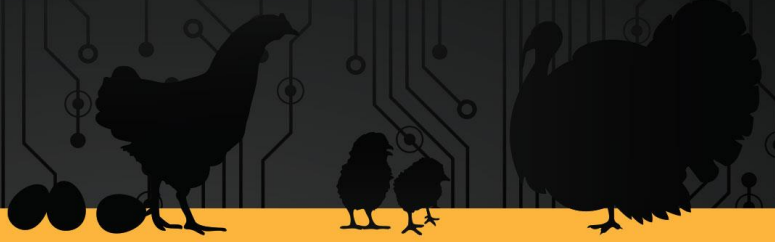


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Promoting and managing gut health in breeders

Dr. Richard A. Bailey

Poultry Health Scientist

Aviagen Ltd, Edinburgh, UK

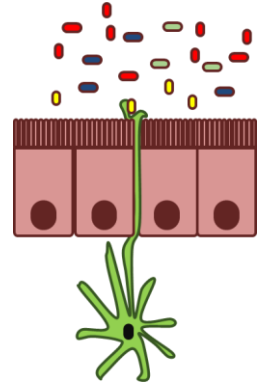


Outline

- Key features of the chicken gut
- Key focus areas of gut development and physiology
- Describe what happens when the gut becomes imbalanced
- Overview of gut health products
- Examples of how to use gut health products

What is intestinal health?

- Ability to defend against gut pathogens
- Ability to breakdown feed into constituent parts
- Ability to absorb all the digested nutrients
- Ability of the immune system to respond correctly



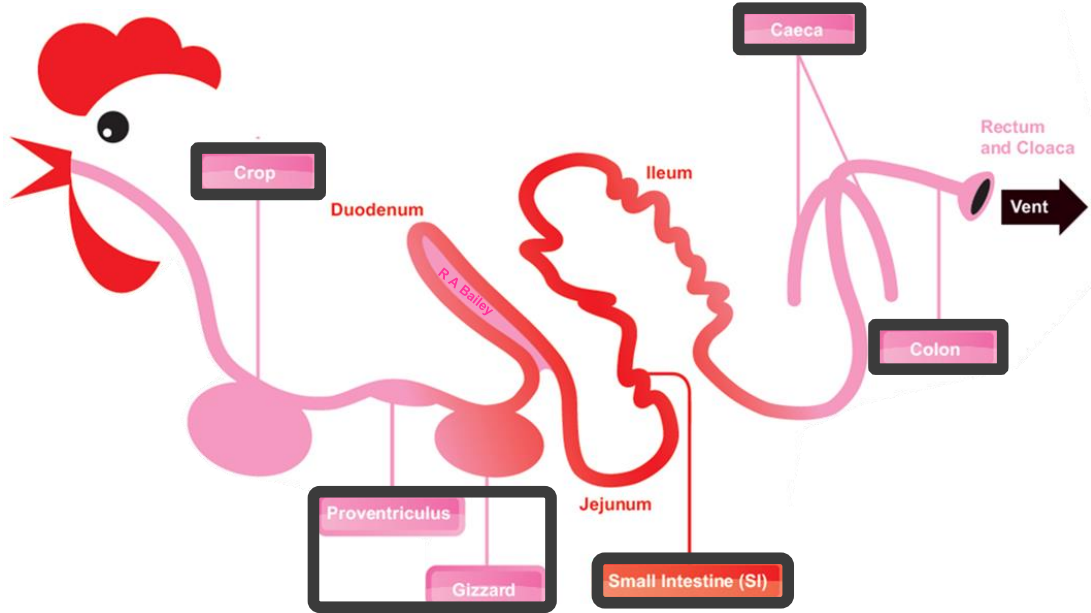
Optimal tissue
development

Optimal immune
system
development

Optimal gut
microbiota
development

Failure of any one of these will result in poor gut health

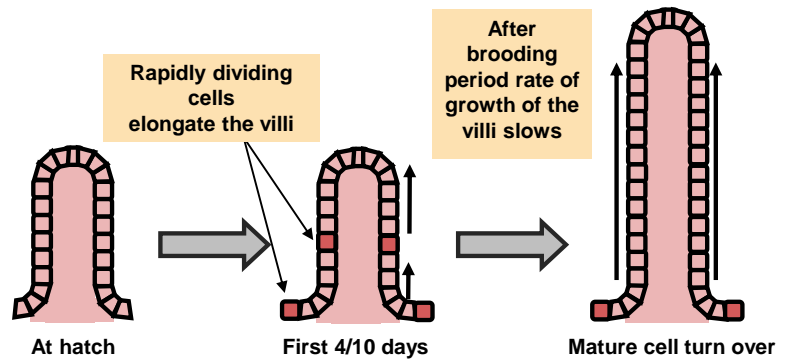
What is the gut?



Gut development

- Brooding plays a critical role in the development of the villi

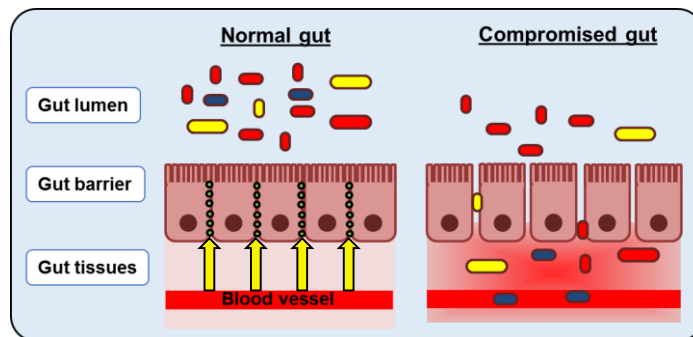
- Gut development starts in the egg
- Growth is dependant on the presence of food in gut
- Stimulated by the intestinal bacteria
- Growth inhibited by stress



>

The gut barrier

- Maintaining the gut barrier is essential for optimal gut health
- The gut barrier is a single layer of cells covering the surface of the villi
- Tight junctions strengthen this barrier preventing bacteria entering the body
- Failure of the gut barrier can result in bacteria crossing into the gut tissues



Failure of the gut barrier

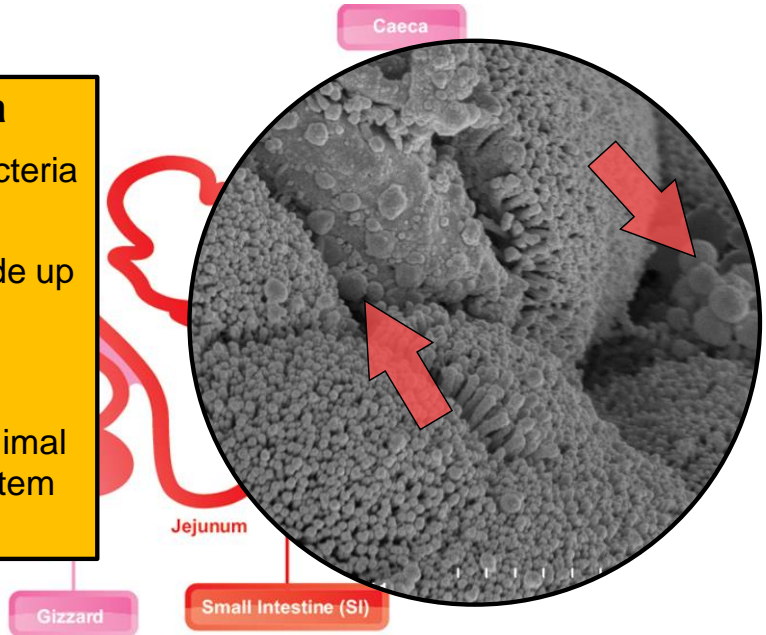
- Gut function impaired, gut becomes inflamed increasing the risk of further disease
- Reduction in nutrient absorption
 - Poor growth rates
 - Nutrient deficiencies
 - Bacterial overgrowth
- Opportunistic infections
 - Necrotic enteritis
 - Spinal lesions
 - Joint infections and leg health problems
 - Peritonitis



Key features of the gut – Gut Microbiota

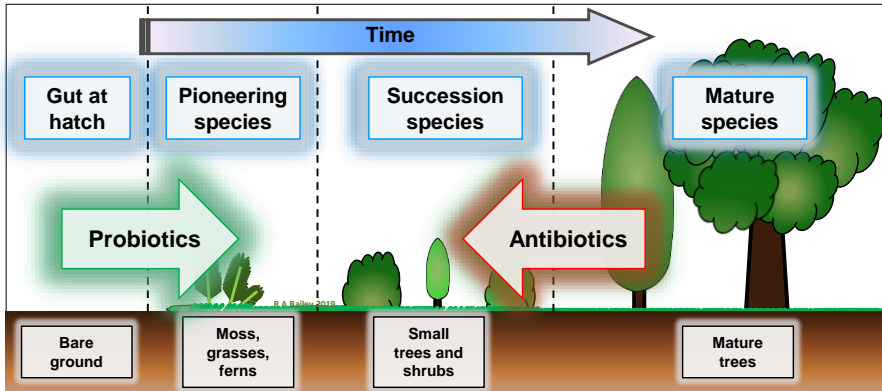
The gut microbiota

- Large community of bacteria living in the gut
- Trillions of bacteria made up of 700-800 species
 - A mix of favourable and unfavourable bacteria
- Plays a major role in animal health and immune system development



Microbiota Development

The microbiota is a dynamic entity that develops over time



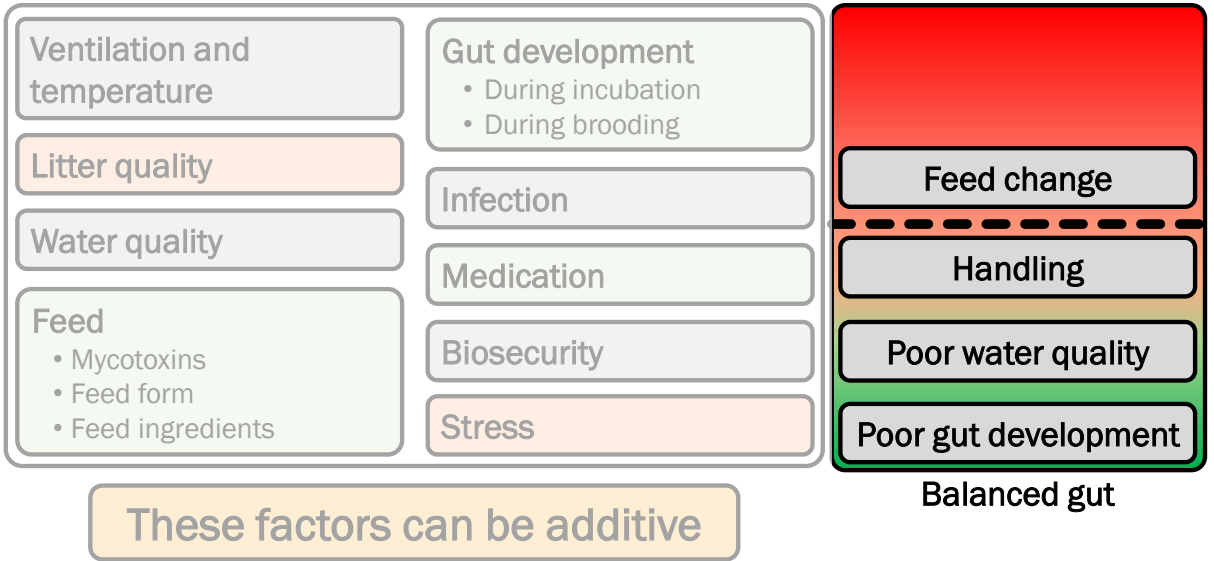
Any pressure on the gut system during brooding can slow the rate of succession

What happens during a gut imbalance?

- Shifts in microbiota are indicative of malabsorption
 - Poor fat, poor protein and sugar absorption
 - Fat, sugar and protein available in the caeca
 - More nutrients for bacteria
- Bacterial overgrowth
 - Excess CO₂, CH₄, H₂S produced
 - Toxic amines (irritates gut and causes growth depression)
 - Bile acid inactivation (impairs fat absorption)
 - Cause an immune response resulting in a leaky gut
- Leads to further disruption and intervention is needed to help rebalance the microbiota

**This is the
dysbacteriosis
cycle**

Factors affecting gut health



Impact of stress on gut health

- Stress can be from physical or environmental factors
- Stress can cause immunosuppression
 - Impacts immune development
 - increases susceptibility to disease
- Stress hormones and neuro-transmitters released in the gut can cause an increase in the growth and activity of some bacteria such as
 - E. coli
 - Salmonella
 - Enterococcus
 - Staphylococcus
 - Streptococcus

Using gut health additives over stress periods can help reduce the overgrowth of these bacteria

Nutrition and gut health

- Impact of diet formulation
 - Quality of raw ingredients
 - Different raw ingredients will influence the bacteria
 - Changes in nutrient density will alter the gut microbiota composition
 - Avoid large changes in raw materials with feed changes
- Impact of mycotoxins
 - Irritation of the gut resulting in inflammation and tissue damage
 - Shrinkage of villi
 - Shown to cause immunosuppression resulting in gut imbalance

Nutrition and gut health

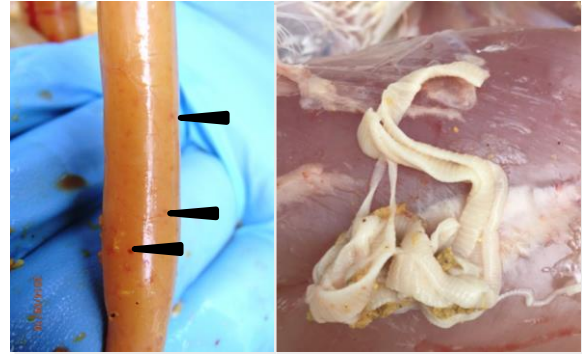
- Feed form is important for gizzard function & subsequent gut health



- In the gizzard feed mixed with acid and pepsin
 - Grinds the feed for digestion
 - Breaks proteins into peptides for absorption in small intestine
- Small particle size reduces time feed stays in gizzard
 - Inefficient protein preparation
 - Protein into hind gut
 - Increased gut viscosity
 - Poor absorption and FCR

Infection and gut health

- The gut can be put under pressure from both clinical and subclinical infections at all ages
 - Viral
 - Bacterial
 - Parasites
- An increase in mortality may not be seen but a reduction in performance may occur
- Good biosecurity and vaccination programs are critical for gut health



Water quality

- Gut health relies on the provision of good quality water
- Water can be a source of pathogen challenge
- The pH and mineral content of water can influence the physiology of the gut and activity of bacteria
- Having a good water sanitation protocol is essential for gut health throughout the life of a breeder

- Remove biofilm and scale from water lines
- Through the life of the flock ensure water is sanitised (e.g. Chlorine, Chlorine dioxide, Hydrogen peroxide)
- Acidify the water (pH of 5.5-6.5)
- Flush lines every 6-8 weeks to prevent biofilm build up

What is the impact of poor gut health on the breeder?

- Poor gut health can reduce nutrient uptake
 - Less nutrients for growth and egg production
 - Poor antibody deposition in the egg
 - Poor flock uniformity
 - Malabsorption of nutrients results in bacterial overgrowth
- Poor gut integrity can result in bacteria passing into the bloodstream
 - Infectious joint disease
 - Peritonitis
- Bacterial imbalance in the gut can affect the egg
 - When the egg passes through the cloaca it comes into contact with gut bacteria
 - These can enter the egg - impact the embryo & chick

How can we promote gut health?

- 'Alternatives to antibiotics' or 'Alternative strategies'?

DEVELOPMENT

- Gut tissues
- Gut immunity
- Gut microbiota

***Setting up the gut for
the
life of the bird***

TRANSITION

- Feed changes
- Vaccinations
- Environmental
- Handling

***Prevent reduction in nutrient
absorption
and overgrowth of less
favourable bacteria***

MAINTENANCE

- Gut has developed
- Stable microbiota
- Promote integrity

***Ensure gut is supported
to conserve
homeostasis***

Gut health products

PRODUCTS

- Phytogenics/plant extracts
- Direct fed microbials
 - Probiotics
 - Competitive exclusion products
- Organic acids
 - Traditional
 - Protected
- Prebiotics
- Mannan-oligosaccharides
- Bacterial/Yeast fermentation products
- Feed enzymes

MODES OF ACTION

- Improve gut integrity
- Stimulate or provide a beneficial flora
- Improve gut development
- Improve gut function
- Inhibit pathogens

Choose a product that will provide the required action and give the correct support to the gut

Gut Health – Development Phase

- On the farm gut health can be influenced from day 1
 - Ensure chicks get access to feed as soon as possible to stimulate development of the gut
 - Correct brooding temperatures
 - Provide gut health products to boost the early gut development and seed the gut with beneficial bacteria
- By doing this the gut development is optimal ensuring the birds are better equipped to cope with gut challenge



Gut Health – Transition Phase

- When the gut is at risk of becoming imbalanced
 - Feed changes
 - Vaccinations
 - Environmental
 - Handling



- Minimise the number of intestinal stressors at one time to prevent overloading the gut
- Use gut health additives over risk periods



Strategic application of a gut health additive can buffer the gut against bacterial changes

Gut Health Products – Maintenance Phase

- Once the gut is fully developed it is essential gut health is supported to maintain gut health.
- There are key periods where gut health may need extra support
 - **Around peak production (20-30 weeks):**
 - Increased organic acids in water to help the gut
 - Support the gut with probiotics or phytogetic products
 - **After peak production (30+ weeks):**
 - Gut integrity can decrease with age increasing the risk of bacterial translocation across the gut wall
 - Increased use of products to boost gut integrity such as lactic acid bacteria based probiotics and organic acids such as butyric acid.
- Monitor gut health daily

Gut Health Products – Maintenance Phase

- Detecting gut health issues



When a gut health imbalance is suspected administer a gut health additive for 3-4 days

Key messages

1. Ensure optimal brooding to promote the best gut development.
2. Understand what the gut needs at each time point of the bird's life.
3. Good gut health relies on optimal water sanitation.
4. Feed formulation and quality is important for good gut health and performance.
5. Know when the gut is at risk of imbalance and support it accordingly.
6. React quickly when a problem is seen before it becomes more serious.