



Novel targeted methane mitigation technology on ruminants

## CAN THE RUMEN MICROBIOME BE MANIPULATED TO REDUCE METHANE?

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**Background:** There is significant interest in reducing the environmental footprint of beef production. The largest component of greenhouse gas emissions associated with cattle is the methane produced by microorganisms (methanogens) in the rumen as cattle digest their feed. A very active area of research is exploring feed additives to reduce methane production; however, there are significant regulatory approvals that need to be obtained before these products can be sold and they are often formulated for a specific dosage (which means delivery is challenging for cattle on summer pasture or extended grazing situations). This project is taking a different approach by attempting to determine if genomics (RNA interference) can be used to reduce the production of methane from specific rumen microorganisms.

### Objectives:

1. To develop a technology to successfully produce and deliver antisense or silencing RNA in rumen methanogens
2. To determine whether the growth or activity of selected rumen is affected by the antisense or silencing RNA
3. Evaluate the efficacy of antisense or silencing RNA on methane mitigation and rumen fermentation in a simulated rumen under different dietary strategies

**Implications of the Research:** This is relatively early-stage research, but if successful, would show proof of concept for rumen microbial manipulation to reduce methane emissions. The use of nucleic acids (RNA) has already received regulatory approval in Canada, and while it remains to be proven, it may be possible that animals could be “dosed” at birth and experience long lasting effects.

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