FUNDING DETAILS

Smart Hand-Held Device for Automated Blood Analysis: Innovative Prediction of Sheep Pregnancy and Litter Size

Accurate, early detection of pregnant ewes helps with implementation of appropriate nutrition and animal welfare programs. Following a recent project that identified promising metabolite biomarkers indicative of both pregnancy and litter size (PLS) at ~50 days after breeding, a handheld point of care (PoC) device will be designed to deliver real-time PLS results within minutes of collecting fresh blood (via an ear prick).

Ultrasonography, as the gold standard, is difficult to access and too costly for many producers given their flock size and/or remote locations. The PoC PLS device will allow targeted nutrition and health management of ewes to enhance lamb survivability and ultimately improve flock profitability and competitiveness.

RECIPIENT:

Lakeland College

PI: Dr. Susan Markus

PARTNERS:

RDAR

TOTAL BUDGET:

$552,500

AI FUNDING:

$145,000

PROJECT DATES:

FEB 2022 – DEC 2023

PROJECT TRL:

Start: 4
End: 8

APPLICATION

This could be the first of similar handheld, on-farm testing devices and could revolutionize animal screening for health and production traits. The portable detection system (blood collection device, biomarker detection device and mobile app) could lead to high throughput, low-cost, on-farm or pen-side testing of livestock. The device could also be readily modified to provide real-time detection of many traits (with a set of validated biomarkers).
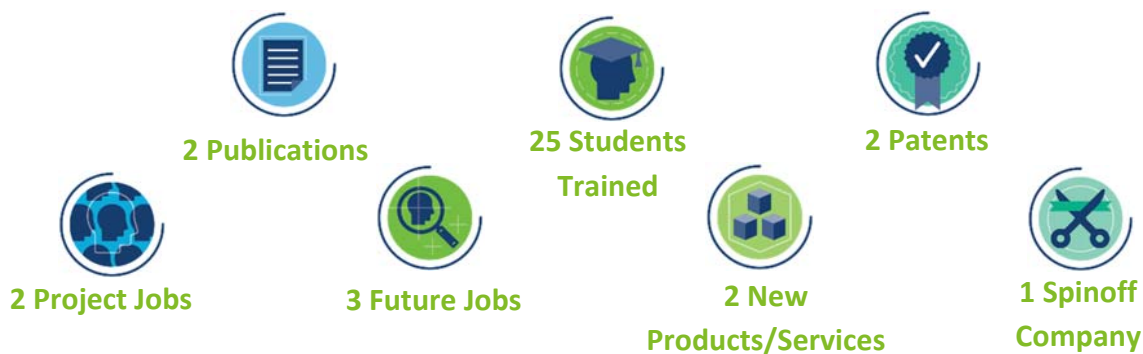
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PROJECT GOALS

- Create a portable, accurate, accessible, affordable device for independent, real-time, pen-side detection of ewe PLS.
- Maintain ewe health and welfare and prevent metabolic disorders.
- Improve lamb survival and program the progeny to be healthier than the average lamb by adjusting animal feed based on pregnancy requirements.
- Identify open ewes as early as possible to allow producers the option of re-breeding or culling.
- Optimize feed management, grouping animals based on pregnancy status and formulating feed rations accordingly to prevent "blind feeding" all animals with the same rations.
- Eliminate the need for other personnel to administer blood tests or conduct analyses.
  - Accurate, immediate results for flock managers so sorting can be performed at the same time as test analysis is completed chute side on the farm.

BENEFITS TO ALBERTA

- Improved flock profitability.
- Improved marketing and related animal sale prices.
- Improved lamb survivability when ewes identified as pregnant with multiple fetuses have access to targeted feed programs.
- Job creation if manufacturing of the PLS device can be done in Alberta.
- Increased exports of the device as sheep and other industries adopt the technology globally which could lead to more demand in manufacturing and new investment attraction.
- Increased skill set for HQP beyond engineering and biochemistry backgrounds; current demand for livestock agriculture trained students with skills in biochemistry, engineering and/or information technology fits well with the new Ag Technology degree programs at Olds and Lakeland Colleges.

2 Publications

25 Students Trained

2 Patents

2 Project Jobs

3 Future Jobs

2 New Products/Services

1 Spinoff Company

CURRENT STATUS

FEB 2022
Mock-up prototype being assembled, including modifications to the existing colour sensor for use with the developed tests and converting the serum separation method developed for use in a portable device. Device being developed with automated fluidics and appropriate sensors for real-time, fully integrated, hands-free detection of biomarkers of pregnancy and litter size.