

The effects of feeding a high or moderate starch dry cow diet on newborn dairy heifer calf growth

J. Haisan¹, Y. Inabu², W. Shi¹ and M. Oba¹

¹Department of Agricultural Food and Nutritional Science, University of Alberta, Edmonton T6G 2P5, Canada, moba@ualberta.ca; ²The Research Center for Animal Science, Graduate School of Biosphere Science, Hiroshima University, Higashi-Hiroshima, Japan 739-8528

The objective of this study was to determine the effects of feeding a high or moderate starch dry cow diet on the growth of female offspring in early life. Thirty-eight Holstein heifers were born to dams fed either a high (26% starch; HIGH) or moderate (16% starch; MOD) starch dry cow diet for 28 days prior to expected calving date. Following birth, all calves were housed in individual pens and managed the same; fed three 2-L meals of colostrum within the first 24 h of life, and offered 10 L/d of milk replacer (26% CP, 18% fat, mixed to 130g/L). Body weight and blood samples were collected at birth, 2, 10 ± 2 and 20 ± 2 days of life.

There was no difference in birthweight between HIGH and MOD (38.6 vs. 38.1 kg; $P = 0.69$) or at day 20 ± 2 of life (58.0 vs. 58.8 kg; $P = 0.57$). There was no difference in milk intake or health events between calf groups, however, HIGH calves had reduced average daily gain between day 2 and 10 ± 2 of life (0.67 vs. 0.89 kg/d; $P = 0.03$). Blood sampling at day 2 and 10 ± 2 indicated there was no difference in basal concentrations of glucose or insulin among calves, however, at both time points basal glucose concentrations in calves were correlated with maternal glucose concentrations prior to calving. In addition, when calves were subjected to a glucose tolerance test at day 2 and 10 ± 2, HIGH calves had reduced insulin sensitivity and glucose clearance rates as compared to LOW. These findings suggest that calf growth and glucose metabolism is influenced by the diet fed to dams; HIGH calves may have reduced glucose uptake into tissues resulting in reduced growth.

Implications: Overall the findings suggest that feeding a high-starch dry cow diet may affect growth and reduce insulin sensitivity of female offspring early in life.