

**Variability of lactose in milk and in blood during the first 36 weeks of lactation of dairy cows**C. Gaillard<sup>1</sup>, M. Boutinaud<sup>1</sup>, J. Sehested<sup>2</sup> and J. Guinard-Flament<sup>1</sup><sup>1</sup>Institut Agro, PEGASE, INRAE, 16 Le Clos, 35590 Saint Gilles, France, <sup>2</sup>ICROFS, Aarhus University, Blichers Allé 20, 8830 Tjele, Denmark; charlotte.gaillard@inrae.fr

The lactose content in dairy cows' milk (LM) varies during an energy deficit and can represent an interesting indicator for production and health management systems. One reason of its variation is the leak of lactose in the blood (LB) also revealing the permeability status of the mammary epithelium. Up to now, the variations of LM and LB have not been studied together over lactation. Therefore, the objective was to describe the variability of LM and LB over dairy cows' lactation. A total of 53 Holstein cows (including 17 primiparous) managed for a 16 months extended lactation were involved. The cows were divided into two feeding strategies, a control feeding strategy (NOR) and an individualized feeding strategy (EXP) during which the cows received a ration enriched in energy in early lactation (on average until week 7 of lactation). The LM and LB averages by animal were highly variable between animals (from 4.65 to 5.10% for LM, and from 18.7 to 104 mg/l for LB). The LM increased from calving to week 3 (from 4.69 to 4.89%), then kept stable, and decreased slowly from week 26 to 36 (from 4.88 to 4.79%). The LB decreased in early lactation (from 77.7 to 47.0 mg/l) and kept stable and low after week 3 until week 36 (on average 37.8 mg/l). Before week 3, the feeding strategy had no effect on LM, while between week 3 and 7 LM was higher for the EXP than the NOR cows, and it was the opposite after week 7. On average over the lactation, the EXP cows had a higher LB than the NOR cows ( $P=0.02$ ). After week 3, LM was higher for the primiparous than the multiparous cows ( $P=0.01$ ) while parity did not affect LB ( $P=0.22$ ). Overall, over the weeks, LM and LB were not correlated. To conclude, LM and LB varied among cows, at the beginning of the lactation, and regarding the feeding treatment. In this study, parity only affected LM, and LB did not provide information to explain LM variations. It would be interesting to continue these observations in the last part of the extended lactation and relate potential health events with LM and LB concentrations.

## Session 11

## Theatre 11

**Locomotor activity of lambs reared by their mothers or artificially reared, measured by actigraphy**

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In order to compare locomotor activity (ACT) of lambs reared or not by their mothers, during their first week of life, 16 lambs (8 twin pairs; 8 males, 8 females) were fitted with an accelerometer (ActiGraph wGT3X-BT; ActiGraph, Pensacola, USA) (46×33×15 mm in size, weight 19 g), 24 hours after birth, attached on a neck collar. Lambs were divided into two groups: group M ( $n=8$ ), which were reared by their mothers, and group A, which were separated from their mothers after colostrum intake, and artificially fed reconstituted milk replacer using an automatic lamb feeder. Ewes and M lambs were housed in a collective pen (6×7 m), and A lambs were housed in a pen (5×3 m) with another 12 lambs. The sensors were programmed to collect acceleration data from day 2 to day 8 of age. Mean ( $\pm$ SE) hourly ACT (counts/min) of the seven days was calculated, and the effect of lamb gender, rearing mode and daytime (8:00-18:00) or night-time (19:00-7:00) on locomotor ACT was tested by the GLM procedure. The proportion of lambs presenting circadian rhythmicity of ACT was tested by the  $\chi^2$  test. Significant effects of gender ( $P<0.001$ ), rearing mode ( $P<0.001$ ), and day/night-time ( $P<0.05$ ), and their interactions ( $P<0.01$ ) on ACT count were observed. A lambs presented more ACT ( $P<0.05$ ) than M lambs ( $159\pm6$  vs  $143\pm5$ , resp.), and both groups of lambs had more ACT during daytime ( $175\pm6$ ) than night-time ( $131\pm5$ ) ( $P<0.001$ ). Female lambs ( $167\pm6$ ) exhibited a higher overall ACT than male lambs ( $135\pm5$ ) ( $P<0.001$ ), but only in the artificial rearing method ( $192\pm8$  vs  $126\pm7$ ) ( $P<0.001$ ). Lambs had two peaks of activity, with no differences between rearing modes, in the morning ( $298\pm19$ ) and the evening ( $263\pm17$ ), although rearing mode affected the time of both peaks: peak 1 was at  $7.22\pm0.2$  am in the M group and at  $8:00\pm0.0$  in A group ( $P<0.01$ ), and the second peak at  $19:00\pm0.5$  am in the M group and at  $17:37\pm0.2$  in A group ( $P<0.05$ ). The proportion of A lambs presenting circadian rhythmicity (7/8) was significantly higher than the M group (3/8) ( $P<0.05$ ). In conclusion, both groups had a similar pattern of ACT, although with peaks at different times, but lambs reared artificially presented a higher locomotor ACT and an earlier circadianity. Female lambs were more active than male lambs in the AR group.