



Vaccination and Immunization

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 Background


- Biomune Company 2002
 - Lenexa KS (Kansa City)
 - Autogenous vaccines / bacterins
 - Custom made, emergency type vaccines
 - First Salmonella (Layermune SE) bacterin
 - 53 USDA licensed poultry vaccines today
- Purchased by CEVA in 2005
 - 100% animal health
 - Global Animal Health Company
 - Dogs/cats, equine, sheep, bovine, swine, poultry, pet birds
 - Vaccines, therapeutics, drugs, pheromones
 - www.ceva-us.com
- George Boggan, PSU 1981, 1984, U of Penn 1988
 - 1989-2001 – Primary Breeder Companies (H & N International, Hendrix)
 - 2002-present – CEVA Biomune
 - Harrisburg, PA, george.boggan@ceva.com

 Today's discussion


- Vaccination vs. Immunization
- Purpose of vaccination
- Mechanics of immunization
- Types of Vaccines/ Vaccine choices
- Building a vaccination/ immunization program
- Vaccine equipment and administration





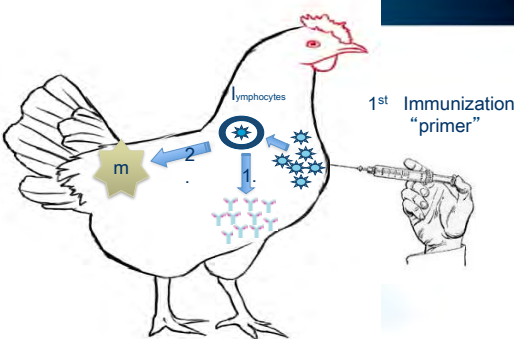
“Anyone can vaccinate chickens but :
only the growers that do it right immunize them”
Gil Warner

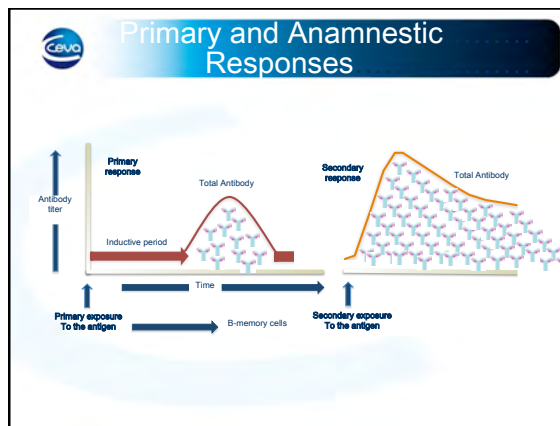
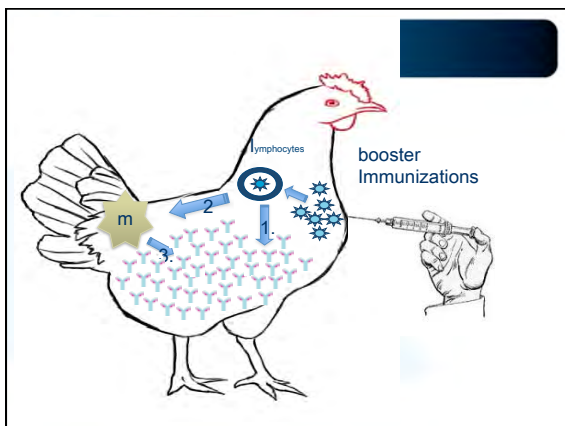


Vaccination (mechanical process) → Immunization (immune response) → Flock protection

 Vaccination : a game of deception

- Vaccination is the deliberate and controlled exposure of an animal to something (antigen) that is perceived to be a disease causing agent. 
- Purpose: to “fool” or deceive the bird’s immune system into believing it is under attacked by the actual disease causing organism
- Result of successful vaccination is immunization.
 1. clears offending intruder from the body
 2. a protective army of antibodies and other immune components
 3. quick acting memory system 





Types of Antigens

- **Fooling the bird's Immune system**
 1. Live organisms that mimic the disease causing organisms
 2. Killed preparations of the actual disease causing agent.
 3. Organisms that have been modified by man
 - laboratory attenuated
 - genetically modified


Types of Antigens: live

1. Live organisms that appear similar to the organisms that cause disease
 - Marek's disease
 - HVT - similar virus of turkey origin
 - Pigeon Pox virus
 - Infectious Bursal Disease (Leukert strains)
 - Newcastle Disease (B1, Lasota)
 - Infectious Bronchitis (mass, conn. strains)

Classical Live Vaccines:

Advantages:

1. capable of infecting and multiplying
2. inexpensive to produce, store, apply
3. stimulate an immune response with memory




Disadvantages:

1. mild disease/ reaction possible
2. immune response not long lasting
3. exposure of live organisms (seed the environment)
4. care in application (must be kept alive)

Killed Vaccines

1. Killed vaccines and Bacterins
 - basically any disease causing organism can be grown in the laboratory, killed, concentrated and injected into the bird to stimulate an immune response.




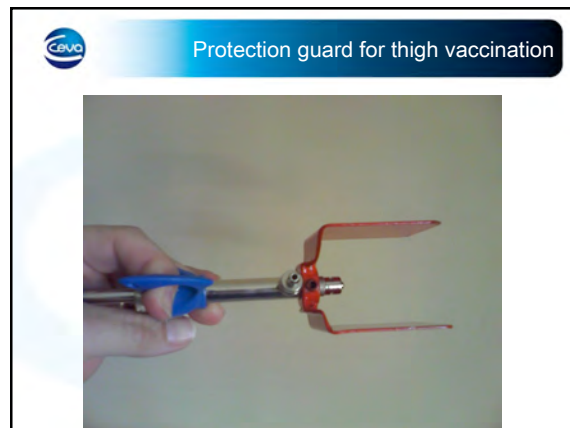
Advantages of Killed Vaccine antigens:

1. Safe (no introduction of live organisms)
2. Actual disease pathogens can be used (SE, AI)
3. When used in conjunction with live will maximize the immune response

Killed Vaccines:

Disadvantages: of a killed antigen vaccine

1. requires a carrier (reactive)
2. must be injected (bird handling)
3. does not replicate (no immune memory)
4. usually requires two doses and live priming for best results

Laboratory created vaccines:


Vaccines that have been artificially created

- Attenuated:
 - CEO LT virus
- Chemically mutated:
- Gene deleted:
- Recombinant vaccines

Organisms modified in the laboratory

Chemically mutated:

Gene Deleted Vaccines



--- Vaccine organisms that have either had genes changed in some manner or completely deleted to make them harmless but effective

--- Advantages:

- very safe
- very effective when right gene selections are made

Vectormune FP-LT+AE

- Efficacious against FP, LT & AE challenge
- Safe
- No LT virus shed
- No respiratory reaction

LARYNGOTRACHEITIS VIRUS FOWL POXVIRUS VECTORMUNE FP-LT

Available Poultry Vaccines (USA)

<p><u>Viral vaccines:</u></p> <ol style="list-style-type: none"> 1. Marek's * 2. Infectious Bursal Disease* 3. Newcastle Disease* 4. Infectious Bronchitis 5. Infectious Laryngotracheitis* 6. Fowl Pox/ Pigeon Pox* 7. Avian Encephalomyelitis* 8. Chicken Anemia Virus 	<p><u>Bacterial vaccines:</u></p> <ol style="list-style-type: none"> 1. E. coli 2. Salmonella 3. M. gallisepticum* 4. cholera 5. coryza
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Protozoal Vaccines

1. Coccidiosis

* vaccines available as both conventional and in recombinant presentations

Typical Pullet Vaccination Program PA:....

Age	Vaccination		Route
Day 1	Marek's vaccination	HVT/ Rispens	Sub Q
18 days	Infectious Bursal Disease	Leukert strain	water/ spray
21 days	NCD/ Bronchitis	B1/ Mass	water/spray
25 days	Infectious Bursal Disease	Intermediate	water/spray
32 days	Infectious Bursal Disease	Intermediate	water/spray
35 days	NCD/ Bronchitis	B1/ Mass	water/spray
42 days	AE/ POX	AE/ fowl and pigeon pox	wing web
56 days	Laryngotracheitis	TC/ CEO	water/ eye drop
63 days	NCD/ Bronchitis	Lasota/ Mass Holland	spray
98 days	Killed SE/ NCD/IB		injection

total of 9 different field vaccinations

Typical Vaccination Programs

- LIVE vaccine programs
 - Easy to administer
 - Relatively inexpensive
 - Least protective when used alone
- KILLED vaccine program
 - More labor intensive
 - More reactive in the birds
 - Provides greater level of protection
- COMBINATION program (live and killed)
- RECOMBINANT and NEW TECHNOLOGY Vaccines..
 - Greater flexibility/ more options
 - Greater safety
 - Strong protection

Vaccination routes in Poultry

- In-ovo vaccination
- Gel droplet application
- Water vaccination
- Eye drop application
- Spray vaccination
- Wing web stab application
- Needle injection

- Generally vaccination methods attempt to mimic the natural routes of exposure

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Routes of Vaccine administration


Live vaccines:

1. typically administration strives to mimic the route of natural infection:
 - Respiratory viruses – sprayed, eye dropped, or water vaccinated (NCD, IB, LT, MG)
 - GI viruses and bacteria - work best by ingestion (IBD, live Salmonellas)
 - Marek's – early exposure mandates hatchery administration
 - Pox carried by biting insects/ requires wing stab application
 - recombinant vaccines administration determined by carrier organism

Killed vaccines

1. Always injected because of carriers and antigen concentration

 Hatchery Vaccination
In ovo 18 days incubation



Broiler chicks


 Hatchery

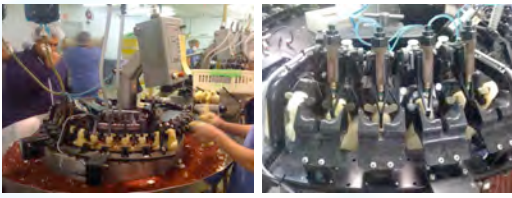
- Day of age subcutaneous (Marek's)



 Hatchery Vaccination
Day of age subcutaneous neck injection



 Hatchery Vaccination
Day of age subcutaneous neck injection



Turkey poults and layer pullet chicks

 Hatchery Spray application



 Hatchery

- Multiple sprays





Field vaccines and applications

- Vaccination via Drinking Water
- Live Salmonella
- Live E-coli
- Newcastle disease
- Infectious Bronchitis,
- Infectious Bursal Disease
- Infectious Laryngotracheitis
- REO, CAV
- HEV (turkeys)

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Water Vaccination: Things to remember

- **Live delivery of the vaccine**
 - Water quality is very important (not all drinking water is created equal)
 - Time before consumption – At young ages, amount of water to fill water lines greater than consumption of vaccine water in 2 hours
- Water intake is highly variable depending on:
 - Temperature of the house
 - Age of the birds
 - Strain of birds
 - Water system in the house

Water Vaccination Steps

1. Clean the water lines
2. Water withdrawal time
3. Calculate and fill lines before lights on in AM
4. Use an approved dye, stabilizer, and distilled water
5. Flush the lines/ then fill
6. Turn the lights on
7. Lower the water lines
8. Have a half hour of stock solution left when lights turned on

Water vaccination

Dyed Vaccine Water at end of line :

A photograph showing a small bottle of vaccine and a water line with a blue dye stream at the end, indicating the vaccine is being delivered.


HEV vacc cont.

- Blue dye
- Blue dye

Two photographs showing the application of blue dye to water lines. The first shows a hand pouring dye into a water line. The second shows a red waterer with blue dye in the water, with chickens drinking from it.

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CEVA **Thirsty?**




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CEVA **Walk the birds.....**



CEVA **Positive Tongue Staining.....**



CEVA **Crop Contents Stained**



CEVA **Field Spray**

- **Spray**
- **Live Salmonella, ND/IBV, IBD, ILT**
 - Field spray is a very effective vaccine application technique, but its an art! – can be very subjective
 - Many different types of spray vaccination equipment
 - Spray droplet size and uniformity is critical, 50-100 micron sized droplets good for most vaccines [IBV, NCD, IBD] 100 micron+ for live Salmonella and cocci
 - Preferred to vaccinate early in morning
 - Use practice run[s] to determine volume of water needed
 - Mix vaccine on farm just prior to vaccination. Use distilled water and mix thoroughly
 - Turn fans off and lights low as possible (or off!!)

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CEVA **Check list: Spray vaccination.....**

- Turn off Ventilation
- Dim lights / off
- Select correct nozzle for droplet size
 - Ingestion vs. Inhalation
- Use distilled water for stock
- Figure amount of water
 - number of birds
 - droplet size
 - pressure
 - length of house
 - walking speed

Field Spray

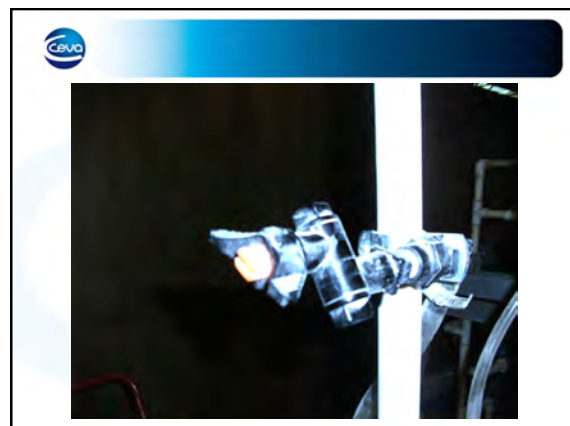
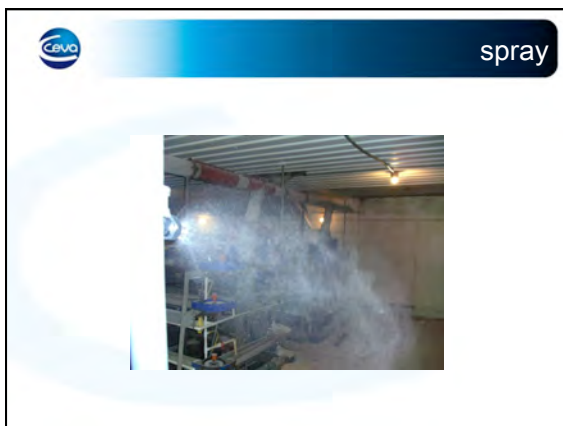
- **Spray con't**
 - Spray over all chickens heads. More than one pass may be necessary
 - Turn fans back on
 - Rinse vaccination equipment [nozzle, lines, vaccine vessel] with clean water
 - Use water sensitive paper to evaluate spray coverage
 - Estimate spray droplet size: 25-50 micron = wet fog, 50-100 micron = misty rain, 200-400 micron = light rain. 50 micron diameter droplets are visible
 - Reaction
 - Trial and error.....its an art!

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Back pack sprayers





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Spray Vaccination Stabilizers

- Distilled water recommended
 - May have low pH
- Stabilizers in tap water appear to be superior to distilled or de-ionized water for spray vaccination



Wing-Web check list.....

- Inject from under-side of wing
 - No feathers
- Only mix enough for 2 hours until next refill
 - Half life of live vaccines diminish over time
- Keep vaccine clean and free from dust
- Check takes 7-10 post vaccination

Vaccination Clinic



Field Wing Web Stab

Wing web stab Check takes 7-10 post vacc



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"Takes"



Thank you

