

Study finds surprising benefits about dairy cow inflammation

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Inflammation. The word typically has a negative connotation. Arthritis ... infection ... numerous maladies come to mind. But a Kansas State University researcher found that inflammation that occurs naturally in dairy cows the first few days after giving birth may play a surprisingly beneficial role in the complex process of going from late pregnancy to lactation.

"We know that during the first several days after giving birth and going into the lactating phase, [dairy cows](#) naturally experience some degree of inflammation," said Barry Bradford, associate professor in the university's department of animal sciences and industry. "We also know that many disorders, including metabolic diseases such as ketosis and fatty liver, occur during this time of transition."

He, along with a team of researchers from Kansas State University, Iowa State University and Michigan State University, wondered if inflammation actually causes the [metabolic problems](#).

Thinking that reducing inflammation during this period might be beneficial for the cow's transition from gestation to [lactation](#), plus limit [metabolic disease](#), Bradford and the team conducted a study. The objective was to determine if using an anti-inflammatory drug (sodium salicylate or SS) for the first seven days of lactation would prevent liver fat accumulation, improve the supply of glucose for lactation, and limit metabolic disease in dairy cows entering lactation. SS was delivered to the animals in a controlled way to their drinking water.

The team did not get the result they expected.

"Our findings suggest that mild inflammation may be a necessary part of a cow's adaptation to lactation," Bradford said.

Among the significant findings, the research showed that rather than preventing fatty liver by blocking the inflammation, liver fat content was actually increased in the first week of lactation. Similarly, anti-inflammatory treatment led to a dramatic drop in [plasma glucose](#) concentration in mature cows. Both of these responses are often associated with metabolic disease in early lactation cows.

"The study improved our understanding of the re-prioritization process by suggesting that inflammatory pathways promote a temporary state of insulin resistance in dairy cows, resulting in conservation of glucose for use by the mammary gland," Bradford said.

The results of the study, which was funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture, indicate that inflammation-induced insulin resistance is in some cases an adaptive, rather than pathological, phenomenon. It may help clarify why the links between inflammation and metabolism have survived the evolution process, he said.

And it's not just cattle that experience the shift in demands on the body: "Many species experience these dramatic shifts," Bradford said. "The role of inflammation in this process has not been studied very much. We are missing some information about why our bodies are wired the way they are – even after evolutionary refinement of the immune system, there seems to be a role for inflammation in metabolic function."

The research team's findings have been published by the *American Journal of Physiology*.

"Our findings suggest that we want some degree of inflammation at this time because it helps the animal shift gears," Bradford said. "Rather than thinking of mild inflammation as a disease-inducing factor, we think there may be times during life where some [inflammation](#) is advantageous or necessary."

The research team plans to delve into the topic further and is seeking funding to find evidence of the phenomenon in other species.

Provided by Kansas State University

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