The combination of lowered antibiotic consumption with improved production figures highlights the advantage of prophylaxis compared to treatment. Vaccination protects the pigs from onset of disease, thereby preventing damage to the intestinal mucosa, resulting in an increased growth rate of the vaccinated pigs compared to non-vaccinates (Bak and Rathkjen, 2009). Hence, vaccinated pigs perform better compared to non-vaccinated pigs, even if the non-vaccinated pigs receive antibiotic treatments after an outbreak of diarrhea.

**Conclusion**

Preliminary results from the project are positive, indicating that it will be possible to produce at least 50% of the pigs without use of antibiotics. This is possible with herd relevant vaccination programs, including PCV2, *Mycoplasma hyopneumoniae* and *Lawsonia intracellularis*, and with continuous focus on caretaking and hygiene.

References

- DANMAP (2013): Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark. ISSN 1600-2032; p 92.

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2 National Veterinary Institute, Danish Technical University;
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### Table 1: Feed conversion and average daily weight gain in weaners after initiation of the antibiotic free pigs project.

<table>
<thead>
<tr>
<th>Weaned pigs</th>
<th>Yearly average</th>
<th>All free period</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily weight gain</td>
<td>504</td>
<td>538</td>
<td>+ 34 g/day</td>
</tr>
<tr>
<td>FE/kg gain</td>
<td>1.84</td>
<td>1.69</td>
<td>- 0.15 FE/kg</td>
</tr>
</tbody>
</table>

A Danish research project, MINIRESIST, investigated the consequences of varying doses and treatment strategies for oxytetracycline treatment of *Lawsonia intracellularis* diarrhea in nursery pigs. Batches of nursery pigs in five herds were randomly allocated to one of five treatment protocols (batch treatment orally with high, normal and low doses; penwise treatment with normal dose and injection treatment with normal dose). Outcomes, in terms of reduction of L. intracellularis determined by qPCR, growth rate and fecal dry matter content (determined on 30 pigs per batch in 61 batches), and levels of tetracycline-resistant coliforms, and quantification of resistance genes in intestinal content (determined on 15 pigs per batch in 80 batches), were determined and analyzed statistically. These studies were supplemented with in silico simulation of phenotypic resistance development in the intestine based on in vitro determined growth characteristics of porcine commensal E. coli in the presence of tetracycline, Low-dose batch-treatment did not differ significantly from normal and high dose treatment in terms of reduction of L. intracellularis, and phenotypic resistance levels under field conditions also did not differ statistically depending on dosing levels. qPCR results were shown to add to phenotypic resistance-determination with information on selected genes. Injection treatment resulted in the lowest number of resistant bacteria, but also in the lowest overall cure rate, probably because treatment was based on fecal scores, which have low sensitivity for diarrhea. Simulation studies suggested that resistance development was mostly dependent on the duration of the treatment and the total amount of oxytetracycline used per pig. Ongoing field testing has been initiated to confirm this conclusion, since no field experimentation has yet been performed with variation of duration of treatment. In conclusion, batch treatment with the lowest dose was recommended from both a disease and a resistance point of view.