

**Fetal development in Danish sows**

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Fokus 35

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**Project- Feed4Life (2017-2022)**

**Background:**

- Low-birth weight piglets have high mortality rates.
- Survival of small piglets can be improved through feeding and management.
- BUT it takes a lot of work!
- SO it would be easier if fewer small piglets were born...



**Overall aim:**

- To develop feeding strategies for sows in early gestation to increase birth weight

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**Slaughter trial on gestating sows**

**Aim of the slaughter trial:**

- Fetal development in sows with high litter size
- How early can we detect differences in fetal size within the litter? when does the damage happen??
- What defines small versus large fetuses?

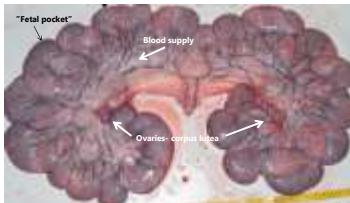
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**Animals- slaughter trials**

- 47 parity 4-9 sows from a commercial farm
- Landrace x Yorkshire sows mated with Duroc semen (DanBred)
- Slaughtered at day 28, 33, 45, 50, 56 of gestation


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**The pregnant uterus**



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**Fetal weight and variation within the litter**

Slagtedag	28	33	45	50	56
					
Fostervægt, g	0,82	2,76	18,8	36,3	89,5
Variationskoefficient, %	21	16	14	12	13



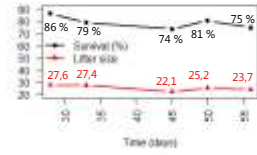
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Variation in fetal size within the litter – Day 56



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Litter size and fetal survival



Day	Fetuses
28 ( 9 sows)	20-40
33 (10 sows)	14-38
45 (9 sows)	14-30
50 (8 sows)	15-34
56 (11 sows)	16-31

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What characterizes small versus large fetuses?



Can we detect the differences seen at birth already during gestation????

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Organ size of fetuses

Small fetuses have:

- Relatively larger brain (day 45, 50 and 56)
- Relatively smaller intestine (day 45,50 and 56)
- Relatively smaller lungs (day 45 and 50)
- Relatively smaller spleen (day 50 and 56)



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What characterizes large versus small fetuses?

- Litter size?
- Placement in uterus?
- Sex?
- Weight and area of placenta?
- Length and anatomy of umbilical cord?

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What characterizes small vs. large fetuses?

• Different placement in the uterus (day 56)



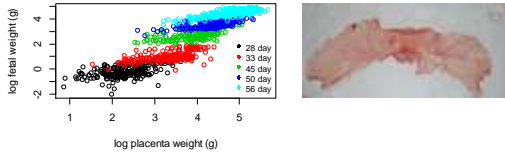
Very interesting – BUT we cannot change sex and placement...

- Males are heavier than females

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**Fetus weight- effect of placenta weight**

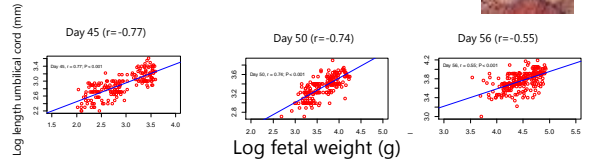
- Small fetuses  $\longleftrightarrow$  lighter placentas + smaller area of placenta



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**Fetus weight – effect of umbilical cord length**

- High fetus weight (g)  $\longleftrightarrow$  Longer umbilical cord



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**Histology of umbilical cord**

- Large fetus -> thinner membrane of umbilical cord
- Large fetus -> larger circumference of umbilical cord

Differences that can affect the function of the umbilical cord



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**Placental development seems central to understand why some piglets are smaller at birth- SO what can we do??**

- Placenta develops from day 12-16 post-mating



- The placenta is already highly developed in early gestation
- Already differentiated size of fetuses and placentas at day 28

**Nutritional interventions must be initiated at mating or earlier!**

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**What is next???**

- We are currently running feeding trials in two farms
  - Feeding in early gestation
  - Measurements: blood samples, back fat, fetal development, farrowing results

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**QUESTIONS?**



Funded by:



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