Abstract #320

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Rumen-protected methyl donors during late pregnancy: 3. Maternal Smartamine M and its association with neonatal Holstein calf neutrophil gene network expression.

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The aim was to evaluate the effect of supplementing pregnant cows with rumen-protected methionine (MET) on calf neutrophil expression of genes related to cell adhesion and chemotaxis, oxidative stress and inflammation. Forty Holstein calves born to cows receiving during the last ~4 wk of pregnancy MET (Smartamine M, Adisseo NA; ~2.9:1 Lys:Met; n = 20) or control (CON, ~3.35:1 Lys:Met, n = 20) were used. Immediately after birth calves were separated from the dam, fed first colostrum within 6 h (3.8 L with minimum IgG concentration of 50 g/L), housed individually and fed a common milk replacer (25% CP, 17% fat) twice daily. Blood neutrophils were isolated at birth (before receiving colostrum), 24 h after first colostrum and at 14, 28 and 50 (~1 wk post-weaning) d of age. Data were analyzed as repeated measures using the MIXED procedure of SAS. Neutrophil phagocytosis was not affected ($P > 0.05$) by maternal MET supplementation, but increased ($P < 0.01$) over time in both groups. Regardless of maternal diet *SELL*, *CADM1*, *LCP1* and*CYBA* expression increased ($P < 0.05$) from birth to 24 h after colostrum intake, then decreased ($P < 0.05$) until 28 d.*ZBP1* increased ($P < 0.01$) from birth to 28 d. *SELL* expression was overall greater ($P = 0.04$) in MET than CON calves. Expression of genes related to oxidative stress (*MPO*, *NOS2*, *SOD1*, *SOD2*, *NFE2L2*) was not affected ($P > 0.05$) by maternal diet. Similarly, blood biomarkers related to oxidative stress (ROMt, myeloperoxidase, retinol, tocopherol) were not affected ($P > 0.05$) by diet. *TLR2* had lower ($P = 0.04$) expression in MET calves, but other inflammatory mediators (*TLR4*, *MYD88*, *IRAK1*, *TRAF6*, *NFKB*, *TNF*, *IL1B*, *SLAMF7*) and blood IL-1B and IL-6 concentrations were not affected ($P > 0.05$). A marked decrease ($P < 0.01$) in both cytokines from birth to 24 h after colostrum intake was observed regardless of diet. Overall, the data suggest that maternal supplementation with MET during the last ~4 wk of gestation had a minor effect on calf neutrophil gene network expression and blood biomarkers of oxidative stress and inflammation.

Key Words: fetal programming, nutrition, nutrigenomics