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Leptin concentration in mares and their subsequent offspring

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Leptin is an adipocyte-derived hormone that influences an animal's feed intake and immune response, as well as body temperature regulation in the neonate. Additionally, leptin serves as an indicator of total body fat mass within the animal. Our objectives were to quantify the concentration of leptin in the blood of recently foaled mares to determine if leptin levels in the blood were related to body weight (BW) and/or body condition score (BCS) of mares, and to determine if leptin levels in the mare's blood were related to leptin levels in the foal's blood. Blood samples were collected from mares before the foal nursed (d 0), at 12 h (d 0.5) and 24 h (d 1) after parturition, then daily through day 4. Body weights were taken on the mares within 24 h of parturition. At 1200 h on days 5, 12, 19, 26, 33, and 61, blood samples were collected from mares and foals, BW were taken on mares, and BCS assigned to the mares. Our study revealed that mare blood serum concentrations of leptin were not significantly correlated to foal blood serum concentrations of leptin ($P = 0.69$). Post partum mare blood serum concentrations of leptin were not significantly correlated with mare BW ($P > 0.10$) or mare BCS ($P > 0.10$) on any day, with the exception of d 61 where there was a trend for BCS and leptin to be correlated ($r = 0.66$; $P = 0.07$). There was a significant effect of day on mare blood serum concentrations of leptin ($P < 0.0001$) and on foal blood serum concentrations of leptin ($P < 0.0001$). Mare blood serum concentrations of leptin decreased after parturition until d 2 and then gradually increased after d 3, remaining relatively constant through d 61. Foal blood serum concentrations of leptin increased over time until d 2, plateau through d 5 and gradually decreased through d 61. It has been demonstrated in other species that neonatal blood serum concentrations of leptin are correlated with leptin concentrations in the dam's milk. The initial increase of leptin in the foal blood serum may be due to an initial elevation in mare milk leptin. Ingestion of colostral leptin by the neonate may play a role in thermoregulation, energy expenditure, and immunology of the foal.