**Press release –13 March 2017**

# Toward the synthesis of antibiotics by a new bacterial enzyme

**Researchers at the French National Institute for Agricultural Research (Inra) and Inserm have discovered a new family of bacterial enzymes that can produce hitherto unidentified peptides with antibiotic activity. Published in *Nature Chemistry*, this work holds promise for the synthesis of molecules of pharmaceutical interest and the design of new antibiotics.**

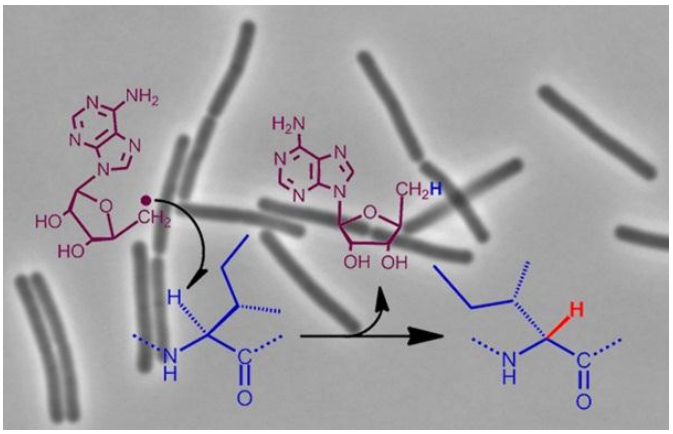
As part of research involving study of the enzymes of the gut microbiota, researchers from Inra and Inserm studied the model bacterium *Bacillus subtilis*. Genetic analysis of the organism showed the presence of genes conserved by common bacteria from the gut microbiota, such as enterococci.

The scientists were especially interested in two *Bacillus subtilis* genes potentially coding for a peptide and an enzyme from the superfamily known as "radical SAM enzymes." Their work has made it possible to describe a new enzyme mechanism that can transform a peptide into a bioactive molecule. Known as epimerisation, this enzymic transformation brings about a change in the configuration of certain amino acid residues from the L- configuration (normally found in peptides) to the D-configuration. The researchers discovered how this enzyme works: it removes a hydrogen atom from the alpha-carbon atom of the amino acid residues and donates another, bringing about their epimerisation. It is a mechanism not previously described in nature.

It is the first time that researchers have demonstrated the ability of "radical SAM" enzymes to catalyse epimerisation within a peptide *in vitro*. Surprisingly, the peptide thus modified and called an "epipeptide" is able to inhibit growth of *Bacillus subtilis* very effectively. These epipeptides thus represent a new class of natural products that might be used to develop new antibiotics against Gram positive bacteria (such as staphylococci, enterococci or streptococci), which are becoming increasingly antibiotic resistant, constituting a major public health problem.

**Reference:**

**Post-translational modification of ribosomally synthesized peptides by a radical SAM epimerase in *Bacillus subtilis*.** Alhosna Benjdia, Alain Guillot, Pauline Ruffié, Jérôme Leprince and Olivier Berteau. *Nature Chemistry*, 6 February 2017. doi:10.1038/nchem.2714



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