Does dam nutrition during prepubertal phase affect muscle gene expression in male foetal progeny?

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There is some evidence for transgenerational effects on progeny of fluctuations in nutrient intake of their dams. However, there is no information on whether such effects can be carried over to the next generation, when the original dietary fluctuations were incurred during the pre-pubertal period. The objective of this study was to determine if maternal diet during the prepubertal phase would affect the expression of key genes related to muscle development and growth in male foetuses. Eighty Angus × Holstein-Friesian heifer (141±8 days of age and 119±23 kg of BW, mean ± SD) were offered either a high (H) or moderate (M) plane of nutrition from 4.5 to 8.5 months of age. Target growth rates were 1.2 kg/d and 0.5 kg/d, for H and M groups, respectively. Following this, all heifers were offered a conventional moderate level of nutrition. At breeding, heifers were bred to a synchronised oestrus using semen from a single AI sire (mean age and BW: 502±8 days and 360±46 kg). A transrectal uterine ultrasound was performed 63 days after AI to determine pregnancy and foetal sex. On day 100 of gestation a cohort of heifers (H: n=11; M: n=12) reflecting the average BW and age of the group and carrying male foetuses were slaughtered. Skeletal muscle tissue was sampled from each foetus, with RNA subsequently isolated from each sample. RNA was reverse transcribed into cDNA and then used for qPCR evaluation of key genes (GHR, IGF2, IGF2R, MSTN, MYF5, MYF6, MYOD, MYOG, PAX7) related to skeletal muscle development and growth. Differences in gene expression between H and M groups were determined using mixed model ANOVA (PROC MIXED, SAS). No treatment differences (P>0.05) were detected in expression profiles of the candidate genes notably associated with skeletal muscle cell differentiation and fibre development. In conclusion, this study shows no transgenerational effect on key genes related to muscle development and growth in male foetuses, when dam nutrition fluctuated during prepubertal phase.

Effect of maternal *Solanum glaucophyllum* intake on suckling piglet growth and muscle gene expression

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Supplementing vitamin D to sows is suggested to facilitate parturition and support neonatal piglet survival. It is however unknown, if this may affect offspring growth as well as muscle gene expression with potential consequences for postnatal development of the offspring. *Solanum glaucophyllum* (waxy-leaf nightshade) contains high proportions of calcitriol, the active form of vitamin D, and increases circulating calcium concentrations after oral intake. At about 107 days of gestation, sows were randomly divided into two experimental groups (n=6 per group). All animals received a commercial lactation feed. The feed of one group (SG) was supplemented daily with a top-dressing containing 600 mg Panbonis 10 (Herbonis, Augst, Switzerland), providing 10 mg/kg calcitriol-glycosides (equivalent to 6 µg/sow/day of calcitriol). The second group (control) received the same top-dressing without Panbonis 10. At farrowing, the piglets' body weight (BW) was determined. Cross fostering took place within feeding groups. At about four weeks of age, one male and one female piglet with a birth weight closest to the respective average litter birth weight were selected from each sow. The BW of these selected piglets was determined before slaughtering by electrical stunning and exsanguination. The weights of liver, kidneys, perirenal adipose tissue, lungs, heart, and spleen were measured. Muscle tissue was collected for gene expression analysis via qPCR. Birth weight of SG piglets (1.58±0.27 kg (mean ± SD)) tended to be higher (P=0.085) than that of control piglets (1.39±0.22 kg) while litter size tended to be smaller in SG (13±3) than in control (16±3) sows (P=0.088). At slaughter, SG piglets (7.77±0.96 kg) were heavier (P=0.050) than control piglets (6.99±0.71 kg). No significant difference was observed for any of the organ weights. Gene expression of myogenic regulatory factors (myogenin and myogenic differentiation 1) in muscle did not differ between groups. Diet group and sex did not show any interaction for any parameter. Gene expression analyses are ongoing to evaluate the potential underlying reasons why maternal intake of *S. glaucophyllum* providing the active form of vitamin D resulted in heaver piglets (+11%) at four weeks of age.