

Researchers find a core cow microbiome dictates dairy cow productivity and emissions

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An international team of researchers has found that a core cow

microbiome dictates dairy cow productivity and methane emissions. In their paper published in the journal *Science Advances*, the group describes DNA testing they did on rumen microbes in cattle in several European countries and what they found.

As the planet continues to warm due to human-related activities, scientists continue to look for ways to reduce greenhouse gas emissions. In this new effort, the researchers wondered if it might not be possible to reduce the amount of methane released by cattle. Livestock have been found to contribute up to 14.5 percent of such gases worldwide. Far less methane is released into the atmosphere each year than [carbon dioxide](#), but methane is better at trapping heat.

The researchers note that prior research has shown that the primary generator of methane in cows is the rumen—the first stomach. When a cow eats grass, it goes into the rumen, where a host of [microbes](#) reside along with other digestive materials. The host microbes work together to break down the carbohydrates via a [fermentation process](#). As part of that process, hydrogen is produced by certain types of bacteria, and then archaea combine carbon dioxide with the hydrogen to produce methane. Contrary to common belief, most of the methane is belched out of the cow's mouth.

To find out if cows could be coaxed into producing and belching less methane, the researchers conducted a genetic analysis of the microbes that exist in the rumen of several types of cows from several sites across Europe. In all the team collected samples from more than 1000 cows. Study of their rumen microbiome showed that half of all of the microbes in them had 512 species in common. They also found that 39 of the microbes made up a core that plays a major role in determining not just how much methane is produced, but also how much milk. The researchers are now looking into the possibility of manipulating the cow rumen biota to see if it is possible to bring about changes that will result

in less [methane](#) production.

More information: R. John Wallace et al. A heritable subset of the core rumen microbiome dictates dairy cow productivity and emissions, *Science Advances* (2019). [DOI: 10.1126/sciadv.aav8391](https://doi.org/10.1126/sciadv.aav8391)

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