Bacteria play only a minor role stomach ulcers in cattle

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Stomach ulcers weaken the animals and cause pain. Credit: Alexandra Hund/Universitätsklinik für Wiederkäuer/Vetmeduni Vienna

Scientists at the University of Veterinary Medicine Vienna investigated whether stomach ulcers in cattle are related to the presence of certain bacteria. For their study, they analysed bacteria present in healthy and ulcerated cattle stomachs and found very few differences in microbial diversity. Bacteria therefore appear to play a minor role in the development of ulcers. The microbial diversity present in the stomachs of cattle has now for the first time been published in the journal *Veterinary Microbiology*.

Gastritis and stomach ulcers in humans are often caused by the bacterium Helicobacter pylori. But other factors, such as stress and nutrition, also play a role in stomach health. In cattle the weather and husbandry in general play an additional role. The etiological role of bacteria in abomasal ulcers was investigated by veterinarian Alexandra Hund of the Clinical Unit of Ruminant Medicine together with microbiologist Stephan Schmitz-Esser of the Institute for Milk Hygiene.

"The abomasum is the last of the four stomach compartments in cattle. The three other compartments, the rumen, the reticulum and the omasum, serve to predigest the food. The abomasum is the actual stomach and is similar in anatomy and function to the human stomach. Painful gastritis and ulcers can occur in the abomasa of cattle, potentially weakening the animals, leading to perforations of the stomach and possibly even to cases of death," first author Alexandra Hund explains.

Microbial communities of healthy and ulcerated stomachs nearly identical

Microbiologist Schmitz-Esser analysed stomach samples from slaughter cattle. Around half of the samples were taken from healthy cattle, the other half from cattle with low-grade abomasal ulcers. "Very sick animals are barred from slaughter," says Alexandra Hund.

The researchers isolated and sequenced the bacterial DNA from the stomach samples. The DNA sequences were then used to determine the type of bacteria present. "The most common were species of Helicobacter, Acetobacter, Lactobacillus and new strains of Mycoplasma. The bacterium Helicobacter pylori, commonly found in humans, was not present at all. We nearly saw the same bacterial composition in healthy and ulcerated animals, which suggests that bacteria only play a minor role in the etiology of abomasal ulcers," says Schmitz-Esser. "However, this is something we would like to underpin in future studies."

Different bacteria in calf stomachs

Calf stomachs contain a relatively immature microbial biomass. This means that bacterial diversity must still develop. The primary bacteria found in calf stomachs were beneficial lactic acid bacteria. These bacteria enter the stomachs of calves through the milk that forms their main source of nutrition.

Abomasal ulcers difficult to detect

"Due to the very subtle symptoms of abomasal ulcers, they are very difficult to diagnose for non-experts. The abomasum is the last of the four stomach compartments and therefore not accessible to gastroscopy. We are currently working on a method for the early and rapid diagnosis of those ulcers. In any case, keeping cattle stress-free is one way of preventing stomach ulcers," Alexandra Hund recommends.

More information: "Characterization of mucosa-associated bacterial communities in abomasal ulcers by pyrosequencing" *Veterinary Microbiology*. DOI: 10.1016/j.vetmic.2015.02.023

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