

Use of Autovaccines in Poultry Flocks

Derzsy's Days, Hungary, June 2015



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- founded 2005
- today appr. 80 employees

6 vets

7 biologists

1 biochemist

3 biotechnologists

2 food chemists

2 agric academics

40 qual tech staff



Service Lab focussed on poultry and swine production:

- food safety
- veterinary diagnostic services
- autogenous vaccines
- in-vitro-diagnostics
- industry cooperations



- CMV – Custom Made Vaccine
- Tailor Made Vaccine
- Farm Specific Vaccine
- Autogenous Vaccine
- Autovaccine

its all the same !

- Diagnostic Services

independently from any CMV-business
customer pays for diagnostic services

- Custom-Made-Vaccines

including diagnostic services
diagnostics are important for ongoing product updating
customer pays for vaccine including diagnostics

- isolate from a farm
- vaccine back to the same farm
- needs diagnostics !
 - GMP-like production
 - non-GMP-product
(the isolates are non-GMP)

diagnostics



isolates



products

direct shipment from producer to veterinarian
(DE, UK, HU, CZ)

direct invoice from producer to veterinarian (HU)

no distributors !

how do we get diagnostic material to AniCon ?

EU-wide import allowance for poultry and samples

based on EU-Directives 1069/2009 and 142/2011

Global shipments for PCR-diagnostics

FTA-cards for global shipments
(non-infectious / material is inactivated by the card)

- autovaccines are inactivated vaccines !
- autovaccines are adjuvanted products (oil or AlOH)
- most autovaccines are polyvalent

production and use of autovaccines are allowed:

if no licensed product is in the market

or

if the licensed product is not available actually

or

if the licensed product has been used without success

no registration of products

but

authorisation of producers

- combinations of antigens
- different isolates per antigen
- antigen concentration in the product
- different adjuvants (oil, aluminium, none)
- bottle size (100 ml – 250 ml – 300 ml – 500 ml)
- product volume per bottle
- volume per dose (0,1 – 0,25 – 0,3 – 0,5 – 1,0 – 2,0 – 5,0)

Antigens for autogenous vaccines: Poultry



Bacterial Antigens

- Avibacterium spp
- Bisgaard Taxon
- Bordetella spp
- Brachyspira spp
- Campylobacter spp
- Clostridium perfringens
- Coenonia anatina
- Escherichia coli
- Erysipelothrix rhusiopathiae
- Gallibacterium spp
- Haemophilus spp
- Mycoplasma gallisepticum
- Mycoplasma synoviae
- Ornithobacterium rhinotracheale
- Pasteurella spp
- Riemerella anatipestifer
- Salmonella spp
- Pseudomonas spp
- Staphylococcus spp
- Streptococcus spp

Viral Antigens

- Avian Reovirus
- Avian Rotavirus
- Duck Hepatitis Virus
- Duck Adenovirus
- Fowl Adenovirus
- Infectious Bronchitis Virus

- Avian Influenza (H9)

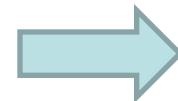
- 1) invasivity: isolates from brain, bone-marrow, pericardium or lung
- 2) virulence-profiles
- 3) identical characteristics of the disease causing organism at population level

clonal isolate



disease

poly-clonal isolates



secondary

- post-mortem diagnostics
- bacteriology
- MALDI-TOF-characterization
- serology
- PCR with very wide spectrum
- histology
- cultural virology
- sequencing

- Streak on Agar plates and/or enrichment of the samples
- Incubation
- Morphology/ smell
- Biochemical testing → MaldiTOF-MS
- Antibiotic sensitivity testing
- Serotyping (agglutination, agar gel precipitation)
- Cryo-conservation



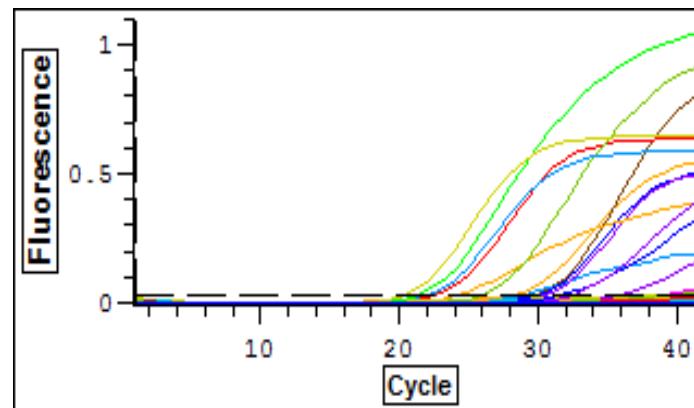


Cascade of biomolecular testing „levels“

1. rapid veterinary diagnostic
2. isolate characterization by PCR
3. sequencing & phylogenetic analysis

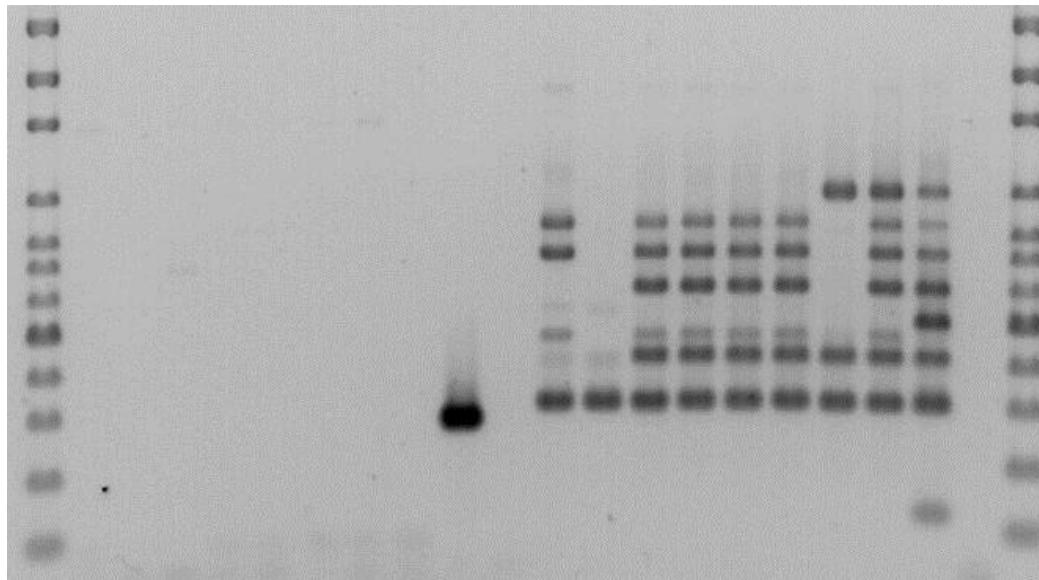
1. rapid veterinary diagnostics

- preferably real-time (RT-)PCR, e.g. screening
- broad portfolio virus, bacteria, parasites
- clinical relevance?
- supports primary virus isolation efforts



2. isolate characterization by PCR

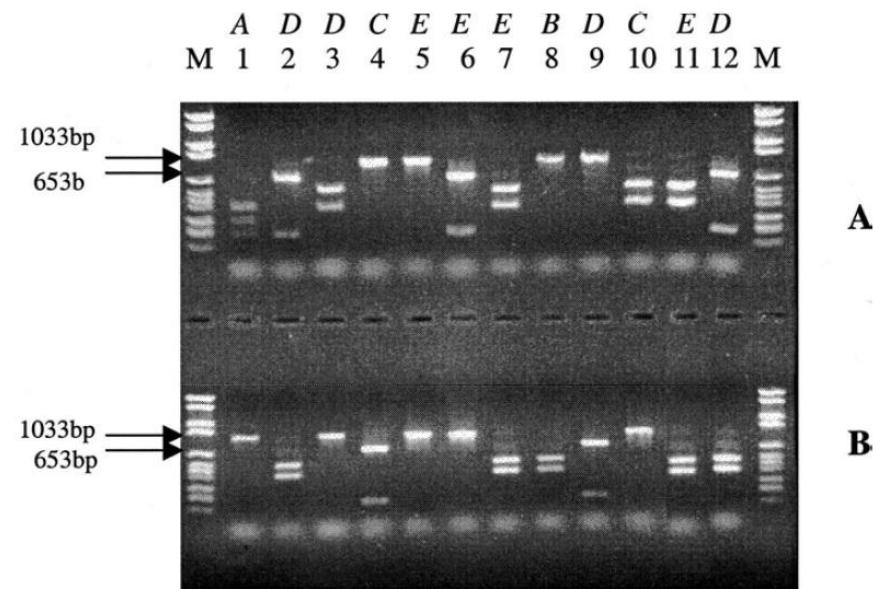
- test for
 - virulence factors (e.g. 8 x APEC)



- adhesion associated
- iron acquisition
- serum resistance
- toxins
- plasmids
- F11 fimbriae expression

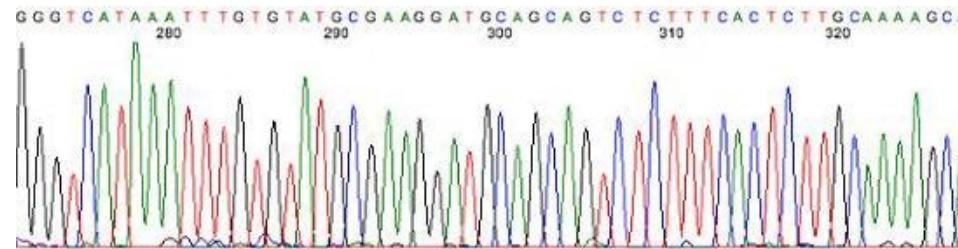
2. isolate characterization by PCR

- test for
 - sero-/ biotype (e.g. **FAdV 1-12**)
 - PCR
 - restriction pattern

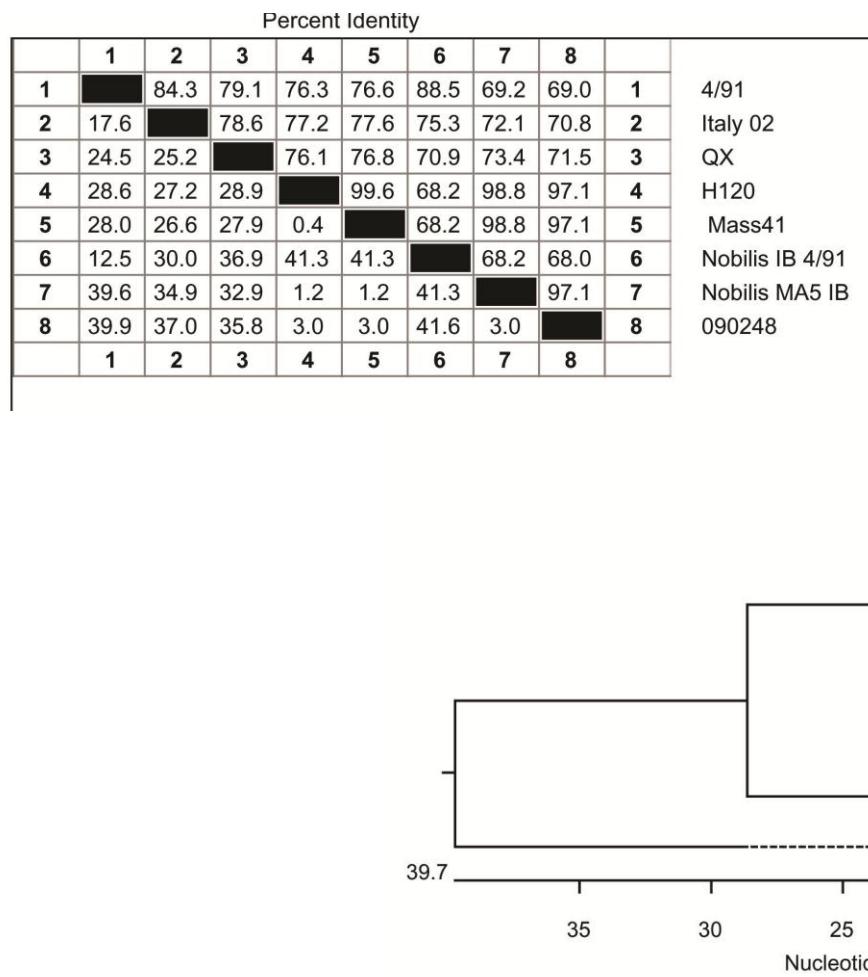


Meulemans et al. 2001

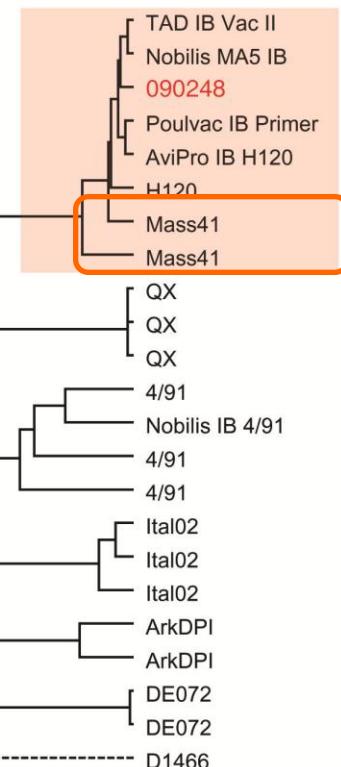
- **sequencing & phylogenetic analysis**
 - virus isolates
 - compare to strains of commercial vaccines
 - e.g. S1 gene IBV
 - not restricted to known variants
 - mapping to clusters of variants/ vaccine strains



Divergence



4/91
Italy 02
QX
H120
Mass41
Nobilis IB 4/91
Nobilis MA5 IB
090248



POULTRY DIAGNOSTIC SUBMISSION GUIDE

Disease Suspected	Specimen	Sample Preparation	Laboratory Procedure
Avian Influenza (AI)	Trachea, Lung, Brain, Caecal Tonsils	Refrigerate / Frozen	Virus Isolation PCR
	Serum	Refrigerate	Serology
Bordetellosis	Trachea, Lung	Refrigerate	Culture sensitivity
	Serum	Refrigerate	Serology
Colibacillosis	Heart, Liver, Spleen, Lung, Air sacs, Ovary, Salpinx, Yolk, Joint, Kidney, Bone marrow, Brain	Refrigerate	Culture sensitivity Serotyping PCR (virulence factors)
	Sinus, Trachea, Lung	Refrigerate	Culture, PCR
Mycoplasmosis (CRD, MG)	Serum	Refrigerate	Serology
	Heart, Sinus, Trachea, Lung, Air sacs, Joint	Refrigerate	Culture sensitivity Serotyping
Ornithobacteriosis	Serum	Refrigerate	Serology
	(Trachea), Liver, (Spleen), Caecal Tonsils, Joint, Gizzard	Refrigerate / Frozen	Virus Isolation PCR
Pasteurellosis (Fowl cholera)	Serum	Refrigerate	Serology
	Heart, Liver, Spleen, Lung	Refrigerate	Culture sensitivity PCR (toxins, capsule type)
Riemerellosis	Serum	Refrigerate	Serology
	Heart, Liver, Spleen, Conjunctiva, Sinus, Trachea, Lung, Air sacs, Brain	Refrigerate	Culture sensitivity Serotyping PCR
	Serum	Refrigerate	Serology

- select invasive strains
(brain, heart, joints, bone-marrow, liver)
 - send material from freshly dead or culled animals
 - verify the clonality of the isolates
- bacterial populations will change under the selective pressure of successful vaccines
 - if you are successful: **continue diagnostics** , check for the eradication, search for new (clonal) isolates

- autogenous vaccines are individually manufactured products
- isolate-typing and production need time
- from ordering the vaccine until delivery it takes about **6-8 weeks!!!**
(Isolate-typing may prolong the process!)



- Laying hens:
E.coli, Pasteurella multocida,
Erysipelas,
Gallibacterium anatis ,
Mycoplasma synoviae,
Salmonella gallinarum,
Infectious Bronchitis



- Broiler Breeders:
E. coli, Pasteurella, Salmonella spp,
Enterococcus spp, Staph. aureus, Infectious Bronchitis

➤ Turkeys:

ORT, Riemerella, Staph. aureus, Bordetella, Reovirus,
E coli, Mycoplasma

➤ Ducks and Geese

Riemerella, Erysipelas, Pasteurella,
Mycoplasma, Duck Hepatitis



the new diagnostic lab



