

Battle for control of gene editor that rewrites species

Jonathan Leake

SCIENCE EDITOR

GENOME editing, the controversial technology that lets researchers rewrite the DNA of entire species, has generated a monster worthy of Frankenstein himself – a multimillion-pound patent war over who should control it.

Crispr, as the technology is known, is so powerful that its discoverers are among the hottest tips for this year's Nobel prizes. The technology is already being used by British scientists to redesign livestock, including editing cattle genes to stop them growing horns and rewriting pig genomes to make them resistant to disease.

One American researcher is editing elephant DNA to recreate the genome of a mammoth. Scientists in China have even used the technology to edit human embryos, arguing it could one day help eradicate many genetic diseases.

However, a bitter legal dispute between the two scientific teams that first devised the process is threatening the field, potentially delaying research – and making any therapies far more expensive.

The Crispr technique was first described in the journal *Science* in 2012 by Jennifer Doudna, a biologist at the University of California, Berkeley, and Emmanuelle Charpentier, a French microbiologist. Last year they were awarded the £2m Breakthrough Prize, one of science's biggest awards.

In April, however, Feng Zhang, a scientist at the Broad Institute, which is linked to the American universities of MIT and Harvard, became the first to win a patent after showing the US Patent and Trademark Office lab notebooks, "proving" he had invented the technique. His team have also won patents in Europe.

The move drew a furious response from Doudna's institution, which has objected to Zhang's patents and lodged claims of its own.

Battles over patents are usually obscure, but this one

matters because Crispr is powerful and could be worth billions of pounds to whoever controls it.

Scientists have used it to disable HIV viruses, cure muscular dystrophy in mice, and create disease-resistant crops. Doudna and Zhang have each founded companies to exploit the technology.

In Britain, AstraZeneca has invested millions in Crispr and is using it to edit the genomes of mice and of human cells to pursue therapies for heart disease, cancer and other illnesses.

Doudna told *The Sunday Times* she could not



Charpentier, left, and Doudna with the Breakthrough Prize

comment on the patent dispute but said its power lay in its precision. "With this technology, it is now possible to 'knock out' specific genes or to correct mutations that cause disease."

Zhang said he had filed patents not to exploit the technology but to open it up. "A technology like this should be accessible to all scientists and we want to ensure it stays that way."

Philip Webber, of Dehns, a British law firm specialising in patents, said: "The Crispr patent wars have only just begun. It is likely to be 3-5 years at least before we get decisions on who owns this revolutionary technology."

@jonathan_leake