



Prolactin-inhibitor cabergoline hastened the mammary involution during drying-off in dairy cows

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significantly higher than the low milk quality group ($P < 0.05$). The uptake rate of 6 essential amino acids (Thr, Val, Met, Ile, His, Arg) in the high milk quality group were significant higher than the low milk quality group ($P < 0.05$), and nonessential amino acids detected were also significantly higher than the low milk quality group ($P < 0.05$). In conclusion, differential utilization of Met, Leu, Ile in the High and Low milk quality groups maybe the main reason to cause the considerable difference of milk protein rate.

Key Words: dairy cow, milk quality, free amino acids

W293 Prolactin-inhibitor cabergoline hastened the mammary involution during drying-off in dairy cows. M. Boutinaud^{*1,2}, N. Isaka⁴, A. Deflandre⁴, E. Gandemer^{1,2}, P.-G. Marnet^{1,2}, F. Des-sauge^{1,2}, and V. Lollivier^{1,2}, ¹INRA UMR 1348 PEGASE, Saint Gilles, France, ²Agrocampus UMR 1348 PEGASE, Rennes, France, ³Université Européenne de Bretagne, Rennes, France, ⁴CEVA Santé Animale, Libourne, France.

In ruminants, the early phase of drying-off is a period of mammary gland involution that is marked by the cessation of prolactin (PRL) release. The analysis of the changes of mammary secretion composition can provide valuable information about the speed of the mammary involution. To assess the effect of PRL inhibition by cabergoline on mammary gland involution, 14 Holstein dairy cows were injected with a single i.m. administration of 5.6 mg cabergoline ($n = 7$) or placebo ($n = 7$) at the first day of drying-off (D0). Mammary biopsy samples were collected one week before drying-off (D-6), at D1 and at D8 and used for RNA extraction and RT-PCR analyses. Mammary secretion samples were collected using a teat-cannula once during lactation (D-6) and at D1, D2, D3, D4, D8 and D14 after the drying-off. The mammary secretion samples were used for milk fat, lactose, true protein, α -lactalbumin, lactoferrin and citrate analysis. The decrease in lactose content of mammary secretions seemed to be faster in cabergoline treated cows compared to controls, demonstrated by lower levels of lactose in cabergoline treated cows already by D1 than in control cows ($P < 0.05$). Cabergoline treatment tended to increase fat content at D3 after drying-off ($P < 0.10$), whereas an increase in fat content was only observed at D4 in the control group. The rise of lactoferrin was significant starting at D4 in the cabergoline treated cows whereas it only happened at D8 in controls, and overall there was a tendency towards greater lactoferrin content in cabergoline treated cows ($P = 0.10$). Cabergoline did not seem to alter citrate content. However, the decrease in lactoferrin/citrate ratio happened faster in cabergoline treated cows compared to controls on D1 ($P = 0.01$). No significant effects of cabergoline treatment were observed both in true protein and in α -lactalbumin contents in mammary secretions or in α -lactalbumin and k-casein mRNA levels in mammary tissues. These changes in lactose, lactoferrin, lactoferrin/citrate ratio and fat, indicate that cabergoline treatment was efficient to hasten the mammary gland involution without affecting milk synthesis in the mammary tissue

Key Words: cow, drying-off, prolactin

W294 Effects of omitting the dry period on plasma progesterone and prolactin during lactogenesis and on colostrum IgG content in dairy cows. R. S. Zbinden¹, H. A. van Dorland¹, G. Remmelink³, B. Kemp², A. T. M. van Kneegsel², and R. M. Bruckmaier^{*1}, ¹Veterinary Physiology, Vetsuisse Faculty University of Bern, Bern, Switzerland, ²Adaptation Physiology Group, Wageningen University, Wageningen, the Netherlands, ³Livestock Research, Wageningen University and Research Centre, Lelystad, the Netherlands.

Omitting the dry period represents a strategy that may reduce metabolic stress in early lactating cows. A drawback of continuously milking is discussed to be a compromised colostrum quality, although insufficient studies have been done to confirm this. The objective of this study was to evaluate the effects of omitting the dry period on key hormone patterns during lactogenesis and the IgG content of colostrum in periparturient dairy cows. Twenty Holstein-Friesian dairy cows were randomly assigned to 2 experimental groups (0 or 60 d dry period; DRY0 or DRY60, respectively). Milk yields were recorded daily and plasma concentrations of progesterone and prolactin were determined from d 5 pre- until d 3 postpartum. Milk samples were collected for analysis of IgG concentration from d 7 pre- until d 3 postpartum for DRY0, and from d 0 until d 3 postpartum for DRY60 cows. Data were analyzed with a mixed model procedure including dry period length, day and their interaction as fixed effects. Plasma prolactin did not differ between DRY0 and DRY60 and started to increase significantly from one day before calving in both groups ($P < 0.05$). Progesterone dropped prepartum and followed a similar pattern in both groups, but was significantly lower on one day before calving in DRY60 compared with DRY0. This may point to a stronger decrease in progesterone concentration for DRY0 and could imply a faster calving process after the progesterone drop. IgG concentration started to increase from d 6 prepartum in DRY0 cows. From calving up to d 3 postpartum, IgG level decreased, but no difference was observed between the groups. However, calculated IgG mass was significantly higher for DRY60 compared with DRY0 ($P < 0.05$) across the study time, due to the higher milk yield in DRY60 (21.8 versus 13.5 kg/d on d 0; $P < 0.05$). In conclusion, the endocrine profiles supporting lactogenesis remained unaffected, and the colostrum quality was not compromised by omitting the dry period in dairy cows. It can be speculated that milking related oxytocin releases during the periparturient period induced an increased labor activity and faster birth.

Key Words: colostrum, immunoglobulin, dry period

W295 Characterization of mammary circadian rhythms of wild-type C57BL/6J mice and the role of thyroid hormone responsive spot 14 (S14) in circadian regulation of milk fat synthesis. L. Ma^{*}, Y. Ying, A. Clarke, P. Bartell, and K. J. Harvatine, Penn State University, University Park.

Peripheral circadian rhythms are well described in liver and adipose tissue and S14 expression follows a circadian rhythm. The objectives of the current study were to characterize the mammary circadian rhythm of wild-type (WT) mice and investigate the role of S14 in the rhythm of milk fat synthesis. Wild-type and S14 null mice were euthanized on d 14 of lactation (0600, 1200, 1800, or 2400 h; $n = 6$ per time point per genotype) and dam mammary tissue and pup stomach milk clots were collected. Dam intake and body weight and litter gain were recorded twice per day. Data were analyzed by ANOVA with genotype, time, and the interaction of genotype and time as fixed effects and second fit to a cosine function with a 24 h period for rhythm analysis. Wild-type mice consumed more feed during the dark than the light phase (66% vs. 34%; $P < 0.01$). Total intake and eating patterns were maintained in S14 null. Litters gained 22% more during daytime compared with nighttime in both WT and S14 null ($P < 0.05$). Pup milk clot fat concentration followed a circadian rhythm and the amplitude and phase were decreased and delayed by 18.7% and 15.6 h in S14 null mice ($P < 0.05$). In S14 null mice, the amplitude and phase of 16-carbon FA were decreased by 66% and advanced by 2.9 h, compared with WT ($P < 0.05$). In the mammary gland, expression of the core clock genes (CLOCK, BMAL1, CRY1&2, and PER1&2), lipogenic regulators (SREBP1c and S14), and lipogenic enzymes (FASN and SCD1) followed a circadian rhythm in