

In search of an animal model for IUGR to study differences in morbidity and mortality between male and female neonates

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P106

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Background

Intrauterine growth restriction (IUGR) is a major health problem in human medicine and animal production.

FACTS

- 5-10% human neonates
- 15-20% piglets
- Low birth weight
- Reduced growth



- Mortality rate ↑
- Short term morbidity ↑
- Long term morbidity ↑



Hypothesis

Aberrant vasculogenesis is believed to be a possible contributing factor to the development of IUGR. Furthermore, it has been reported that fetal vascularization adapts differently in IUGR males and females. Our hypothesis is that the blood vessels in the umbilical cord (UC) of male and female IUGR piglets differ morphologically from each other.

Aim

To assess the cross-sectional area (CSA) of umbilical cord (UC) blood



vessels in male and female IUGR piglets.

Materials and Methods

Selection of piglets

Parameters	Control	IUGR
Head mophology	Normal shape	Dolphin shape
Body Weight (BW)	> MBW - 1×SD	< MBW - 1×SD



Number of animals	Control		IUGR	
	Male	Female	Male	Female
Round 1	8	8	3	3

Sampling process



Round 3 4 4 6 4	Total	22	20	10	12
	Round 3	4	4	6	4





The animal study was approved by the ethical committee of the University of Antwerp (ECD: 2022-10)

Results

- IUGR piglets have a relatively higher cross-sectional area (CSA) of 1. the umbilical arteries and veins compared to control piglets.
- There is no morphological difference between the umbilical arteries and 2. veins of males and females.





Male Female p = 0.37	Statistical test: two-way ANOVAMaleFemale $p = 0.76$				
Conclusions					

- The relatively higher CSA in IUGR piglets might be explained by the higher need for blood flow to the developing organs compared to control piglets.
- Based on our results there is **no difference in CSA of UC blood** 2. vessels between males and females. Nevertheless, functional vascular differences (such as VEGF expression) between both sexes need to be investigated.

