

Bacteria use caffeine as food source

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A new bacterium that uses caffeine for food has been discovered by a doctoral student at the University of Iowa. The bacterium uses newly discovered digestive enzymes to break down the caffeine, which allows it to live and grow.

"We have isolated a new caffeine-degrading bacterium, [Pseudomonas putida](#) CBB5, which breaks caffeine down into carbon dioxide and ammonia," says Ryan Summers, who presents his research today at the 111th General Meeting of the American Society for Microbiology in New Orleans.

Caffeine itself is composed of carbon, nitrogen, hydrogen and oxygen, all of which are necessary for bacterial cell growth. Within the caffeine molecule are three structures, known as [methyl groups](#), composed of 1 carbon and 3 hydrogens atoms. This bacterium is able to effectively remove these methyl groups (a process known as N-demethylation) and essentially live on caffeine.

Summers and his colleagues have identified the three enzymes responsible for the N-demethylation and the genes that code for these enzymes. Further testing showed that the compounds formed during break down of caffeine are natural building blocks for drugs used to treat asthma, improve blood flow and stabilize [heart arrhythmias](#).

Currently these pharmaceuticals are difficult to synthesize chemically. Using CBB5 enzymes would allow for easier pharmaceutical production, thus lowering their cost. Another potential application is the

decaffeination of coffee and tea as an alternative to harsh chemicals currently used.

"This work, for the first time, demonstrates the enzymes and genes utilized by bacteria to live on caffeine," says Summers.

Provided by American Society for Microbiology

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