CRISPR Biology Guides the Future of Genome Editing

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Fundamental research to understand how bacteria fight viral infections uncovered programmable proteins that detect and cut specific DNA sequences. In collaboration with Emmanuelle Charpentier's laboratory, we determined how the enzyme Cas9, which is part of CRISPR-Cas adaptive bacterial immunity, can be harnessed as a powerful technology to alter genomic sequences in cells. This created a simple, precise and widely adaptable technology for genome editing in any cell or organism. Current research is exploring the diversity of CRISPR-Cas systems in microbes and developing genome editing for biomedical and agricultural applications. I have also been deeply involved in discussing the ethical and societal implications of genome editing.