The *MC4R* gene affects puberty attainment in gilts but not in boars

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**Introduction**

**Boar taint:** off-odor present in heated meat or fat
- Genetic selection

**Melanocortin 4 receptor** (Asp298Asn polymorphism): A allele associated boar taint (Schroyen et al., in press)

Androstenone related to testosterone
- Previous research: ↓ androstenone, delay of puberty

Androstenone = pheromone
Objectives

Aim of study:

• Effect on behavior

• Effect on puberty attainment
Experimental design

- **interventional** study
- offspring of a **commercial cross** (hybrid sow X Piétrain)
- Homozygous littermates of AG sow x AG sire

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<tr>
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<th>EM</th>
<th>G</th>
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<tbody>
<tr>
<td>AA</td>
<td>6×11</td>
<td>6×11</td>
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<tr>
<td>GG</td>
<td>6×11</td>
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- **Slaughter**: intended average live weight of 110 kg
Material and methods

Behavior and skin lesions:
observations 11 occasions
(8 weeks-slaughter)

Puberty entire males:
• Preputial smear test
• Testosterone concentration
• Testes weight at slaughter

Puberty gilts:
• Ovaries at slaughter
Behavior

Passive and eating behavior

Behavioral problems

Sexual behavior

Aggressive behavior

Active behavior

Scan sampling on 11 occasions
Behavior

**Passive and eating behavior**
- AA animals: more boar taint
- GG animals: less boar taint

**Active behavior**

P = 0.003

P = 0.015
Skin lesions and lameness

Tendency to effect on back (P=0.067)
No effect on lameness

P=0.043

P=0.028

AA animals: more boar taint
GG animals: less boar taint
Puberty entire males

Preputial smear test:
Aim: estimate the **start of puberty**
Start of puberty: moment **first sperm cell**
**Swabs:** weekly, 2 days/week starting at 16 weeks of age
Sperm cells present in fluid preputium
Swabs: Age

- Mean age first positive swab:
  - AA: n=41, Mean: 150 d, Median: 150 d (AA animals: more boar taint)
  - GG: n=46, Mean: 148 d, Median: 145 d (GG animals: less boar taint)

P = 0.385
Swabs: weight

Mean weight first positive swab:

- AA animals: more boar taint
  - 97 kg
- GG animals: less boar taint
  - 91 kg

\[ P = 0.065 \]
Performances  
(talk session 13)

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<tr>
<td>↑</td>
<td>DG, EM</td>
<td>↓</td>
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<tr>
<td>↓</td>
<td>Meat percentage</td>
<td>↑</td>
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<tr>
<td>↑</td>
<td>Back fat</td>
<td>↓</td>
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AA animals: more boar taint  
GG animals: less boar taint
No effect genotype on concentration of testosterone
Testes weight

Weight (g)

Testes weight

AA animals: more boar taint
GG animals: less boar taint

P = 0.632
Puberty gilts

Puberty gilts

- ovaries in slaughter house: presence follicles / corpora lutea

Non-cycling ovary       Ovary with several CL
Puberty gilts

Percentage cycling gilts

P<0.001

AA animals: more boar taint
GG animals: less boar taint
<table>
<thead>
<tr>
<th></th>
<th>AA</th>
<th>GG</th>
<th>SEM</th>
<th>P-value</th>
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<tbody>
<tr>
<td><strong>Percentage cycling gilts, %</strong></td>
<td>8</td>
<td>31</td>
<td></td>
<td>&lt; 0.001</td>
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<tr>
<td><strong>Slaughter age, days</strong></td>
<td>180</td>
<td>182</td>
<td>0.761</td>
<td>0.954</td>
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<tr>
<td><strong>Slaughter weight, kg</strong></td>
<td>112.8</td>
<td>112.5</td>
<td>0.747</td>
<td>1.000</td>
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<tr>
<td><strong>Meat percentage</strong></td>
<td>63.0</td>
<td>64.4</td>
<td>0.154</td>
<td>&lt; 0.001</td>
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No correlation between cycling and fat thickness, meat thickness or meat percentage.
Conclusion

Selection towards lower prevalence of boar taint:

More active animals
More skin lesions at anterior and caudal part (and back)
No effect on lameness

Entire males: no effect on testes weight, testosterone concentration, mean age first positive swab
Tendency to lower weight first positive swab

 Gilts: Higher percentage cycling gilts
Thank you for your attention!

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Androstenone in serum (ppb) vs. Age (weeks)

- AA
- GG

P = 0.143
Skatole in serum

- AA
- GG

P = 0.003
Indole in serum

Indole in serum (ppb)

Age (weeks)

P=0.074