BIOTECHNOLOGY

Boost for CRISPR challenger

Enzyme firm backs NgAgo.

BY DAVID CYRANOSKI

A biotech firm is backing a controversial challenger to the popular genome-editing tool CRISPR–Cas9.

Novozymes of Bagsværd, Denmark, has paid the Hebei University of Science and Technology in Shijiazhuang, China, an undisclosed sum to use the challenger — a protein called NgAgo — and plans to pay royalties on any NgAgo product that results.

Many scientists doubt that NgAgo actually works as a gene editor as claimed; Novozymes hasn't said whether it will use NgAgo for gene-editing or something else.

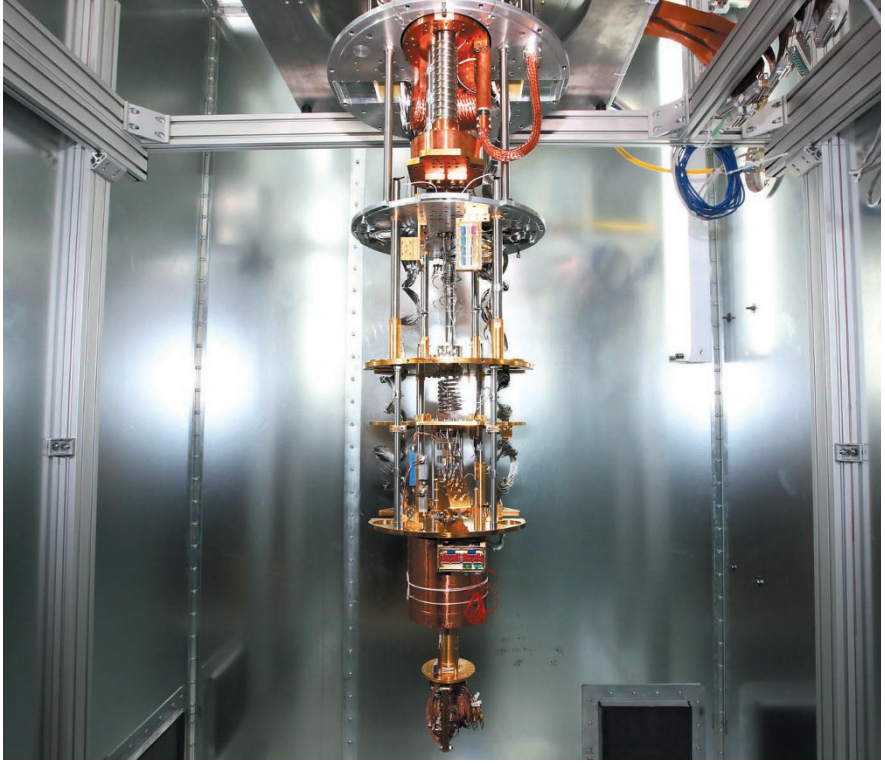
In May, a group led by biologist Han Chunyu of Hebei University reported that NgAgo could snip specific bits of DNA in human cells, permanently disabling genes, and that it might be more efficient and versatile than CRISPR–Cas9 (F. Gao *et al. Nature Biotechnol.* **34,** 768–773; 2016).

But initial complaints on social media that the work could not be replicated were followed by peer-reviewed publications demonstrating the same. In November, *Nature Biotechnology* attached an 'expression of concern' to the paper, which it had published; it has yet to issue its final verdict. Han stands by the results.

On 19 January, Han's university announced the agreement with Novozymes. Novozymes says that it wants "to explore if NgAgo can be a tool in the microbial systems we work with for enzyme production", but did not say whether it had used NgAgo to edit genomes.

Some of the failed attempts to reproduce Han's paper turned up evidence that NgAgo interrupts the process that turns genes into proteins, rather than permanently altering DNA. And geneticist Gaetan Burgio of the Australian National University in Canberra, a critic of Han's paper, suspects that Novozymes may be interested in NgAgo as a gene silencer rather than as a gene editor.

Enthusiasm for NgAgo gene editing among the academic community continues to dwindle. "Han claimed that NgAgo would work in a mammalian system for efficient genome editing," says Wei Wensheng, a molecular biologist at Peking University in Beijing. "Prove it!" ■



KIM STALLKNECHT/NYT/EYEVINE

D-Wave's latest processor has 2,000 qubits — far surpassing the capacity of previous models.

PHYSICS

Quantum computer gets design upgrade

D-wave's latest machine is bigger, but researchers still want better.

BY ELIZABETH GIBNEY

The company that makes the world's only commercially available quantum computers has released its biggest machine yet — and researchers are paying close attention. Named 2000Q after the number of quantum bits, or qubits, within its processor, the machine, made by D-Wave of Burnaby, Canada, has almost twice as many qubits as its predecessor. Many researchers remain sceptical about the long-term potential of such machines, whose approach differs from that of other nascent quantum computers. But others are already booking time on D-Wave's computers to explore challenges from machine learning to cybersecurity.

Moreover, improvements to 2000Q, the company's fourth-generation machine, are largely a result of researchers' feedback.

"We're providing guidance as a community of scientists," says Davide Venturelli, a physicist at the NASA Ames Research Center. Venturelli manages a scheme run by the non-profit Universities Space Research Association (USRA) in Washington DC that lets external researchers access a joint NASA–Google D-Wave machine.

D-Wave is also working on a fifth model, which it hopes will answer critics by providing even greater capacity and connectivity and a closer fit to scientists' needs. Likely to launch within two years, the machine will again double the number of qubits, to around 4,000. Crucially, it will also provide more-complex connections between qubits, allowing it to tackle more-complicated problems.

"Changing the underlying connectivity is going to be a game-changer," says Mark Novotny, a physicist at Charles University in Prague, who is exploring a D-Wave machine's applications to cybersecurity. "I'm basically drooling hoping for it. It's very exciting."

D-Wave machines have attracted scepticism as well as excitement since they went on sale six years ago. So far, researchers have proved that, for a problem crafted to suit the machine's abilities, the quantum computer can offer a huge increase in processing speed over a classical version of an algorithm (V. S. Denchev *et al. Phys. Rev. X* **6,** 031015; 2016). But the computers do not beat every classical algorithm, and no one has found a problem for which they outperform all classical rivals.

D-wave's qubits are much easier to build than the equivalent in more traditional ▶