

**Effects of maternal undernutrition in late gestation on uterine haemodynamics in suckler cows**

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Undernutrition in late pregnancy is a common scenario in extensive systems. The impact on foetal development and the physiological mechanisms involved have to be ascertained, as 75% of foetal growth occurs in this period. We examined the hemodynamic changes in the uteroplacental unit during the late third of gestation in beef cattle in an undernutrition environment. Sixteen lactating cows were synchronised and artificially inseminated. From the 7<sup>th</sup> month of gestation to calving cows were allocated to two diets (CONTROL (100% requirements) or SUBNUT (60%)), which resulted in 44 and 12 kg of total weight gain). Uterine arteries were interrogated by means of transrectal Doppler ultrasonography (EXAGO, imv-imaging, France) on days (d) 195, 221 and 250 of pregnancy. Velocity, resistance index (RI), area and blood flow of uterine arteries were measured. Data were analysed with a mixed linear model with maternal diet and day of gestation as fixed effects. All parameters were dependent on the foetus location, ipsilateral uterine artery quadrupling the blood flow compared to the contralateral one (13.836 and 3.579 ml/min;  $P < 0.001$ ). Focusing on the ipsilateral artery, the increase of systolic velocity from d 195 to d 250 was higher in SUBNUT cows (193 vs 177 cm/s, for CONTROL and SUBNUT at d 195; 215 vs 247 cm/s for CONTROL and SUBNUT at d 250). On d 250 RI of ipsilateral artery was higher in SUBNUT cows (0.46 vs 0.55 RI;  $P < 0.05$ ). The area of ipsilateral artery increased as the pregnancy progressed (1.26, 1.58 and 1.68 cm<sup>2</sup>, on d 195, 221 and 250 of pregnancy;  $P < 0.001$ ). At d 250, the area was higher in CONTROL cows (1.78 vs 1.59 cm<sup>2</sup>), although the difference was not significant. On d 221 of gestation, total uterine artery blood flow was lower in SUBNUT cows (21.079 vs 14.103 ml/min;  $P < 0.05$ ), this difference disappearing on d 250. In conclusion, a high significant resistance index should be considered an indicator for deficient nutrition to the foetus due to a decrement in diastolic perfusion. Therefore, maternal undernutrition may be linked to a lower uterine artery blood flow. Funded by Project PID2020-113617RR-C21 FETALNUT.

# Book of Abstracts of the 73<sup>rd</sup> Annual Meeting of the European Federation of Animal Science



**Book of abstracts No. 28 (2022)**

**Porto, Portugal**

**5 – 9 September, 2022**