Vectormune ND
a step towards control of Newcastle Disease

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The parameters of ND vaccination

For the control of Newcastle Disease (ND) vaccination is a very efficacious tool, if complementary to:
The parameters of ND vaccination

For the control of Newcastle Disease (ND) vaccination is a very efficacious tool, if complementary to:

- Good animal husbandry
- Stringent Biosecurity
- Effective Sanitary Police
The parameters of ND vaccination

ND vaccination program must match the field disease pressure:
The parameters of ND vaccination

ND vaccination program must match the field disease pressure:

- **Low**: ND is a potential risk
- **Medium**: ND is a real risk
- **High**: ND is a strong risk
The parameters of ND vaccination

Reliable vaccination against ND must take into account:
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- Importance of vaccine administration including flock coverage
- Interference with Passive immunity (Maternally Derived Antibodies or MDA)
The critical points regarding vaccine immunity against ND are:
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- Onset of Immunity (OOI)
- Level of Immunity (LOI)
- Duration of Immunity (DOI)
As of today, there are 2 categories of vaccines against ND:
As of today, there are 2 categories of vaccines against ND:

- Live attenuated
- Inactivated (killed) adjuvanted
As of today, there are 2+1 categories of vaccines against ND:

- Live attenuated
- Inactivated (killed) adjuvanted
- rHVT-F (Vectormune ND)
# ND vaccines

## The classical ND vaccines

<table>
<thead>
<tr>
<th>Category</th>
<th>+</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live</td>
<td>Fast OOI Local (&amp; general Imm.)</td>
<td>Susceptible to MDA Post Vaccination Reactions Short lasting Immunity</td>
</tr>
<tr>
<td>Killed</td>
<td>Long lasting Immunity</td>
<td>Susceptible to MDA Local reaction General Immunity only</td>
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<tr>
<td></td>
<td></td>
<td>Local reaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Immunity only</td>
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</tbody>
</table>
The problem of interference with MDA
## The problem of interference with MDA

<table>
<thead>
<tr>
<th>Age (days)</th>
<th>Serum Antibody Titre* (10 log)</th>
<th>Tears Antibody Titre* (10 log)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>4</td>
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<tr>
<td>21</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>&lt;1</td>
<td>0</td>
</tr>
<tr>
<td>41</td>
<td>0</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

*ImmunoPeroxidase Monolayer Assay

(after P.H. Russel, 1993)
The problem of interference with MDA

Live attenuated ND vaccines
The problem of interference with MDA

Live attenuated ND vaccines

% protection / challenge

(derived from Bennejean G. et al., 1978)
The problem of interference with MDA

Live attenuated ND vaccines

% protection / challenge

Chickens

<table>
<thead>
<tr>
<th></th>
<th>MDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>with</td>
<td></td>
</tr>
<tr>
<td>without</td>
<td></td>
</tr>
</tbody>
</table>

Vaccinated

Control

Age (days)

(after Bennejean G. et al., 1978)
The problem of interference with MDA

Live attenuated ND vaccines

% protection / challenge

<table>
<thead>
<tr>
<th>Chickens</th>
<th>MDA with</th>
<th>MDA without</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinated</td>
<td>□</td>
<td>▲</td>
</tr>
<tr>
<td>Control</td>
<td>□</td>
<td>△</td>
</tr>
</tbody>
</table>

(age Bennejean G. et al., 1978)
The problem of interference with MDA

Killed (inactivated) ND vaccines
The problem of interference with MDA

Killed (inactivated) ND vaccines

Killed vaccine - No MDA
Killed vaccine - MDA

(after Bennejean G. et al., 1978)
The problem of interference with MDA

rHVT-F (Vectormune ND) vaccine
The problem of interference with MDA

rHVT-F (Vectormune ND) vaccine

La Sota (Phylaxia) antigen

(Extract from study SCI 193-2012 – SSIU Ceva Phylaxia)
The problem of interference with MDA

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Efficacy of Vectormune ND
Efficacy of Vectormune ND

Laboratory trials in Thailand (vvNDV)
Efficacy of Vectormune ND

Laboratory trials in Thailand (vvNDV)

Percentage of protection

Age at challenge (days)

- Vectormune HVT-NDV
- Cevac Vitapest L
- Cevac Vitapest L + Vectormune HVT-NDV
- Cevac Vitapest L + Cevac Broiler ND K
- Controls
Efficacy of Vectormune ND

Laboratory trials at SSIU Ceva Phylaxia
Efficacy of Vectormune ND

Laboratory trials at SSIU Ceva Phylaxia

- Commercial broilers (20 per group)
- Vectormune ND SQ or in-ovo (-3d)
- Challenge:
  - $10^5$ EID50 Chimalhuacan NDV strain
  - at 3 or 4 or 6 weeks of age
  - IN + ON route
- Oropharyngeal and Cloacal swabs taken 3 and 7 days PC
- Virus quantification using RT-PCR
Clinical protection

- VTM HVT NDV in ovo: CH-1 D20 = 57%, CH-2 D27 = 81%, CH-3 D40 = 95%
- VTM HVT NDV sc: CH-1 D20 = 100%, CH-2 D27 = 100%, CH-3 D40 = 100%
- Broiler control: 0%
Efficacy of Vectormune ND

Challenge at D28

Reduction of shedding

Challenge at D28

<table>
<thead>
<tr>
<th></th>
<th>mean and range of challenge virus amount (log_{10} EID_{50}/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>oroph. swab</td>
<td>CH2 D3</td>
</tr>
<tr>
<td>cloacal swab</td>
<td>CH2 D7</td>
</tr>
<tr>
<td>oroph. swab</td>
<td>VTM HVT NDV in ovo</td>
</tr>
<tr>
<td>cloacal swab</td>
<td>VTM HVT NDV s.c.</td>
</tr>
<tr>
<td></td>
<td>broiler control</td>
</tr>
</tbody>
</table>
Efficacy of Vectormune ND

Challenge at D28

Reduction of shedding

- Reduction of sheddng

Efficacy of Vectormune ND

Challenge at D28

Reduction of shedding

Efficacy of Vectormune ND

Challenge at D28

Reduction of shedding
Does it protect against various types of NDV?
Efficacy of Vectormune ND

Does it protect against various types of NDV?

Yes!
Efficacy of Vectormune ND

Does it protect against various types of NDV?

Yes! Yes!
Does it protect against various types of NDV?

Yes! Yes! Yes! Yes!
Efficacy of Vectormune ND

Does it protect against various types of NDV? Yes!
Efficacy of Vectormune ND

Controlled trials at SSIU Ceva Phylaxia

- Lohman Brown layer pullets with MDA
- Vectormune ND (d1 – SQ)
- Vectormune ND (d1 – SQ) + Cevac Vitapest L (ED)
  + Cevac ND IB EDS K (w15 – IM)
- Challenge :
  - $10^5$ EID$_{50}$ Malaysian 2010 vvNDV viscerotropic isolate (Genotype VII) - IN route (0.1 ml)
  - at 3, 4, 6, 10, 33, and 72 weeks of age
Efficacy of Vectormune ND

Controlled trials at SSIU Ceva Phylaxia

Protection of layers against vvNDV challenge

% Protection

Vectormune HVT-NDV
Vectormune HVT-NDV + Cevac Vitapest L + Killed
Controls

Age at challenge (in weeks)

% Protection

Vectormune HVT-NDV
Vectormune HVT-NDV + Cevac Vitapest L + Killed
Controls

Age at challenge (in weeks)

3 4 6 10 15 33

33

72
# Vectormune ND: vaccination programs

<table>
<thead>
<tr>
<th>Disease pressure</th>
<th>MDA</th>
<th>Vectormune ND</th>
<th>Live ND Priming D1</th>
<th>Live ND boost D14-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High</td>
<td>0</td>
<td>0</td>
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Conclusions: Vectormune ND

- Vaccine « take » is not prevented by MDA
- Vaccine take depends only on the quality of administration
- Administration can be done at the hatchery (in-ovo or SQ) i.e. in the most reliable way
- Early immunity can be re-inforced by MDA and live vaccine(s) if necessary
- Duration of immunity is outstanding
- Shedding of challenge virus is reduced
Conclusions: Vectormune ND

A (major) step towards a better control of Newcastle Disease
THANK YOU FOR YOUR ATTENTION