



Gut health from rearing to peak production in layers

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 **trouw nutrition**
a Nutreco company

About me



Name: Melchior de Bruin

Origin: Netherlands

Location: Away from the big cities,
Netherlands



Education & Work Experience

2021

**Global program manager
poultry health**

Trouw Nutrition, Feed Additives team

2016

Poultry veterinarian for layers

AviVet B.V. (Lunteren, NL)

Trainer/Teacher

AERES TCI / PTC+ (Barneveld, NL)

2014

**Poultry veterinarian for
broilers**

Emsland, Germany

2014

**MSc (DVM) Veterinary Medicine
of farm animals & Veterinary
Public Health**

Utrecht University, NL

2013

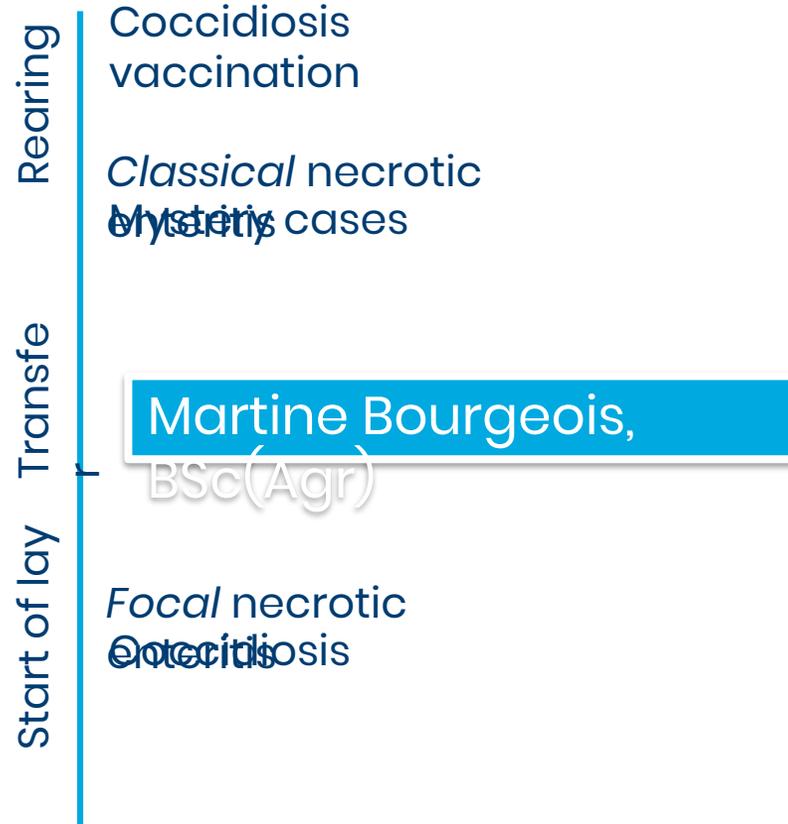
AQUAVET

Cornell & UPen, USA

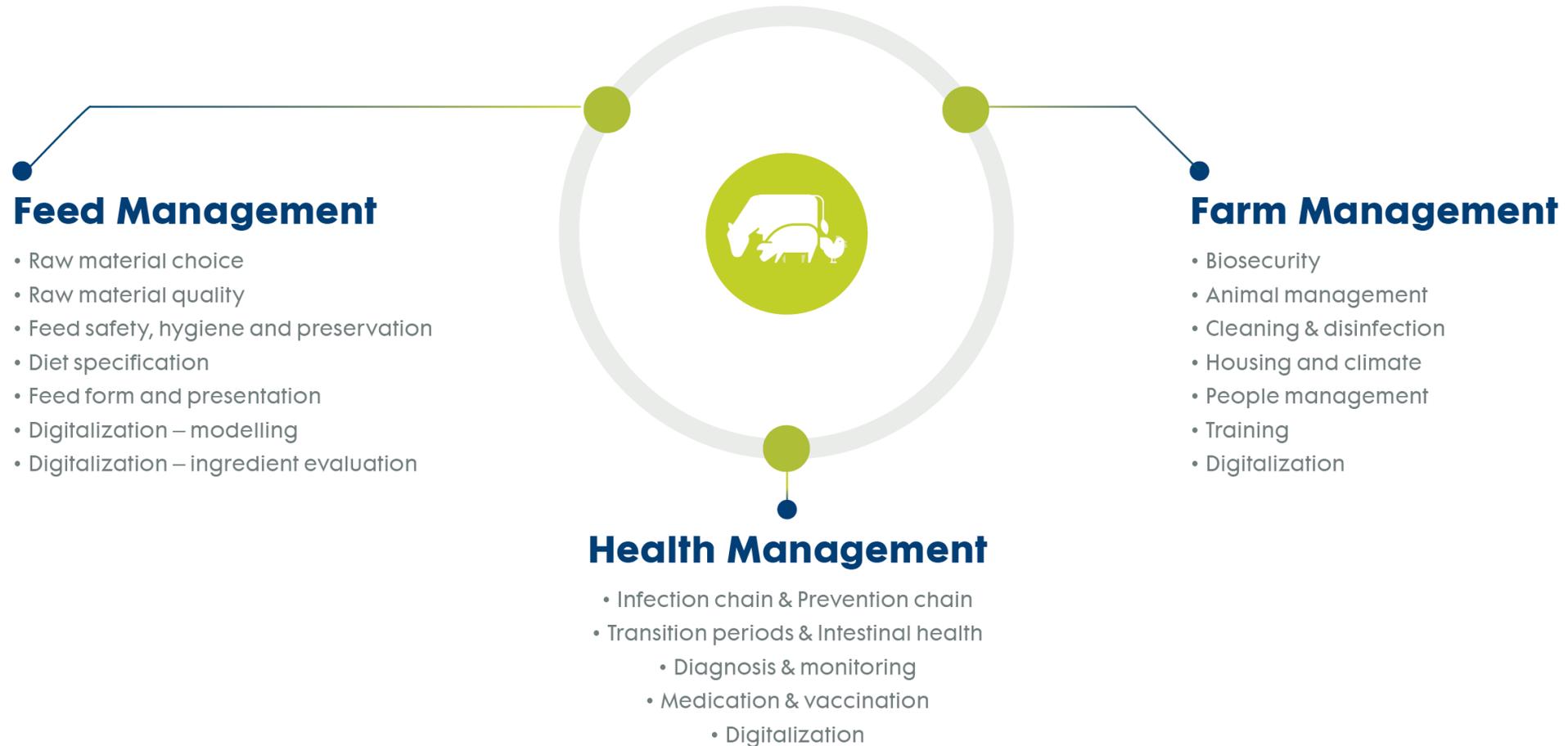
A veterinarians journey through gut health management from pullet rearing to peak production



Image: Novogen White



Trouw Nutrition approach = FFH





Why is gut health important in pullets?



- **Growth and development**
- **Immunocompetence: vaccination success**

Key factors in future production success: get persistent laying flocks

Prof.

Korver

Research is challenging

- Broiler gut health research: get results in 42 days
- Layer gut health research: get results in.. 80 weeks? 100 weeks?

← Lots of feathers = sign of good gut

Coccidiosis vaccination

Important, expensive, difficult



Vaccines use weakened field strains of *Eimeria spp.* that have been selected for low pathogenicity and fast cycling speeds.

How the vaccine works

1

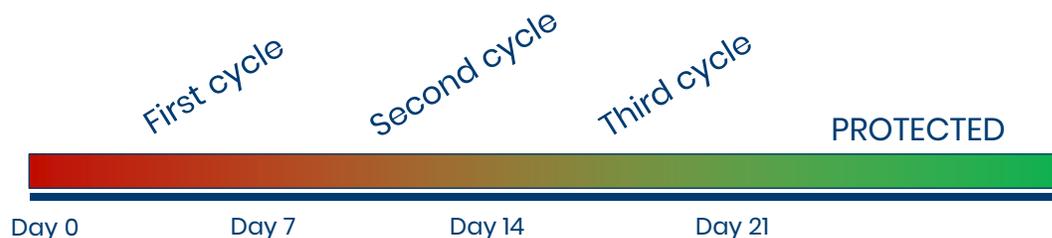
Chicks have to ingest the vaccine in the hatchery or on-farm
The coccidia replicate in 4-7 days before excretion of oocysts ('eggs') into the feces

2

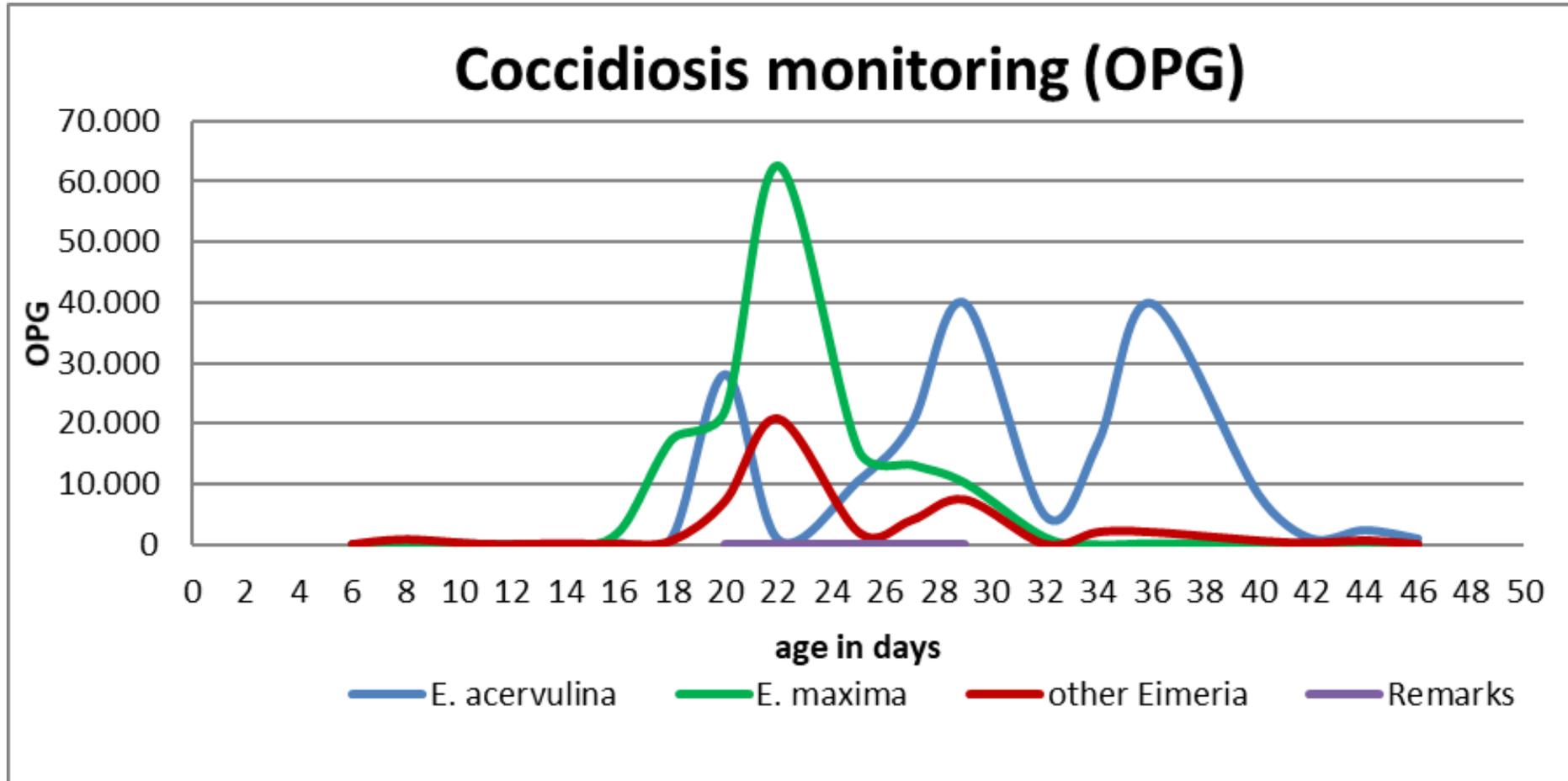
The birds have to pick up the excreted oocysts to initiate a second cycle;
Again after 4-7 days excretion of oocysts into the feces

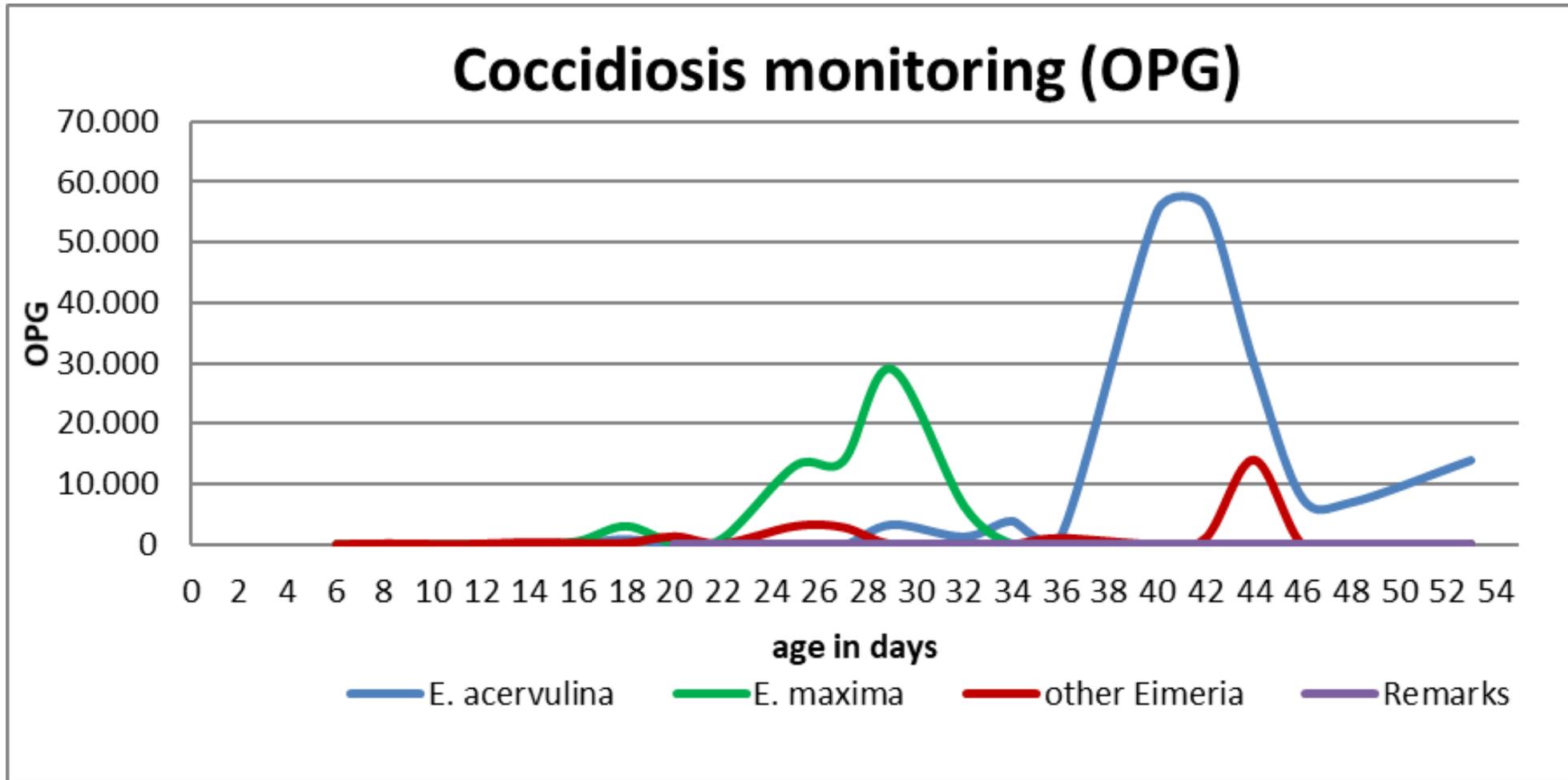
3

Only after another, third time, the chicks become well protected against an *Eimeria spp.* field challenge

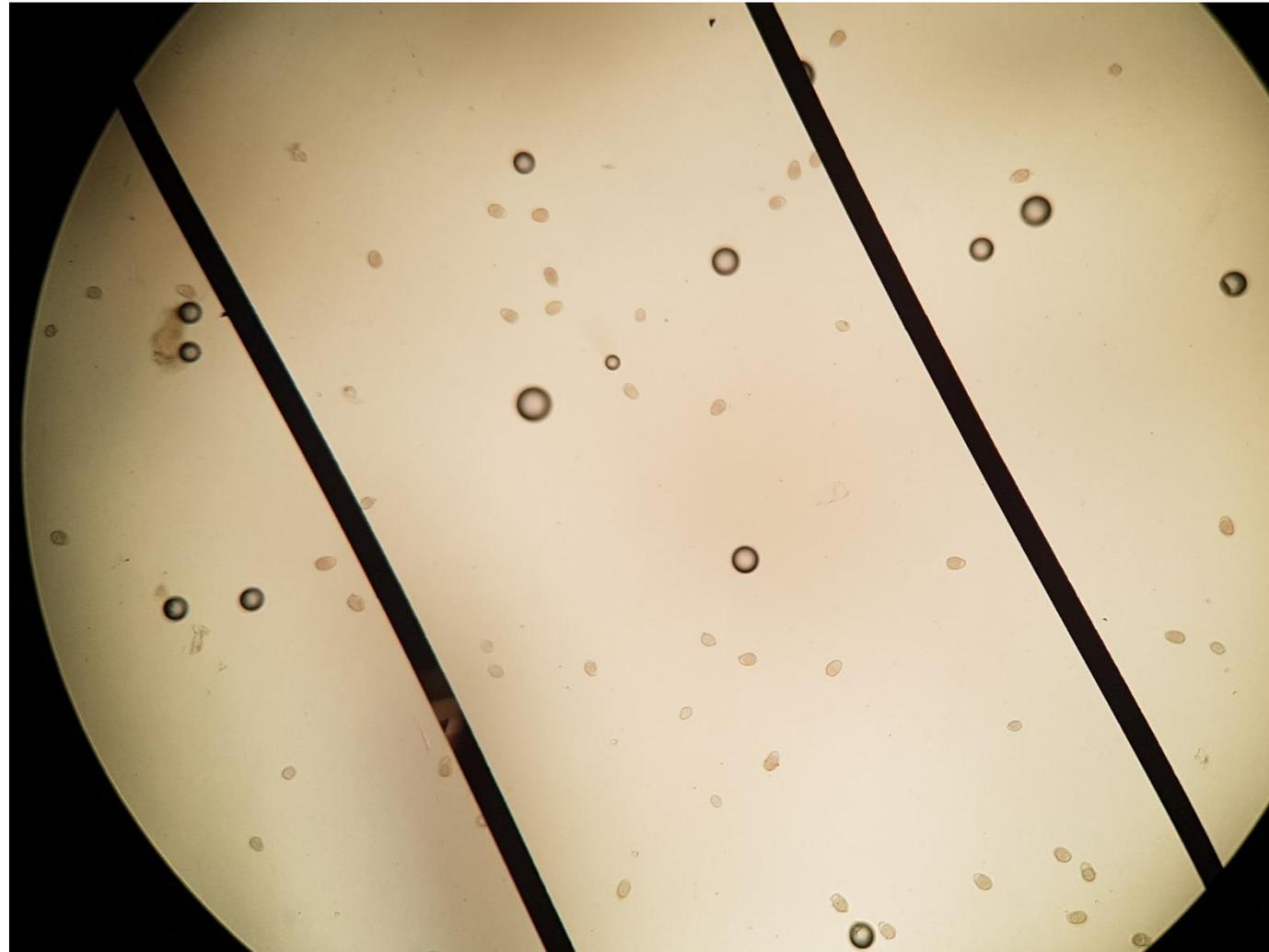


It's a race!





Reasons for coccidiosis vaccine failure



- Uptake
- First week *Escherichia coli*
- Vaccine was slowed down or did not survive 3 cycles
 - In cages, cycling is most difficult → chick paper dries out
 - Climate: RH < 50% (optimal = above 60%)
 - Antibiotic usage
- Poor gut health / underlying diseases

Gut mucosa in droppings



Investigate coccidiosis

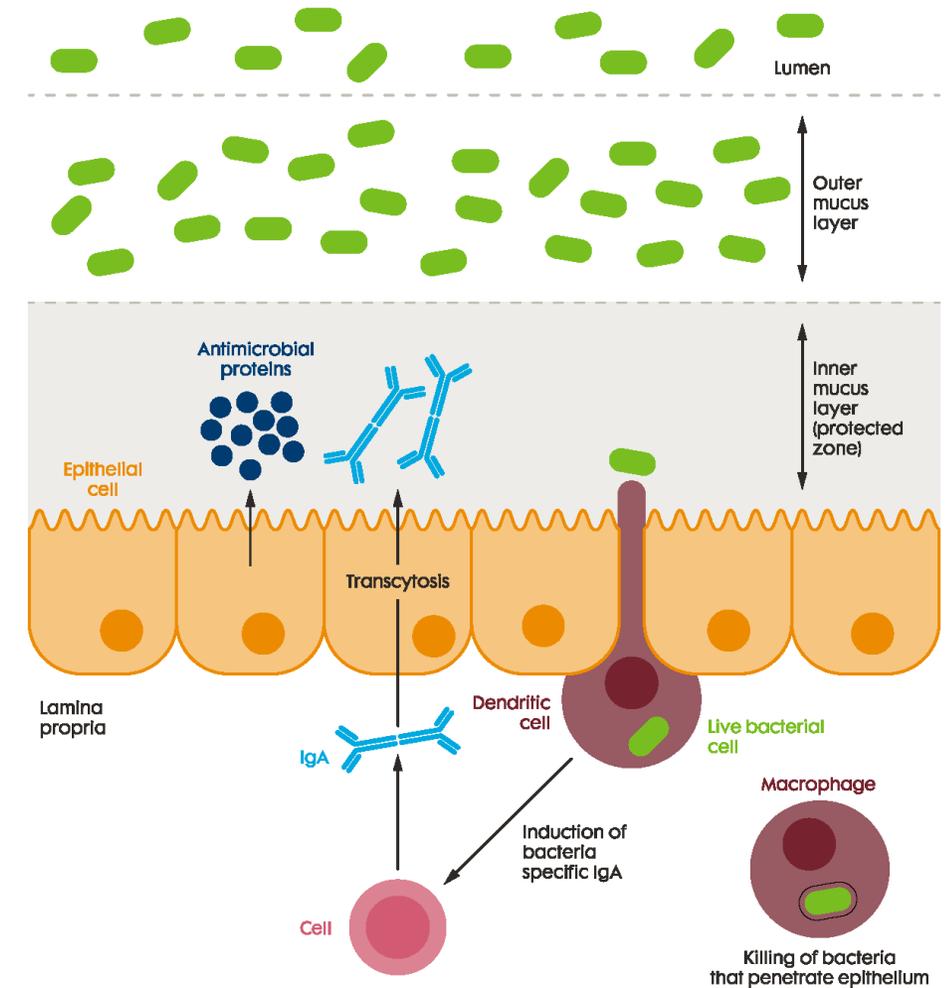
Eimeria immunity – gut health

Immunity against coccidiosis is a complex and poorly understood mechanism.

- Antibodies play a minor role (adaptive immune system)
- Large role for various mechanisms in the innate

We need an intact and competent gut wall to interact with the *Eimeria* vaccine, for it acquire immunity as soon as possible.

And for any other vaccines that have to trigger the immune system in the gut (*Salmonella* vaccines for example).



Classic necrotic enteritis

Severe inflammation of large portion of the small intestine

Pseudo-membrane / 'Turkish towel'

Mortality, increased water:feed ratio, undigested particles, mucus, foamy cecal content, etc.



Triggers: everything that can enable rapid *Clostridium perfringens* colonization of the gut

- Dysbiosis
- Coccidiosis
- High protein diets
- Digestibility of diets
- Increased viscosity of diets
- Co-infection pathogens & mycotoxins

Usually: multiple factors

Mysterious gut health cases

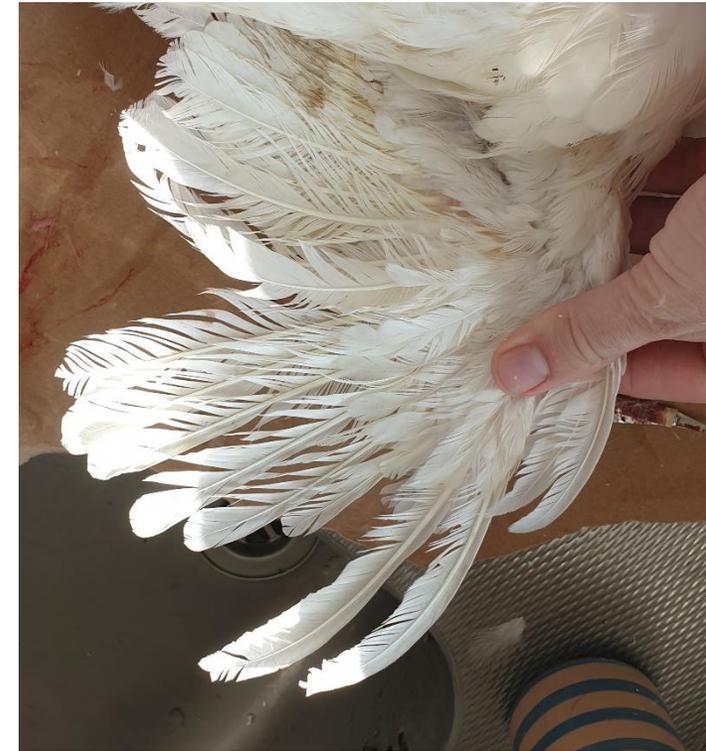
Practitioners frequently encounter cases of chronic gut health issues in pullets between 6-12 weeks of age. Dysbacteriosis syndrome?

Clinical signs

- Poor uniformity, underdeveloped feathering, low body weights
 - Eating feathers from litter, cannibalism
- Slightly abnormal droppings (undigested feed particles, wet, foamy cecal fraction)
- Necropsy: thin-walled gut tissue, undigested particles, mild enteritis

Possible explanations

- Viral enteritis (Chicken Astrovirus, Rotavirus A + D, Avian Nephritis Virus-3, Reovirus)
- Long-lasting coccidiosis challenge / subclinical Clostridium ?
- Mycotoxins
- Feed
- ... Likely a combination of above!



Summary & Recommendation Pullets



1. Growth and development
2. Immunocompetence: vaccine

Multiple factors influence severity and long term consequences of gut health diseases

- Challenges are mainly from *Clostridium spp.* (classic necrotic enteritis) and coccidiosis
- Enteric viruses play a role, but a lot remains unclear
- Immunosuppressive diseases can be involved
- Feed, Farm, Health

Recommendations

Monitor pullet flocks: at least 3 tech/vet visits are highly recommended

- Intervention: fine-tune **feed/farm/health** during flock rearing → repair is possible!
- Prevention: for sister- and future flocks

Feed additives: Presan-FY (2 kg/mt during high-risk periods)*

Water additives: Selko pH (7+ days) to support digestion and reduce bacterial intake



*more on Presan-FY later in webinar



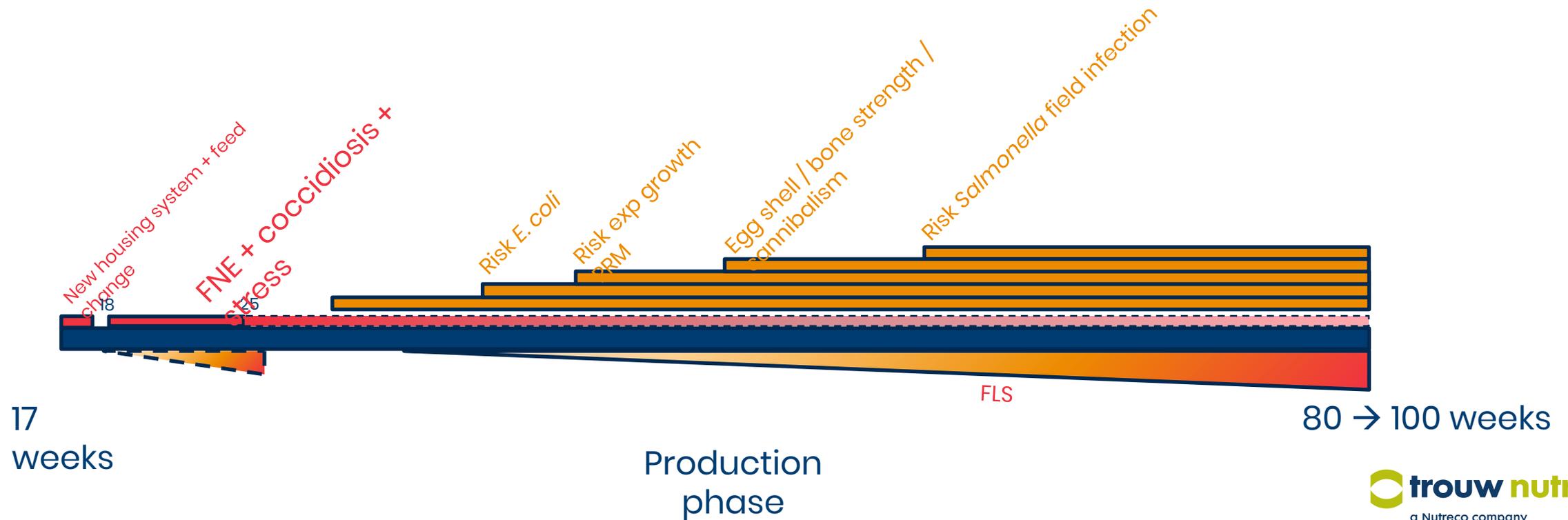
LAYER GUT

Health challenges and risk periods



Start of lay: immunosuppression through stress and hormonal changes

During lay: the immune system defense system is tested

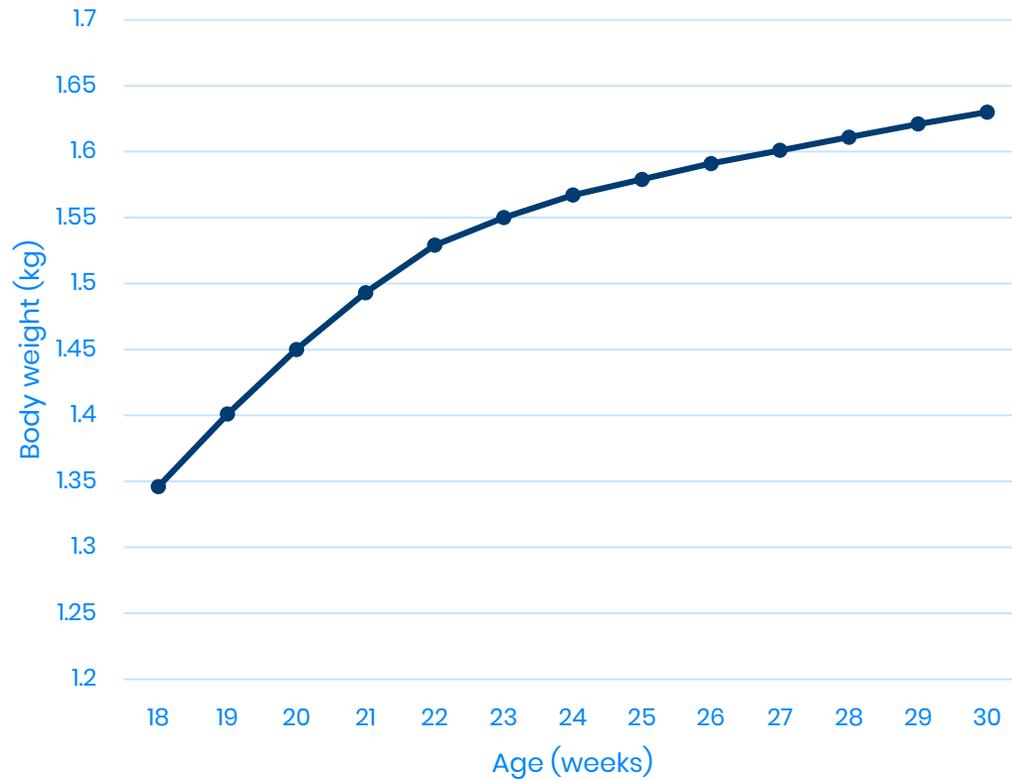


Bacterial diseases in layers

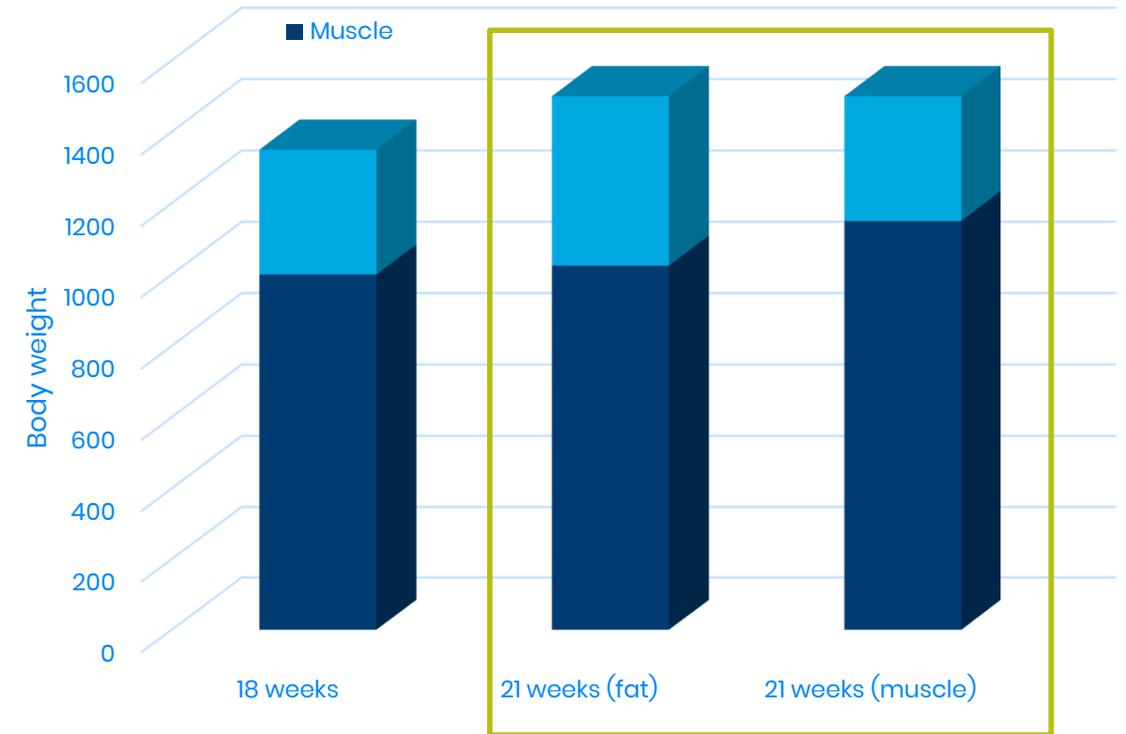
Name	Importance	Remarks	Gut health related
Salmonella	++++	SP/SG for poultry, other serovars for public health	●
Campylobacter / “spotted liver syndrome”	+	Emerging disease, multi-species farms	●
Colibacillosis	++++	Both respiratory and GI disease	
Pasteurellosis	++	Respiratory disease, high mortality	*
<i>Ornithobacterium rhinotracheale</i> (ORT)	+++	Respiratory disease, egg shell issues	
Infectious coryza	+++	Especially tropical climates (high RH + warm)	●
Mycoplasmosis (Ms + Mg)	+++	Major global disease; respiratory	
Clostridial diseases	++++	Classic, focal necrotic enteritis and dysbacteriosis	●
Staphylococcosis	+	Rare in layers, secondary to <i>E. coli</i>	* ●
<i>Streptococcus spp.</i> & <i>Enterococcus spp.</i>	++	Underreported in pullets / layers	●
<i>Erysipelas</i> Uncertain	++	Outdoor systems / multi species farms, high mortality	●
Avian Intestinal Spirochetosis	++	Mostly outdoor / multi species farms	

Body weight development early lay

Body weight development start of lay



Body development of laying hens start of lay



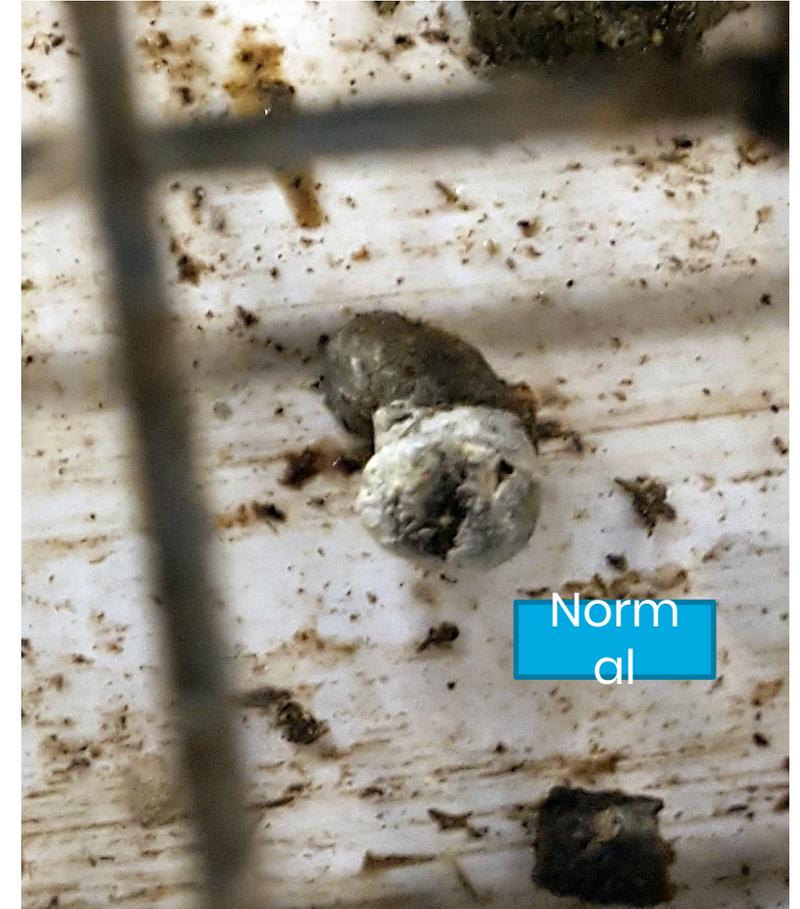
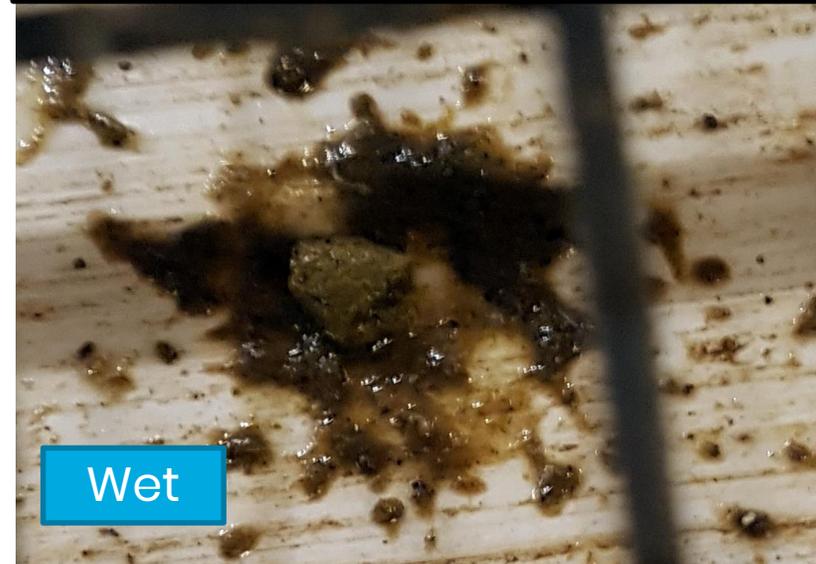
Both are 1.5 kg. One will last longer..

Use hands, not just eyes

Look at what goes in [feed] & what comes out [feces] + [eggs]



Squeeze test





Overproduction of gasses (fermentation) in cecal content



Avian Intestinal Spirochetosis (AIS): layers + breeders

Nonspecific clinical signs: underreported, underdiagnosed

- UK is the exception: very 'popular' diagnosis

Prevalence in layer flocks is very high (especially alternative systems)



Clinical signs may include

- Delayed egg production
- Reduced production
- Foamy and/or sometimes remarkably light colored cecal fraction → fecal staining of (breeding) eggs

Avian Intestinal Spirochetosis (AIS): layers + breeder

Nonsp

- UK i

Preval

Clinic

- Del

- Red

- This is why feed farm health is important!

- Foamy and/or sometimes remarkably light colored cecal fraction → fecal staining of (breeding) eggs

Pathogenicity of AIS is dependent on *Brachyspira sp.*, **microbiome composition, diet** and also profits from **dysbacteriosis in the small intestine**

Diet: Rapidly fermentable fibers are a known important predisposing factor → Feed formulation!

Treatment with tiamulin is possible, but the effect is temporary unless significant gut health improvement is also achieved



Managing gut health challenges plays central role

- Adaptation to feed change
- Dysbacteriosis (dysbiosis)
- **(Focal) Necrotic Enteritis**
- Coccidiosis



Body weight increase

Keep in mind: stress is a major immunosuppressive factor

- Alternative systems: new environment



FOCAL NECROTIC ENTERITIS

FNE = Overlooked, underestimated

- Chronic *Clostridium*-related condition
- Not directly related to coccidiosis
- Mortality low, morbidity high
- Used to be 20-30 week issue, last few years: increase of flocks suffering the entire production
- High prevalence in layer industry!

Chronic inflammation and lesions in the small intestine = malabsorption of nutrients.

2 possible ways for the hen to cope:

- Lower production (typically -2% but up to -10%)
- Increased feed intake (5% to 20%)



Clinical signs in flocks with FNE

High prevalence within a flock! 10-50% is common

Slightly lower activity (behavior, sound production)

Watery crop contents

Overrepresented fraction of coarse particles in crop content

Insufficient crop content

Low wing tension

Signs of early molting (neck area)

Poor feather quality (dirty, matte, curly feathering, etc)

Undigested particles and/or too much water in droppings

Contaminated eggshells (moderate-severe cases of FNE)

Malabsorption
of nutrients..



FNE = Overlooked, underestimated



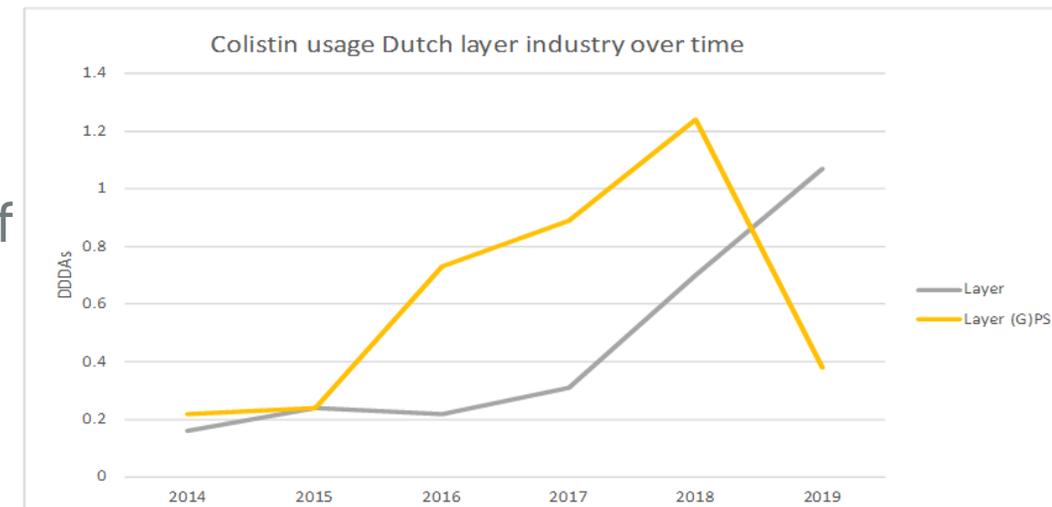
In severe cases: Treatment with antibiotics is needed

- Very effective (phenoxymethylpenicillin, tylosin, oxytetracycline)
 - But the treatment ends.. Then what? With antibiotics we massively disturb the microbiome
 - Relapse after treatment is common



Aside from production efficiency losses..

- We still need insight in the other long term effects of chronic focal necrotic enteritis
- Room for opportunistic pathogens? Metabolic changes?
 - FLS and *Escherichia coli* mortality is on the rise



[CASE] New client with very hungry hens!



White layers in aviary

Total of 130.000 laying hens in 5 houses

Well managed farm

Industry eggs

Price per egg (>54 gr): € 0,037

Feed price (kg): € 0,26 (FYI: current price € 0,32)

Flocks peak production at 95% - 96% [GOOD]

Average daily feed intake 20-85 weeks: 134 gram/hen [??]

Chronic (mild) FNE during entire production period

After 50 weeks: high mortality (*E. coli* + FLS)

Mg- / Ms+

IB vaccination through DW

	ref	CASE	
Average daily feed intake	Max. 121	134gr	
Cumulative feed intake	54,6	62,2kg	
Additional feed intake		7,6kg	
Additional feed costs / hen		€ 1,98	
% increased feed costs / hen		14%	
			<ul style="list-style-type: none"> • From <i>just</i> the increased feed intake
			<ul style="list-style-type: none"> • Total damage case of FNE
			€ 256.880,-

[CASE] New client with very hungry hens!



White layers in aviary

Total of 130

Well managed

Industry eq

Price per e

Feed price

Flocks pe

Average d

Chronic (m

After 50 w

Mg- / Ms+

IB vaccina

Integrated approach to find solutions

Tech support + nutritionist + vet [FEED, FARM, HEALTH]

- Water sanitation
- Water acidifier exchanged with copper (vet prescription)
- Various feed additives, costing +€ 6-10/mt
 - Depending on bi-monthly vet visit assessment
 - Presan-FY
- Antibiotic treatment intervention when not responding to other options
- Feed formulation improvement
- Ms vaccination (€ 0,35 / hen)
- PRM management

Farmer: Expensive solutions, but happy with the ROI. The business has now regained good profitability. "Never

change a winning team"

ref

CASE

Gut health support



Selko | Selko-pH

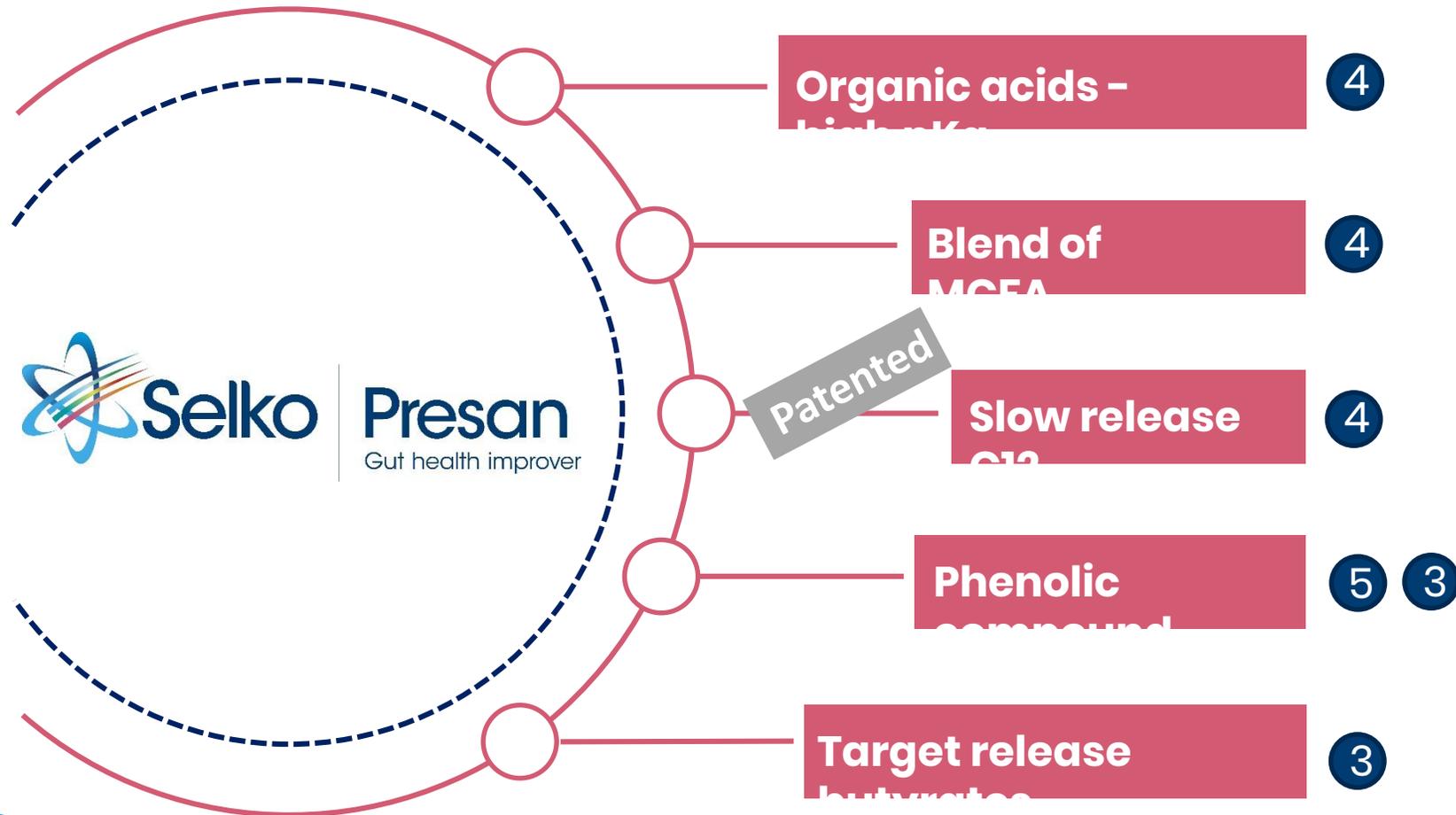
Supports digestion and natural barrier against gram-

Improves microbial balance throughout small intestine & boosts gut wall

Selko | Presan
Gut health Improver

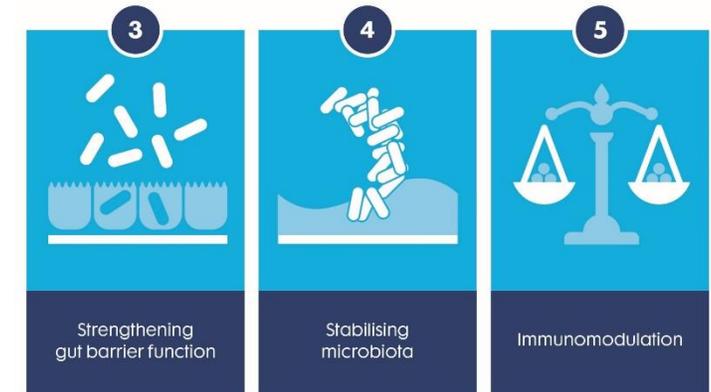
- 1 Preventing bacterial intake
- 2 Supporting digestion
- 3 Strengthening gut barrier function
- 4 Stabilising microbiota
- 5 Immunomodulation

Presan's combined approach to improve gut health



Client trial data

Age (weeks)	Focal necrotic enteritis	
	Presan-FY	Control
24	-	++
26	-	+++
28	+	++
30	-	-
33	+	++
37	-	-



The ideal approach for a starting layer flock



Managing gut health challenges plays central role

- Adaptation to feed change
- Dysbacteriosis (dysbiosis)
- (Focal) Necrotic Enteritis
- **Coccidiosis**

Body weight increase

Keep in mind: stress is a major immunosuppressive factor

- Alternative systems: new environment

- Droppings with gut mucosa / undigested particles
- Wet litter

Post-mortem gut scrapes under light

microscope

Monitor coccidiosis in feces (McMaster method)

- Use amprolium if >10.000 OPG for >1 week.
- Don't compare broiler OPG with layer OPG

We do *not* have products that work *directly* against coccidiosis

Support the bird's gut health to (re)establish immunity against coccidiosis

18–30 weeks of age

Frequent (daily?) updates on feed & water intake + eggs produced

- Track if the feed intakes keeps increasing – stagnation for 2 days can be first sign of trouble
- Production should increase rapidly, stagnation again potential sign of trouble

Every other week: farm visit to do gut health audit (see previous slides)

- Provide feedback to farmer/feed-mill: how are they developing? Gut health status? Increase light +1 hour?

Weekly OPG counts if everything looks normal, bi-weekly if anything is suspicious (wet litter, droppings, etc.)

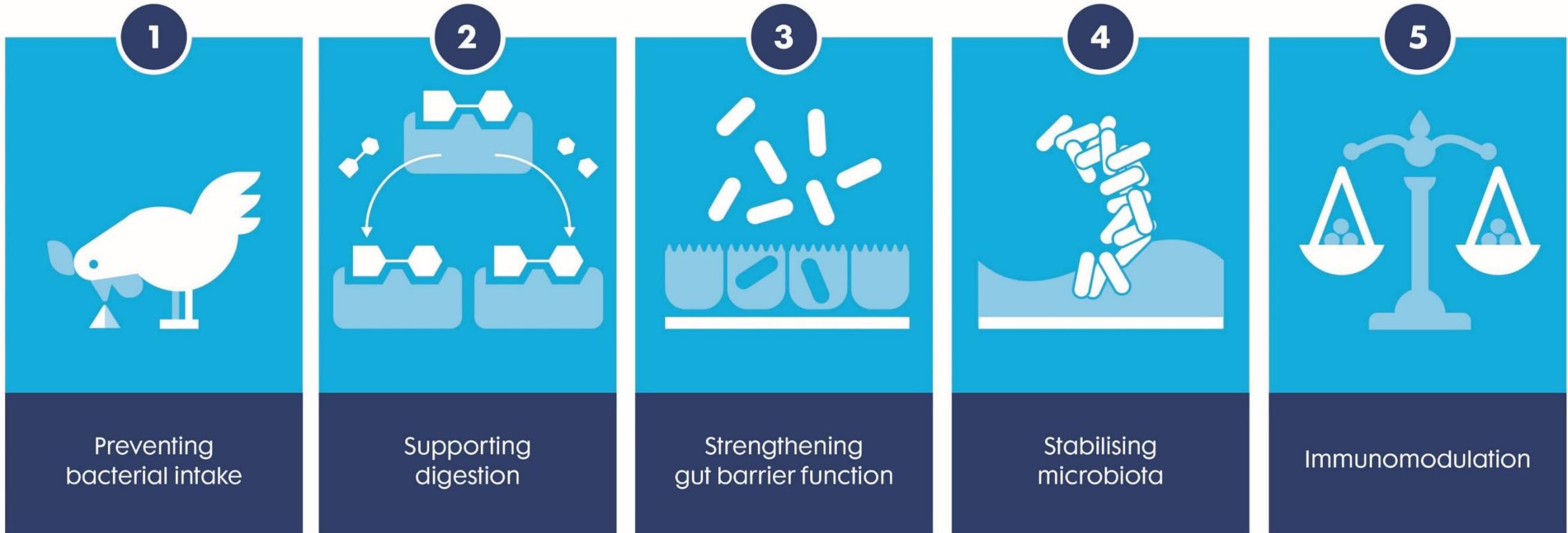
- Free-range: also check for helminth infections



Alfalfa can help
reduce
cannibalism and
support gut
health

Provide 2-3 mm
stones to
improve gizzard
function in
alternative
systems

5 functional pillars in the Selko gut health portfolio



Best results: use an integrated approach: Feed, Farm and Health!



**Thank you
for listening**

Bonus mini-case



22-23 weeks: FNE, IB QX/D388 field challenge (low CT), low mortality, insufficient peak



