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Effect of feed restriction and hypothermia on fetal mice

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Low birth weights result in high mortality in highly prolific pigs. Anecdotal evidence in sheep and cattle suggests restricting feed early in gestation and/or cooling late in gestation increase birth weights. Therefore, the objective of this study was to determine the effect of early gestation feed restriction in combination with late gestational chilling on term decidual and fetal weights, and prenatal survival in mice. The study used 37 ICR male mice each mated with 4 females except for one male with 5 females. Once a female had a vaginal plug, she was removed from the male and placed into her own cage. Pregnant females were allocated to four groups: full feed-normal temperature, full feed-chilled temperature, restricted feed-normal temperature, and restricted feed-chilled temperature (n = 18, 19, 23 and 16, respectively). The restricted feed females were fed 80% of their previous five day's average intake from day 5 to 10 of gestation while full feed females were fed ad libitum. All females were fed ad libitum from day 10 to 18. On day 14 the chilled temperature females were moved to an 18 °C environmental chamber while the normal temperature females were housed at 22 °C. On day 18 the females were sacrificed and the fetal weight, respective fetus's decidual weight, and number of corpora lutea and implantations were recorded. During restriction, intake of restricted mice was 68% of full feed mice. Immediately after restriction, there was a compensatory increase in intake by restricted mice, but overall, restricted mice consumed 93.8% that of full feed mice. There were no significant differences in survival rates among the four groups. There was also no significant difference between chilled temperature and normal temperature for decidual or fetal weights. However, full feed mice had greater ($P<0.05$) birth weights than restricted feed mice (1.36 vs. 1.31 g). In conclusion, restricting feed and chilling during gestation did not increase birth weights in mice.