



## Prenatal and Postnatal Lamb Muscle Growth as Influenced by Ergot Alkaloid Exposure in Utero

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**Keywords:** ergot alkaloid, lamb, muscle, postnatal, prenatal  
Meat and Muscle Biology 2(2):21

doi:10.221751/rmc2018.018

### Objectives

Two experiments were conducted to determine the impact of ergot alkaloids fed during 2 stages of gestation (MID, d 35 to 85, or LATE, d 86 to 133/parturition) on prenatal (Experiment 1, Exp1) and postnatal (Experiment 2, Exp 2) lamb muscle growth.

### Materials and Methods

Pregnant Suffolk ewes (Expt. 1,  $n = 36$ , BW  $78.02 \pm 9.53$  kg; Expt. 2,  $n = 60$ , BW  $83.13 \pm 1.69$  kg) were fed endophyte-infected tall fescue seed (E+; 1772  $\mu\text{g}/\text{hd}/\text{d}$  ergovaline+ergovalinine) or endophyte-free tall fescue seed (E-; 0  $\mu\text{g}/\text{hd}/\text{d}$  ergovaline+ergovalinine) during MID or LATE gestation, which created 4 dietary treatments of E+/E+, E+/E-, E-/E+, and E-/E-. Maternal and fetal necropsies were performed at d 133 of gestation. Semitendinosus (ST) muscle was removed from each fetus, immediately frozen in liquid nitrogen and stored at  $-80^\circ\text{C}$ . Total cellular RNA was extracted using the *mirVana* miRNA Isolation Kit (Ambion, Austin, TX) and quality analysis of RNA performed using an Agilent 2100 Bioanalyzer, with a RIN threshold of 7.0. The tRNA from 3 fetuses per treatment from the ST was used for miRNA sequencing and data analysis (LC Sciences, Houston, TX). Data was analyzed as a randomized block design with a  $2 \times 2$  factorial with fescue treatment (E+ or E-), stage of gestation (MID or LATE), and 2-way interaction in the model. In Expt. 2, Suffolk ewes were stratified by genotype (dopamine receptor 2 [DRD2] SNP; AA, AG, GG) and assigned to fescue treatments of E+ or E- fed during 2 stages of gestation, MID or LATE similar to Expt. 1, except that ewes were allowed to lamb

naturally. Data for Expt. 2 were analyzed as a  $3 \times 2 \times 2$  factorial with ewe genotype, fescue treatment, time of gestation and all interactions in the model. Lamb weights were recorded at birth and weaning. At weaning, wethers ( $n = 44$ ) were fed individually a high concentrate diet until they reached 59 kg or 185 d postweaning.

### Results

Prenatal (d 133) lamb fetal weights were lower ( $P < 0.05$ ) for ewes fed E+ fescue during LATE gestation (E-/E+ and E+/E+). Total and individual muscle mass were also lower in fetal lambs from ewes fed E+ fescue during LATE gestation. miRNA transcriptome were altered in the semitendinosus muscle of fetal lambs from ewes fed E+ fescue during LATE gestation. Exp. 2 lamb birth and weaning weight was lower ( $P < 0.05$ ) for ewes fed E+ tall fescue seed during LATE gestation. At slaughter, wethers from GG ewes fed E+ had greater live weight than E-. Hot carcass weights, dressing percentage, and carcass traits did not differ due to fescue treatment. Biceps femoris muscle was lower on a percentage of hot carcass weight for wethers from ewes fed E+ fescue during LATE gestation. Carcass fat percentage, as measured by dual-energy X-ray absorptiometry at 24 h postmortem, did not differ ( $P > 0.05$ ) by ewe genotype or fescue treatment.

### Conclusion

Exposure to ergot alkaloids from E+ fescue during LATE gestation reduces prenatal and postnatal muscle growth in lambs, and alters prenatal muscle miRNA expression.