

Researchers unlock the secret of bacteria's immune system

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A team of Université Laval and Danisco researchers has just unlocked the secret of bacteria's immune system. The details of the discovery, which may eventually make it possible to prevent certain bacteria from developing resistance to antibiotics, are presented in today's issue of the scientific journal *Nature*.

The team led by Professor Sylvain Moineau of Université Laval's Department of Biochemistry, Microbiology, and Bioinformatics showed that this mechanism, called CRISPR/Cas, works by selecting foreign DNA segments and inserting them into very specific locations in a bacterium's genome. These segments then serve as a kind of immune factor in fighting off future invasions by cleaving incoming DNA.

The researchers demonstrated this mechanism using plasmids, DNA molecules that are regularly exchanged by [bacteria](#). The plasmid used in the experiment, which contained a gene for antibiotic resistance, was inserted into bacteria used in making yogurt, *Streptococcus thermophilus*. Some of the bacteria integrated the segments of DNA from the resistance gene into their genome, and subsequent attempts to reinsert the plasmid into these bacteria failed. "These bacteria had simply been immunized against acquiring the resistance gene," commented Professor Moineau. This phenomenon could explain, among other things, why some bacteria develop antibiotic resistance while others don't."

The CRISPR/Cas [immune system](#) also protects bacteria from

bacteriophages, a group of viruses that specifically target bacteria. This makes Professor Moineau's discovery particularly interesting for food and biotechnology sectors that use bacterial cultures, such as the yogurt, cheese, and probiotics industries. Bacterial culture contamination by bacteriophages is a serious concern with considerable financial implications for those industries.

Provided by Universite Laval

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