New approaches for IBD and ND control around the world

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Many reasons to move the IBD vaccination from the field to the hatchery
Field drinking water vaccination has demonstrated not to be reliable

- Interference of Maternal immunity
- Many bad practices making difficult the proper vaccination and control

New IBD technology vaccines (Immune-Complex IBD and Vector HVT-IBD) can be applied at the hatchery without suffering the interference of maternal immunity

From 1 to 2 vaccinations in the field to 1 injection in the hatchery

- More uniform vaccination
- Higher coverage of the population
- Demonstrated efficacy
Evolution of IBD Vaccination in the Hatchery using New Technology Vaccines

From less than 1 Billion broilers in 2006

To more than 19.5 Billion broilers in 2013
IBD Vaccination in the Hatchery
Africa & Middle East

From 0.6 Bn broilers in 2011 to 0.9 Bn in 2013

(Percentage of total broiler’s population)
IBD Vaccination in the Hatchery

Asia Pacific

2011

- Asia-Pacific: 19%
- Thailand: 56%
- Philippines: 78%
- Malaysia: 31%
- Indonesia: 24%
- China: 17%

2013

- ASIA PACIFIC: 31%
- Bangladesh: 40%
- Malaysia: 44%
- Philippines: 74%
- Pakistan: 19%
- Thailand: 60%
- Indonesia: 34%
- China: 47%

➢ From 2.0 Bn broilers in 2011 to 4.5 Bn in 2013

(Percentage of total broiler’s population)
IBD Vaccination in the Hatchery
North America

From 2.0 Bn broilers in 2011 to 3.3 Bn in 2013

(Percentage of total broiler’s population)
IBD Vaccination in the Hatchery
Latin America

From 6.4 Bn broilers in 2011 to 8.4 Bn in 2013

(Percentage of total broiler’s population)
<table>
<thead>
<tr>
<th>Country</th>
<th>2011 (%)</th>
<th>2013 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEET</td>
<td>0%</td>
<td>33%</td>
</tr>
<tr>
<td>Ukraine</td>
<td>9%</td>
<td>21%</td>
</tr>
<tr>
<td>Turkey</td>
<td>9%</td>
<td>28%</td>
</tr>
<tr>
<td>Russia</td>
<td>28%</td>
<td>48%</td>
</tr>
<tr>
<td>Romania</td>
<td>40%</td>
<td>59%</td>
</tr>
<tr>
<td>Poland</td>
<td>3%</td>
<td>29%</td>
</tr>
<tr>
<td>Hungary</td>
<td>27%</td>
<td>48%</td>
</tr>
<tr>
<td>Belarus</td>
<td>15%</td>
<td>29%</td>
</tr>
</tbody>
</table>

*From 0.6 Bn broilers in 2011 to 1.5 Bn in 2013*

(Percentage of total broiler’s population)
IBD Vaccination in the Hatchery
Western Europe

2011

Western Europe: 12%
UK: 5%
Spain: 32%
Portugal: 12%
Italy: 16%
Greece: 42%
Germany: 0%
France: 12%

2013

Western EU: 17%
Greece: 22%
Portugal: 3%
Belgium: 17%
Netherlands: 38%
Italy: 17%
Spain: 53%
Germany: 1%
Poland: 11%
France: 20%
United Kingdom: 4%

➢ From 0.5 Bn broilers in 2011 to 1.0 Bn in 2013

(Percentage of total broiler’s population)
IBD Vaccination in the Hatchery
Summary per Zones

2011

- TOTAL: 25%
- Western Europe: 12%
- CEET: 15%
- Asia-Pacific: 19%
- North America: 21%
- Latin America: 60%
- Africa Middle East: 11%

2013

- TOTAL: 38%
- WESTERN EU: 17%
- NORTH AMERICA: 36%
- LATIN AMERICA: 73%
- CEET: 33%
- ASIA PACIFIC: 31%
- AFRICA - M.EAST: 14%

From **11.2 Bn** broilers in 2011 to **19.5 Bn** in 2013

(Percentage of total broiler’s population)
Three types of live Gumboro vaccines

- Conventional live vaccine
- Immune complex IBD vaccine
- Vector HVT-IBD vaccine
Live IBD vaccines and Protection

All Immune-Complex IBD, Vector HVT-IBD and Conventional IBD vaccines can protect against the negatives consequences of the disease (clinical protection).

Protecting the bursa against the infection is the lastly characteristic that the vaccines should accomplish, but there are remarkable differences in between them.
It is possible to Stop the Gumboro Cycle by Vaccination → Immune Complex IBD vaccine

- **STOP** the shedding of the field virus
- **PREVENT** the challenge risk cycle after cycle
- **PROTECT** against infection from any type of IBDV strains

- No buildup of existing field viruses
- Less field virus load in the litter
- No selection of new strains

= CONTROLLING THE GUMBORO DISEASE
Blocking the infection will stop the challenge virus replication in the bursa

SPF chickens, vaccinated at 21 days with W2512 IBDV strain and challenged 2, 3 and 4 days later with vvIBDV

<table>
<thead>
<tr>
<th>Challenge date</th>
<th>At challenge</th>
<th>4 days post challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Histopathology (lesions produced by the vaccine virus)</td>
<td>Histopathology (lesions produced by the challenge virus)</td>
</tr>
<tr>
<td>2 days post vaccination</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>3 days post vaccination</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>4 days post vaccination</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

W2512 strain can BLOCK the infection of the bursa by any field virus and consequently STOP the shedding
more than 35 Billion broilers vaccinated since 2006
Vector Vaccines against Newcastle Disease. The ultimate solution?
What is a vector vaccine?

DONOR

NDV D26

PEC promoter

A very specific INSERTION SITE

VECTOR

HVT FC 126

HVT virus vaccine
Evading maternally derived antibodies

Traditional Live NDV Vaccine

VECTOR HVT-NDV Vaccine
Efficacy against different NDV isolates

Genotypes

Class I

DE-R49/99

Class II

Distance 0.02

TR-2/96
BG-30/95
MZ-50/95
ZA-29/93
BMYBU87078
DE-372/86
Taiwan95
JS/10/05/C
05-059
DI-3/88
DE-85/96
DE-82/94
DK-1/95
CH-1/95
H-310/82
Israel 70
Iraq AG68
1083/72USA
pi17498/98
Iraq AG68
229808/03U
piDE2653/9
PIA95295
ZA-18/90
ZA-16/90
ZA-5/68
SG-41H/65
H-10/72
CA 1085/71
15/00HN
5166/98MX
229808/03US
6244/98MX
4100/99MX
290/00MX
Italien/45
Herc/33
ZhJ-1/85CN
JS-1/97CN
Miyadera/51
AU Victoria/32
V4 Queensland/66
DE26-76
I-2
Vitapest
Ulster2/67
Texas/48
Beaudette/45
LaSota/46
Clone 30
B1

Velegen, Asia

Many subgroups a-e

Velegen, Asia

Many subgroups a-g

Velegen, South Africa- Asia

Velegen, America

Velegen, Europe

Velegen, Asia

Lentogenic-velogenic, Asia

Asymptomatic, Worldwide

Lentogenic-velogenic, USA
### Vectormune® ND protection versus live vaccines

<table>
<thead>
<tr>
<th>Group</th>
<th>Vaccine(s)</th>
<th>NDV challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vectormune ND</td>
<td>VTM ND (D1)</td>
<td></td>
</tr>
<tr>
<td>Live prime / boost</td>
<td>Live prime with apathogenic vac. (D1) + live booster with lentogenic vac. (D18)</td>
<td>3, 4, 5 weeks of age</td>
</tr>
<tr>
<td>Control</td>
<td>no NDV vaccination</td>
<td></td>
</tr>
</tbody>
</table>

**Challenge:**

5.0 log$_{10}$ ELD$_{50}$/dose of a genotype VIIId vvNDV by oculo-nasal route

Post-challenge samplings:

- oropharyngeal and cloacal swabs at 4 and 7 dpch
100% of birds vaccinated with Vector HVT-NDV were clinically protected against NDV challenge at each date.

Conventional vaccine-based program provided 85-100% protection.
Results – NDV Shedding

- **Vectot HVT-NDV:** low/hardly detectable shedding (no detectable cloacal shedding after CH2 and CH3).

- **Conventional vaccination program** - markedly reduced shedding compared to controls, but less reduction compared to VTM HVT-NDV vaccinated birds.

- All chickens in the broiler control group excreted the challenge virus in high concentrations (6-7 $\log_{10}$ ELD$_{50}$/ml after CH2 and CH3; slightly lower 4-5.5 $\log_{10}$ ELD$_{50}$/ml after CH1).
## Field Trials: Brazil

(Low ND challenge area)

<table>
<thead>
<tr>
<th></th>
<th>Vectormune® ND</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 1</strong></td>
<td>Vectormune® ND</td>
<td>Cevac Transmune (injection)</td>
</tr>
<tr>
<td></td>
<td>Cevac Transmune (injection)</td>
<td>and Cevac Vitapest or Nobilis ND C2</td>
</tr>
<tr>
<td></td>
<td>Cevac Mass L (spray)</td>
<td>or Cevac Mass L (spray)</td>
</tr>
<tr>
<td><strong>5 different</strong></td>
<td>4 963 000 broilers</td>
<td>4 517 000 broilers</td>
</tr>
<tr>
<td><strong>integrations</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results

Key benefits for the industry:

- Safety:
  - no Post vaccination reaction.
  - no usage of live ND vaccine.
- No interaction with IBV vaccination program
- Unique hatchery application

= Economical Benefit
Immune-Complex IBD and Vector HVT-NDV.

Full compatibility bringing benefits to the Poultry Industry
Compatibility of the Immune-Complex IBD and Vector HVT-NDV vaccines

Clinical protection against NDV challenge
*(Asian genotype 7)*

(2011, Ceva-Phylaxia. Study SCI – 137-2011)
Compatibility of the Immune-Complex IBD and Vector HVT-NDV vaccines

Detection of Im-Cx IBD take in the bursas by histophatological lesions

<table>
<thead>
<tr>
<th>Groups</th>
<th>Bursa histology ( % positives)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D18</td>
</tr>
<tr>
<td>VECTORMUNE ND + TRANSMUNE</td>
<td>0%</td>
</tr>
<tr>
<td>TRANSMUNE</td>
<td>0%</td>
</tr>
</tbody>
</table>

(2011, Ceva-Phylaxia. Study SCI – 137-2011)
Benefits of the association of the Im-Cx IBD vaccine and the Vector HVT-NDV

Russia
(High ND / IBD Challenges)

<table>
<thead>
<tr>
<th></th>
<th>CONTROL</th>
<th>Im-Cx IBD + HVT-NDV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broilers</td>
<td>122,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Age (days)</td>
<td>37,5</td>
<td>37,5</td>
</tr>
</tbody>
</table>

Average daily gain, g

Feed conversion

EIP

EIP: +36,9

EIP: 295,60

Benefits of the association of the Im-Cx IBD vaccine and the Vector HVT-NDV

Russia
(High ND / IBD Challenges)
Benefits of the association of the Im-Cx IBD vaccine and the Vector HVT-NDV

Brazil

(Low ND / IBD Challenges)

(means in the same graph followed by different letters differ statistically)
Thank you for your attention!

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