Synthetic biology biocontainment ‘lock and key’ prevents accidental releases

Researchers at the University of California, Berkeley, have developed an easy way to put bacteria under a molecular lock and key in order to contain its accidental spread. The method involves a series of genetic mutations that render the microbe inactive unless the right molecule is added to enable its viability.

The work appears this week in the journal *ACS Synthetic Biology*, a publication of the American Chemical Society. The findings show promise as a practical method of biocontainment as advances in synthetic biology and genetic engineering prompt more research into techniques to control newly created organisms, said senior author J. Christopher Anderson, an associate professor of bioengineering.

The researchers worked with a strain of *E.coli* commonly used in research labs, targeting five genes that are required for the organism to survive and devising easy ways to modify them. They created mutations in the genes that would require the addition of the molecule benzothiazole in order to function.

‘This approach is very robust and simple in that it only requires a few mutations in the genome,’ said Anderson. ‘The molecule serves as the key, and we engineer the lock.’

Study lead author Gabriel Lopez, who started the project as a UC Berkeley graduate student in bioengineering, compared the approach to taking out a component in a car.

‘The car would still run if it lost its rear-view mirror, but it wouldn’t go far without the camshaft or fuel tank,’ said Lopez, now a postdoctoral researcher in Anderson’s lab. ‘Organisms are the same. Some parts are essential, and some aren’t. Of the 4,000 genes in E. coli, about 300 are essential to its survival. What we’re doing is putting an ignition switch onto a handful of the bacteria’s essential genes. Without the right key, the bug won’t live.’

The GLP aggregated and excerpted this blog/article to reflect the diversity of news, opinion and analysis. Read full, original post: Scientists use molecular ‘lock and key’ for potential control of GMOs