# Comparing the Performance of Timed-AI versus Automated Activity Monitors in Dairy Heifer Reproduction

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In total, 340 Holstein dairy heifers from a commercial farm near Edmonton, AB, were fitted with an ear tag activity monitor (SCR eSense, Allflex) once they were eligible for breeding (~13.5 months of age). Heifers were divided into two treatments, those in the timed-AI (TAI) treatment (n =170) were submitted to a modified 5-d Cosynch+PRID protocol (without the initial GnRH and a single prostaglandin injection at PRID removal), with the first AI scheduled for first day of breeding (D0). Those heifers in the automated activity monitor (AAM) treatment (n = 170) were bred based on activity alert, becoming eligible for AI on D0. All heifers received sexed semen for the first AI and conventional semen for subsequent breedings. Pregnancy diagnosis was done at 25, 30 d and confirmed at 45 d post AI and heifers had 3 opportunities to become pregnant to AI. Heifers in the TAI group determined non-pregnant 25 d post-AI were resynchronized and TAI 8 d later (inter-breeding interval of 33 d). There was no difference in overall pregnancy (90 vs. 94%, *P* = 0.16) and days open (25 vs. 24 d, *P* = 0.95) between TAI and AAM treatments. However, number of AI was greater in the TAI compared with AAM treatment (1.67 vs. 1.46 AI, *P* = 0.01). There was no difference in pregnancy loss or days to AI between treatment for any AI number; however, pregnancy at 30 (57 vs. 71%, *P* = 0.01) and 45 d (53 vs. 65%, *P* = 0.04) after first AI was reduced in the TAI compared with the AAM treatment.

**Take Home Messages:** There was no difference in the overall pregnancy and days open between TAI and AAM programs in dairy heifers. However, pregnancy at the first AI was increased in the AAM treatment. Producers who use more expensive and less fertile sexed semen for the first AI in heifers may benefit from using an AAM program compared with TAI. Our group is currently conducting an economic analysis between the TAI and AAM treatments to help inform decisions between reproductive programs in dairy heifers.

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# Macronutrient Composition of Whole Milk Powder and High Fat Milk Replacer Influences Gastrointestinal Development of Preweaned Dairy Calves

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The objective of the current study was to compare the effect of whole bovine milk or MR with similar macronutrient inclusion on gastrointestinal structure and function. Eighteen male Holstein calves (46.6 ± 1.2kg; 1.78 ± 0.13 d of age) were individually housed and randomly assigned to three times daily feeding of 3.0 L (135g/L) of either: 1) whole milk powder (WM, 26.0% fat, 24.5% protein, 38.0% lactose, n = 9); or 2) MR with high fat content (MR, 25% fat, 22.5% protein, 38.1% lactose, n = 9). Bodyweight (BW) was measured weekly and feed intake was recorded daily. On day 21 intestinal permeability was evaluated using Cr-EDTA. Calves were euthanized at 4 wk of age to obtain organ weights and intestinal samples to assess gastrointestinal structure via histological analysis. Data was analyzed in SAS software using Proc GLIMMIX for repeated measures and dissection parameters using BW as a covariate. Weekly intake of MR and BW did not differ (*P*>0.05) and BW prior to dissection was 68.9 ± 1.4kg. Whole forestomach, rumen, reticulum and omasum weights were 22% (*P*=0.02), 23% (*P*=0.05), 31% (*P*=0.05) and 36% (*P*=0.02) larger in WM vs MR calves, respectively. Duodenal and ileal weights did not differ between treatments; however, distal jejunum weight and whole small intestine weight were 19% (*P*=0.01) and 15% *(P*=0.03) greater in WM calves compared to MR calves, respectively. There were no differences in muscularis thickness, villus height or width, crypt depth or width between treatments in any tissues. Surface area of the duodenum and ileum did not vary between groups. Yet, surface area of the distal jejunum was 33% (*P*=0.03) greater in WM than MR calves. Intestinal permeability measured as %Cr recovered in urine was greater in WM fed calves (9.5% vs 7.6%, *P*=0.08). Overall, the results suggest that differences macronutrient composition between MR and WM affect gut mass, structure and permeability, while no affects were observed on growth or feed efficiency.