end up in every genetic engineer's tool box. The Freiburg researchers know they are setting a high goal for themselves.

"Scientists have tried to do it in the past and failed," molecular biology student Kristian Mueller said. "But new methods have been discovered that have convinced us now is the right time for this experiment."

Creating new life

The Freiburg students' research, as well as the iGEM contest in general, fits into a field of science called synthetic biology. Drew Endy, one of iGEM's founders, has said that while genetic engineering simply adds foreign genes into a natural organism, synthetic biology creates new organic molecules using standard biological parts and, eventually, creating new forms of life that do not exist in nature.

It's a field where scientists have been heavily criticized for playing god and warned that they could create potentially dangerous organisms. Markus Schmidt of the Organization for International Dialogue and Conflict Management in Vienna likened the present state of synthetic biology to the computer hacker scene in the late 70s and 80s when computers left research centers and major companies and were available to nearly anyone.

"Just as a computer hacker scene developed, there will also be a bio-hacker scene, with all of its advantages and risks," he said. "Today it's possible for someone with malicious intentions to create a new flu virus."

But students said such speculation doesn't play a role in their work. They called synthetic biology an

expanding field of science that calls for creativity, patience and teamwork rather than rote memorization or repetition of experiments that have already been done by generations of students.

"It doesn't have anything to do with playing god," said Caroline Nieder. "We aren't creating life. We work with bacteria and create molecules. That's it."

Author: Michael Lange (sms)

Editor: Kate Bowen

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