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Media contacts:

Eileen Leahy

Elsevier

+1 732 238 3628

jdsmedia@elsevier.com

Ken Olson, PhD, PAS

American Dairy Science Association®

+1 630 237 4961

keolson@prodigy.net

Experts challenge current understanding of transition dairy cow health

Comprehensive review in the Journal of Dairy Science® examines the riskiest period for dairy cow health, between giving birth and milk production, in a new light

Champaign, IL, July 19, 2021 – For dairy cows, the transition period—the time between a cow giving birth and beginning to produce milk—brings the greatest possibility of health problems. The current widespread belief is that the effects of excess nonesterified fatty acids (NEFA) in the bloodstream and the ensuing hyperketonemia during this period, coupled with low levels of available calcium, are largely responsible for disorders such as mastitis, metritis, retained placenta, and poor fertility. Much attention has therefore been devoted to regulating NEFA and calcium levels in transition cows—yet all these efforts have not made the transition period less of a challenge to cows and, hence, to farmers, with approximately 75 percent of disease occurring during the first months postpartum. Dairy producers literally pay the price in terms of reduced milk production, costs of treatment, early culling of cows, reduced reproductive abilities, and animal welfare.

In a new [review](#) in the [Journal of Dairy Science](#), a team from the Iowa State University Department of Animal Science, Ames, IA, USA, led by Lance H. Baumgard, PhD, Norman L. Jacobson Endowed Professor in Dairy Nutrition, critically reviews the current accepted understanding of cow health during the transition period to investigate the reasons for these persistent problems and suggests lines of inquiry and perspectives on dairy cow health that may prove more effective. Their findings call into question the methods and conclusions of a large body of previous research and how such work has been applied in the dairy industry.



Caption: In this review, researchers from Iowa State University challenge the generally accepted understanding of causes of health problems among dairy cows in the weeks before and after giving birth—when 75 percent of diseases occur (Credit: iStock/Diane Kuhl).

“During the last 50 years, dairy scientists have increasingly viewed elevated circulating NEFA and ketones and hypocalcemia as pathological and causal toward negative outcomes,” Baumgard observed.

The team found that this tenet is largely based on observational studies, epidemiology, correlations, and ex vivo immune cell function assays. “It is becoming increasingly evident that periparturient diseases and disorders cannot be explained by the severity of changes in these simple metabolites. Interpreting biomarkers as causal agents of metabolic disorders deviates from the purpose of epidemiological studies,” Baumgard added. In their review of previous research, Baumgard and colleagues emphasized the fundamental scientific principle that “correlation does not equal causation.”

Examining data both from dairy cows and across species, the team concluded that postcalving changes to energetic and calcium metabolism reflect normal biological processes. Healthy animals use these processes to maximize milk production. In other words, conditions that have been widely regarded as indicating poor health may in fact represent normal and even advantageous functions—and some of the ways in which the challenges of the transition period are addressed may actually make problems worse. Unhealthy cows (metritis, mastitis etc.) utilize similar processes to support an effective immune system. Thus, the unhealthy cow and high-producing healthy cow share similar metabolic profiles.

Baumgard and colleagues provide a basis for further investigating this perspective, with the suggestion that future research might focus on preventing immune system activation in cows, thereby reducing the negative effects of inflammation. Proceeding thus, with careful attention to scientific rigor, they hope to make progress in overcoming the transition cow health problems that remain key obstacles to profitable dairy farming and improving overall agricultural sustainability.

Notes for editors

The article is “Invited review: The influence of immune activation on transition cow health and performance—A critical evaluation of traditional dogmas,” by E.A. Horst, S.K. Kvidera, and L.H. Baumgard (<https://doi.org/10.3168/jds.2021-20330>). It appears in the *Journal of Dairy Science*, volume 104, issue 8 (August 2021), published by [FASS Inc.](#) and [Elsevier](#).

Full text of the article is available to credentialed journalists upon request. Contact Eileen Leahy at +1 732 238 3628 or jdsmedia@elsevier.com to obtain copies. Journalists wishing to interview the authors should contact the corresponding author, Lance H. Baumgard, Iowa State University, at baumgard@iastate.edu.

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