Vaccination mitigates the effect PRRSv infection has on the pharmacokinetics of ceftiofur crystalline free acid in pigs.

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**Objectives**
- Determine if PRRS modified live virus (MLV) alone impacts the pharmacokinetic (PK) profile of ceftiofur crystalline free acid in pigs, as wild-type infection does
- Determine if PRRS MLV vaccination prevents PK changes when vaccinated pigs are challenged with a wild-type PRRS virus (PRRSv)

**Conclusions**
- PRRSv wild-type challenge → changes ceftiofur pharmacokinetics, decreased AUC (agreement with other studies on ceftiofur PK in diseased animals)
- Ingelvac® PRRS MLV vaccination → no change of Excede® pharmacokinetics (novel research)
- Ingelvac® MLV vaccination prior to PRRSv wild-type challenge → prevents Excede® pharmacokinetic changes observed in unvaccinated PRRSv wild-type challenge (novel research)

**Relevance to Practitioners**
- PRRSv infection negatively influences absorption, distribution, metabolism, or excretion of ceftiofur; this is primarily observed as lower antimicrobial concentrations in vasculature
- PRRSv vaccination has potential to preserve ceftiofur pharmacokinetics when pigs are faced with PRRSv wild-type challenge

**Continuing Research**
- Further work should be completed to determine the cause of the observed pharmacokinetic changes
- The present study did not measure bioavailability (F); significant changes in plasma drug clearance and volume of distribution may have been influenced by bioavailability; further research could help determine influence of bioavailability on clearance and volume of distribution (i.e. how for absorption from injection site influence pharmacokinetics)
- Analogous work with other antimicrobials and vaccinations could be done to determine if similar trends would be observed

**Results**
- Viral diagnostics and characterization confirmed no compromise of study design
- No observed difference between Control, Vx groups, and Vx+Challenge groups
- Compared to Control Group, Challenge had 4AUC<sub>0-24</sub> /F, V<sub>9</sub>/F

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vx</th>
<th>Challenge</th>
<th>Vx+Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUC&lt;sub&gt;0-24&lt;/sub&gt;</td>
<td>2.64 (2.57)</td>
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<tr>
<td>Area Under the Curve</td>
<td>260.00 (299.00)</td>
<td>260.00 (299.00)</td>
<td>260.00 (299.00)</td>
<td>260.00 (299.00)</td>
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<tr>
<td>T&lt;sub&gt;max&lt;/sub&gt;</td>
<td>29 (38.56)</td>
<td>29 (38.56)</td>
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<tr>
<td>Peak Concentration</td>
<td>0.01692</td>
<td>0.01692</td>
<td>0.01692</td>
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<tr>
<td>Terminal half life</td>
<td>2.61 (3.52)</td>
<td>2.61 (3.52)</td>
<td>2.61 (3.52)</td>
<td>2.61 (3.52)</td>
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<tr>
<td>Cl/F (λ&lt;sub&gt;1&lt;/sub&gt;/2)</td>
<td>53.0 (53.0)</td>
<td>53.0 (53.0)</td>
<td>53.0 (53.0)</td>
<td>53.0 (53.0)</td>
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<tr>
<td>Vol/F</td>
<td>270 (310)</td>
<td>270 (310)</td>
<td>270 (310)</td>
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**Summary of PRRSv carrier diagnostics and viral characteristics**

- **Control**: NP 10/10, V<sub>x</sub> 10/10, V<sub>x</sub>+Ch 10/10
- **Vx**: V<sub>x</sub> 10/10, V<sub>x</sub>+Ch 10/10
- **Challenge**: V<sub>x</sub> 10/10, V<sub>x</sub>+Ch 10/10

**Concentration vs time curves for mean plasma concentrations of desfuroylceftiofuracetamide (DCA).**