

**TITLE**

**MORPHOMETRIC DIFFERENCES IN THE UMBILICAL CORD OF IUGR AND NORMALLY DEVELOPED PIGLETS**

Charlotte Amdi<sup>1</sup>, Olga F. Nielsen<sup>1</sup>, Christian F. Hansen<sup>1</sup>, Jens Peter Nielsen<sup>1</sup>

<sup>1</sup> *Department of Veterinary and Animal Sciences, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark*

**CONTENT**

Intrauterine growth restriction (IUGR) during foetal development is observed in a sub sample of small piglets in litters from highly prolific sows. The umbilical cord is assumed to play a significant role in the development of IUGR. The aim of the study was therefore to determine if there were differences in the morphology of the umbilical cords of IUGR compared to normal piglets at birth. Twelve normal and 12 IUGR piglets were taken immediately after birth and characterized as IUGR or normal based on their headshape. Five centimeters of the umbilical cord was cut (from 20 to 25 cm) and fixed in formalin for histology analysis. The umbilical cords were then fixed, cut and stained with an H&E staining and analysed in Zeiss Zen Blue software. Results of the birth weight showed that IUGR piglets were smaller than normal piglets (0.76 kg vs. 1.37 kg; SE 0.06;  $P < 0.001$ ), and had smaller total area of umbilical cord than normal piglets (33796982.3  $\mu\text{m}^2$  vs. 48457483.7  $\mu\text{m}^2$  SE 3079659.3;  $P < 0.003$ ). In addition, IUGR piglets had smaller Wharton jelly areas (27516627.9  $\mu\text{m}^2$  vs. 38423040.8  $\mu\text{m}^2$ , SE 336234.1;  $P = 0.03$ ) and also smaller umbilical vein (2869260.9  $\mu\text{m}^2$  vs. 3982334.8  $\mu\text{m}^2$  SE 407610.9;  $P < 0.05$ ) and umbilical artery (2495655.0  $\mu\text{m}^2$  vs. 4203237.6  $\mu\text{m}^2$  SE 342812.6;  $P < 0.001$ ) areas than normal piglets. In conclusion, the size of the umbilical cord and thereby the foetal blood supply could be the limiting factor for growth and development during gestation in IUGR piglets but more research is needed to understand the mechanisms behind.