

# BCRC BEEF SCIENCE CLUSTER

# RESEARCH Facts

IN PROGRESS

## Effect of nutrition and genetics on fetal growth and winter feed costs

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**Project Title:** The Impact of Nutrition and Residual Feed Intake on Tissue and Molecular Characterization, Manipulation of Maintenance Energy Costs, and Fetal Growth and Programming in Wintering Pregnant Beef Cows

**Researchers:** Dr. Kendall Swanson, University of Guelph, Dr. Carolyn Fitzsimmons, AAFC Edmonton, Dr. Brian McBride, University of Guelph, Dr. Stephen Miller, University of Guelph and Dr. Ira Mandell, University of Guelph

**Background:** Feed efficiency means different things to different sectors of the industry. An efficient feedlot animal is one that grows the fastest and produces a good carcass using the least feed. An efficient mother cow uses the least feed to produce the most pounds of calf every year for many years. Genetic selection for improved feedlot efficiency will likely impact cow efficiency and reproductive traits, so we need to understand how pregnant cows and fetal calves use nutrients during pregnancy. Winter feed requirements are a major input cost in cow-calf production. The interactions between a pregnant cow's winter feed requirements and the fetal growth of her calf are complex. The cow does all the eating, but two animals are being fed. The cow has reached its mature size, but it is still gaining weight because the calf is developing rapidly. The cow uses nutrients to maintain her weight, body condition and metabolism, while the fetus uses nutrients to grow a whole new calf. The cow's and calf's nutrient requirements also differ because these two animals aren't genetically identical.

**Objective:** Examine how genetics and nutrition affect cow winter feed requirements, fetal growth, and calf performance.

These researchers will study the interaction between genetics and winter feed management in pregnant beef cows and calves. The expression of genes regulating energy metabolism and fetal growth will be monitored throughout pregnancy. Gene expression will be compared in pregnant cows that had low or high residual feed intake as growing heifers. Gene expression will also be monitored in pregnant cows fed a low, moderate or high energy winter diet. Cow weight and body condition score will be recorded, as well as calf growth through puberty or feedlot finishing.

**Implications:** A better understanding of how genetics influence the winter feed requirements of pregnant beef cows, fetal growth and calf performance will help clarify the benefits of selecting for residual feed intake.

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