TRENDS IN POULTRY VACCINES DEVELOPMENT

Yannick Gardin,
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TODAY, THE ENVIRONMENT IS VERY FAVOURABLE TO VACCINES, SO THAT NATURAL EVOLUTION IS TOWARD MORE AND NEW VACCINES
TODAY, THE ENVIRONMENT IS VERY FAVOURABLE TO VACCINES, SO THAT NATURAL EVOLUTION IS TOWARD MORE AND NEW VACCINES

WHY ?
TOWARD MORE AND NEW VACCINES

Why is today’s environment so favourable to vaccines?

Why are vaccines so attractive?

What is expected from a vaccine today?
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION
NEW ENVIRONMENT FOR PRODUCTION

Poultry farming
NEW ENVIRONMENT FOR PRODUCTION

Poultry farming → Production

WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

Poultry farming → Production

Poultry industry
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

Poultry farming → Production

Poultry industry → Volumes
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

Poultry farming ➔ Production

Poultry industry ➔ Volumes

Production of commodity
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

Poultry farming → Production
Poultry industry → Volumes
Production of commodity → Quality
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

- Poultry farming → Production
- Poultry industry → Volumes
- Production of commodity → Quality
- Branding
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

- Poultry farming → Production
- Poultry industry → Volumes
- Production of commodity → Quality
- Branding → Image
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

NEW ENVIRONMENT FOR PRODUCTION

Poultry farming \[\Rightarrow\] Production

Poultry industry \[\Rightarrow\] Volumes

Production of commodity \[\Rightarrow\] Quality

Branding \[\Rightarrow\] Image

MORE AND MORE POWERFUL CONSUMERS
MORE AND MORE POWERFUL CONSUMERS ARE NOW REQUESTING:

WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?
MORE AND MORE POWERFUL CONSUMERS ARE NOW REQUESTING:

- Food security
- Food safety
- No chemicals
- No antibiotics resistance
- No residues
- Animal welfare
NEW ENVIRONMENT FOR PRODUCTION

+ 

MORE AND MORE POWERFUL CONSUMERS

= 

NEW CONSTRAINTS THAT ARE BETTER ANSWERED BY VACCINES
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

MORE POWERFUL DIAGNOSTIC TOOLS & MORE ACCURATE DIAGNOSIS:
MORE POWERFUL DIAGNOSTIC TOOLS & MORE ACCURATE DIAGNOSIS:

WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?
MORE POWERFUL DIAGNOSTIC TOOLS & MORE ACCURATE DIAGNOSIS:

70’s

Unknown agent
WHY IS TODAY’S ENVIRONMENT SO FAVOURABLE TO VACCINES?

MORE POWERFUL DIAGNOSTIC TOOLS
& MORE ACCURATE DIAGNOSIS:

70’s

Unknown agent

FULLY SEQUENCED MICROORGANISM WITH MARKERS FOR PATHOGENICITY

Today
MORE POWERFUL DIAGNOSTIC TOOLS & MORE ACCURATE DIAGNOSIS:

70’s Unknown agent

FULLY SEQUENCED MICROORGANISM WITH MARKERS FOR PATHOGENICITY

Today

Serology
ELISA
IF
PCR
RFLP
Sequencing
MORE POSSIBILITIES FOR VACCINES
NOW OFFERED BY MOLECULAR BIOLOGY
MORE POSSIBILITIES FOR VACCINES NOW OFFERED BY MOLECULAR BIOLOGY

- More options than « live » or « killed »
- Improved safety – no PVRs
- Better genetic stability
- Possible early administration
- Possible « built-in » multivalence
- Better « efficacy »
WHY ARE VACCINES SO ATTRACTIVES?
BECAUSE VACCINES ARE:
WHY ARE VACCINES SO ATTRACTIVES?

BECAUSE VACCINES ARE:

« Natural »
WHY ARE VACCINES SO ATTRACTIVES?

BECAUSE VACCINES ARE:

- «Natural»
- Whith no residues
BECAUSE VACCINES ARE:

« Natural »
With no residues
With no resistance
BECAUSE VACCINES ARE:

« Natural »

Whith no residues

With no resistance

« solution oriented »
WHY ARE VACCINES SO ATTRACTIVES?

CHEMICALS vs BIOLOGICS
WHY ARE VACCINES SO ATTRACTIVES?

CHEMICALS vs BIOLOGICS

« Product oriented »

Compound
CHEMICALS vs BIOLOGICS

« Product oriented »

Compound

Problems

P1 P2 P3 P4 P5
CHEMICALS vs BIOLOGICS

« Solution oriented »
WHY ARE VACCINES SO ATTRACTIVES?

CHEMICALS vs BIOLOGICS

« Solution oriented »

Problem

Vaccines

V1
V2
V3
V4
V5

P
BECAUSE VACCINES ARE:

- « Natural »
- Whith no residues
- With no resistance
- « solution oriented »
- cheap
WHY ARE VACCINES SO ATTRACTIVES?

BECAUSE VACCINES ARE:

« Natural »

Whith no residues

With no resistance

« solution oriented »

cheap

susceptible of huge improvements
DISEASE?
DISEASE ?

INFECTION
DISEASE ?

INFECTION

LOSSES
DISEASE?

INFECTION

LOSSES

SHEDDING
PROTECTION?

INFECTION
PROTECTION?

INFECTION

LOSSES

« DISEASE »
& « PROTECTION »
PROTECTION?

INFECTION

LOSSES

SHEDDING

« DISEASE »
& « PROTECTION »
Trials at SSIU / Ceva Phylaxia

- Commercial broilers (20 per group)
- Vectormune HVT-NDV SQ or in-ovo (-3d)
- Challenge:
  - $10^5$ EID50 Chimalhuacan NDV strain
  - at 20 or 27 or 40 days of age
  - IN + ON route
- Oropharyngeal and Cloacal swabs taken 3 and 7 days post challenge
- Virus quantification using RT-PCR
Clinical protection
Reduction of shedding

Challenge at D27

mean and range of challenge virus amount (log_{10} EID_{50}/ml)

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VTM HVT NDV in ovo | VTM HVT NDV s.c. | broiler control
Reduction of shedding

**Challenge at D40**

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- VTM HVT NDV in ovo
- VTM HVT NDV s.c.
- broiler control
PROTECTION ?

INFECTION

LOSSES

SHEDDING

« DISEASE »
& « PROTECTION »
PROTECTION?
BECAUSE VACCINES ARE:

- « Natural »
- With no residues
- With no resistance
- « solution oriented »
- cheap
- susceptible of huge improvements

WHY ARE VACCINES SO ATTRACTIVES?
WHAT IS EXPECTED FROM A VACCINE TODAY?
THE POULTRY VACCINES MARKET:

a « push » market has become
a « pull » market
THE POULTRY VACCINES MARKET:

a « push » market has become
a « pull » market

A SUCCESSFUL VACCINE MUST ANSWER
THE NEEDS OF THE POULTRY PRODUCER
THE « GOLDEN » VACCINE:
THE « GOLDEN » VACCINE:

- Safe (no negative effect on performances)
- Efficacious / « control of the disease » not only « protection »
- Multivalent / compatible
- Poultry production « friendly » (hatchery)
- « Monitorable » (vaccine take + DIVA)
THE « GOLDEN » VACCINE:

Safe (no negative effect on performances)

Efficacious / « control of the disease » not only « protection »

Multivalent / compatible

Poultry production « friendly » (hatchery) « Monitorable » (vaccine take + DIVA)

+ SERVICES
CONCLUSION
THE VACCINE OF THE FUTURE:

1 vaccine

1 application
(hatchery or point of lay)

all necessary protections
TRENDS IN POULTRY VACCINES DEVELOPMENT

HOW TO DEVELOP IT?
TRENDS IN POULTRY VACCINES DEVELOPMENT

HOW TO DEVELOP IT?

Biotechnologies:
- recombinant / vector vaccines
  - rHVT (ND / LT / AI / IBD ...)
  - rFP (ND / LT / MG ...)
  - rX ...
- immune-complex vaccines
  - ICx (IBD)
- sub-unit vaccines
- adjuvants
- immuno potentiators / modulators
TRENDS IN POULTRY VACCINES DEVELOPMENT

VACCINATIONS AT THE HATCHERY

BROILER

DAY OLD CHICKS

VACCINATIONS BEFORE THE LAYING PERIOD

BREEDERS

PULLET

Sexual maturity

Laying period

Fattening period

Laying period

POULTRY VACCINES DEVELOPMENT

120119 - Y.Gardin
THANK YOU!