MUTANT ENZYMES GIVE BACTERIA UNNATURAL POWERS

Escherichia coli **bacteria (artificially coloured).**

Adding an artificial enzyme to bacteria allows them to carry out unnatural reactions that produce novel chemical compounds from sugars.

To build microbial 'factories', John Hartwig at the University of California, Berkeley, and his colleagues used *Escherichia coli* bacteria that had been engineered to produce natural enzymes from citrus trees. The enzymes turn sugar molecules into a molecule called limonene.

The team created an artificial enzyme from a natural one, CYP119, which the bacterium *Sulfolobus acidocaldarius* uses to change the structures of molecules. The process usually requires iron-based molecules to be present, but the authors' mutation made CYP119's activity dependent instead on iridium-based molecules.

The team endowed limonene-making *E. coli* with the artificial enzyme and the ability to take in an iridium-based compound. When the artificial enzyme binds to this compound inside an *E. coli* cell, the enzyme's structure changes, allowing it to convert limonene into a chemical that doesn't exist in nature.

Engineering bacteria to turn sugars into other compounds through unnatural reactions could ease the synthesis of drugs and agricultural chemicals, the authors say.

Nature Chem. https://doi.org/gm5k8w (2021)

BEYOND REPAIR: HOW TO BOOST DNA-EDITING TOOL

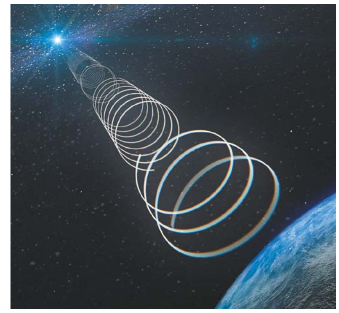
By tweaking a process that cells use to repair DNA, researchers have boosted the efficiency and precision of 'prime editing', a genome-editing method that offers some advantages over the popular CRISPR–Cas9 technique.

Prime editing allows researchers to make specific changes to a cell's genome with more control than does CRISPR. To increase the technique's efficiency, Britt Adamson at Princeton University in New Jersey, David Liu at the Broad Institute of MIT and Harvard in Cambridge, Massachusetts, and their colleagues searched for genes in target cells that influence prime editing's success rate. The researchers found that several such genes are involved in a form of DNA upkeep called DNA mismatch repair.

Experiments showed that these genes promote unwanted DNA changes in target genomes, and reduce the fraction of successful prime-editing attempts. The researchers found that they could disrupt a mismatch-repair gene's effects by adding an engineered form of a protein that the gene encoded. This improved efficiency by 7.7 times, on average, for one particular prime-editing system — and reduced the proportion of unwanted DNA changes.

The team also showed that prime editing benefited from introducing certain mutations near the target site to make it less recognizable to the repair system.

Cell https://doi.org/gm6pr3 (2021)



RADIO WAVES BEAM INTO GALAXY FROM MYSTERIOUS SOURCE

Astronomers have detected an intermittent source of radio waves near the centre of the Milky Way that doesn't seem to fit the profile of any known astrophysical phenomenon.

Ziteng Wang at the University of Sydney in Australia and his collaborators first spotted the unusual radio emissions in January 2020, using the Australian Square Kilometre Array Pathfinder (ASKAP) in Murchison. The array of 36 parabolic dishes had started a systematic survey of the Milky Way's centre in 2019.

The source, dubbed ASKAP J173608.2−321635 (pictured, white circle, artist's impression), was seen repeatedly over a period of about three weeks, then vanished. When the pathfinder array looked for it again, there were times when it was on and times when it was off. The team also spotted the source using the MeerKAT array in South Africa's Northern Cape region.

Several explanations for such a source seem implausible, the authors write. Unusual activity from a red dwarf star would produce not only radio waves but also infrared radiation, and a strongly magnetic type of neutron star called a magnetar would probably release both radio waves and X-rays — but no such counterpart emissions were seen.

Astrophys. J. **920**, 45 (2021)

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