Project Summary

Canola Supplementation in Late Gestation Cows Increases Calf Growth and Modifies Epigenetic, Gene Expression and Blood Metabolite Profiles

Institution: Agriculture and Agri-Food Canada

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Funding: $137,000 from BCRC

Background: Researchers from the University of Saskatchewan found that canola-fat based pellet supplementation in the diet of beef cows during late pregnancy led to greater growth of their calves from birth to slaughter, translating into 22 kg more carcass. The difference between the control diet and the fat-supplemented diet was the source, not the amount, of dietary energy. In conjunction with UAlberta/AAFC, it was discovered that expression of a gene that controls growth and muscle development was also affected by prenatal diet. This gene is under the control of DNA methylation, a modification of DNA that can be altered by general nutrition, and sometimes permanently by prenatal nutrition. The difference in gene expression could indicate that fat supplementation during pregnancy has permanently altered the way genes are expressed in the calves of these cows, and this difference may be contributing to the growth difference in the calves.

Goal: to improve the growth performance of beef calves using prenatal dietary supplementation in cows

Objectives: to determine an optimal level of canola-fat inclusion in the prenatal diet that results in increased calf growth

1) Collection of samples at birth, weaning and slaughter from steer calves exposed to different levels of canola fat in the prenatal diet
2) Identify differences in epigenetic and metabolic profiles from birth to slaughter
3) Determine if prenatal fat supplementation affects DNA methylation and gene expression in tissues responsible for driving metabolism and growth
4) Examine blood DNA methylation and metabolite profiles measured at birth and weaning for use as predictors of postnatal growth, and patterns of DNA methylation and gene expression in metabolically important tissues.

Benefit: understanding biological and epigenetic pathways that underlie connections between prenatal nutrition and postnatal growth and development can lead to increased predictability of calf performance and novel strategies to improve postnatal growth.

Related projects: Level of fat from canola seed supplementation in pregnant beef cow diets: effects on cow performance (Lardner, 2021 – 2025, $209 105 BCRC)

Canola supplementation of cows in late gestation leads to increased calf growth and modification of epigenetic, gene expression and blood metabolite profiles (Lardner, 2021 – 2025, $332 076 NSERC)

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