

The Turkey Microbiome

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Agenda

- **What is the microbiome?**
- **The power of the gut microbiome**
- **Microbiome composition impacts the birds' performance and behavior**
- **It's not just the microbiome**





What is the microbiome?

What is the microbiome?



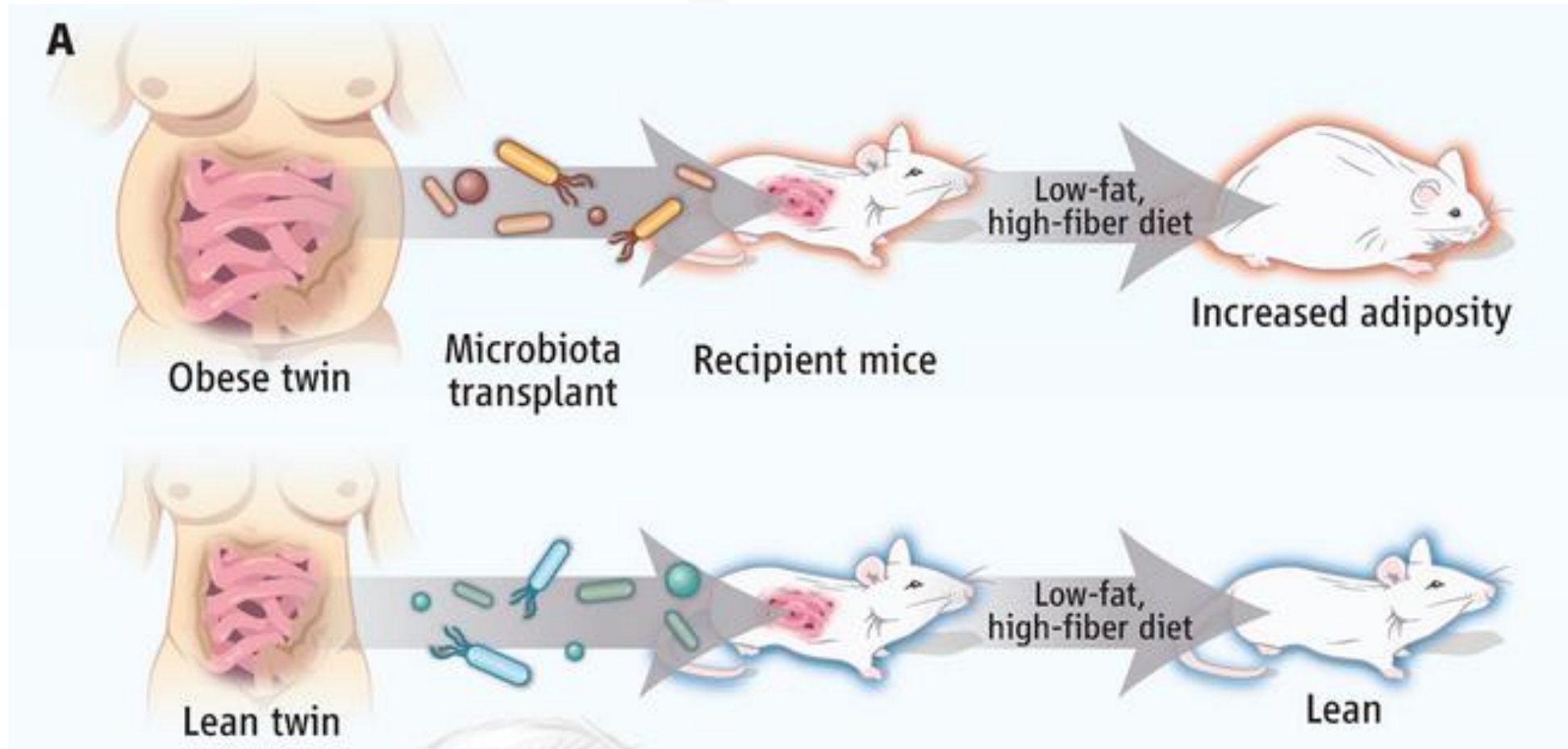
The community of individual microorganisms

Who is there?



The Power of the gut microbiome

Human microbes can make mice fat



[RIDAURA ET AL. \(2013\) SCIENCE](#), Gut Microbiota from Twins Discordant for Obesity Modulate Metabolism in Mice



Microbiome composition impacts the birds' performance and behavior

What is Microbiome Robustness?

Microbiome Robustness is: the ability of the intestinal microbiome to adapt to changing conditions, in order to maintain microbial balance and productivity.

Why Microbiome Robustness is at risk?



Chronic Stress
(Heat stress)



Antibiotic Therapy



MICROBIOME
Robustness



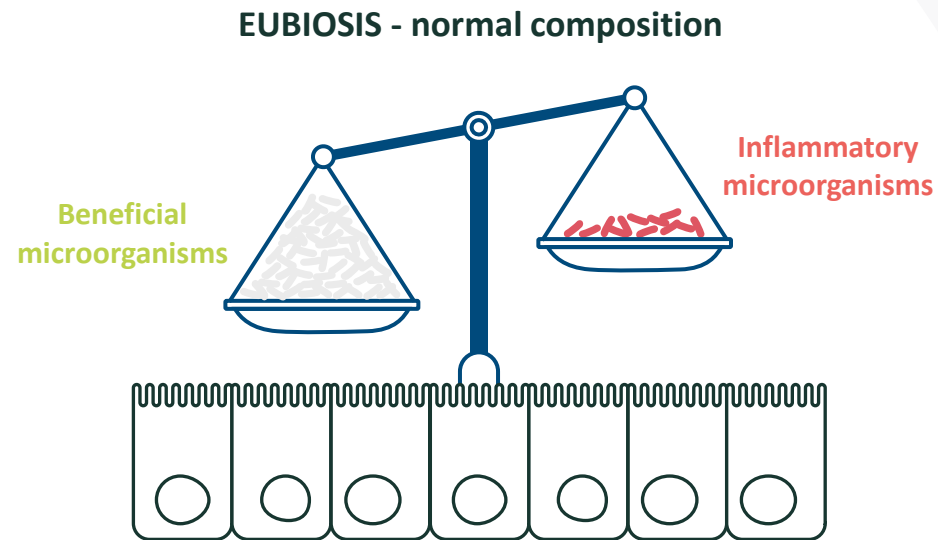
Pathogenic bacteria

(*Clostridia spp.*, *Salmonella spp.*, *E. coli*)



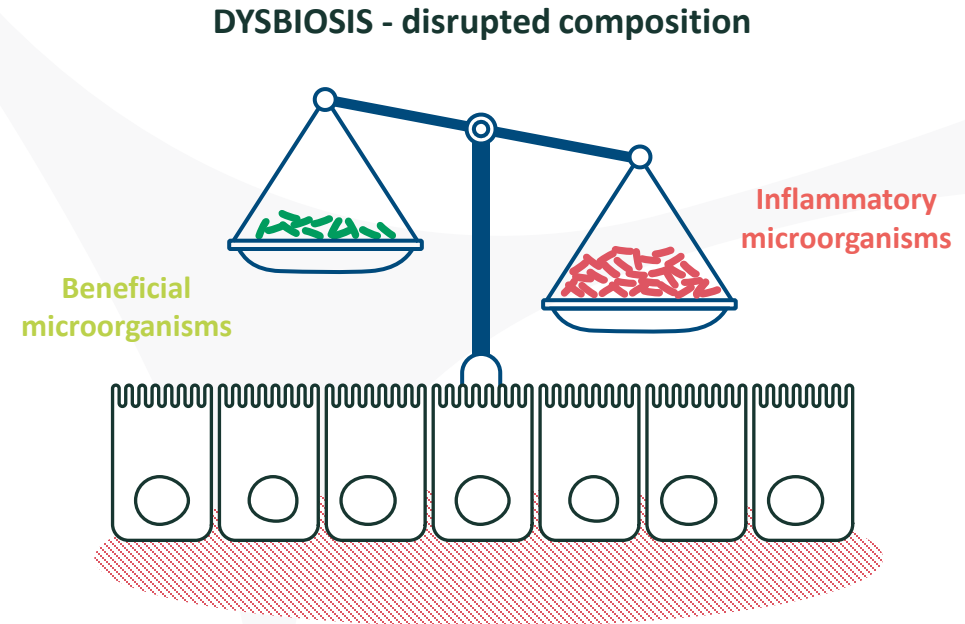
Nutritional Factors

Dysbiosis results from an imbalance of the normal gut microbiome



REGULATORY IMMUNITY AND TOLERANCE

- ↑ Microbial diversity
- ↑ Anti-inflammatory microorganisms
- ↓ Translocation of bacteria



LOSS OF TOLERANCE AND SYSTEMIC INFLAMMATION

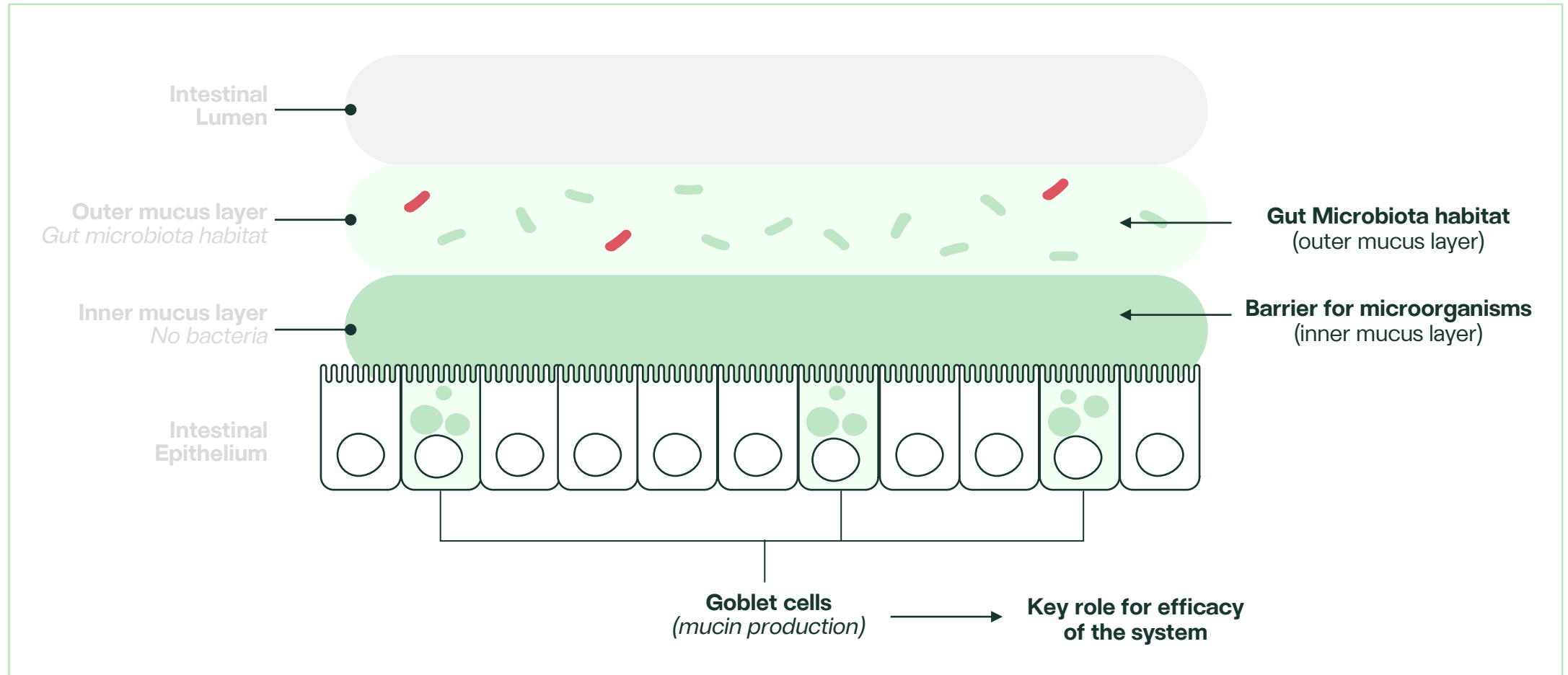
- ↓ Microbial diversity
- ↑ Pro-inflammatory microorganisms
- ↑ Translocation of bacteria



It's not just the microbiome...

Gut Mucus Layer in a healthy system

Important part of the “Innate immune system”
- very efficient - low energy demand



Photomicrography of Mucus Layers

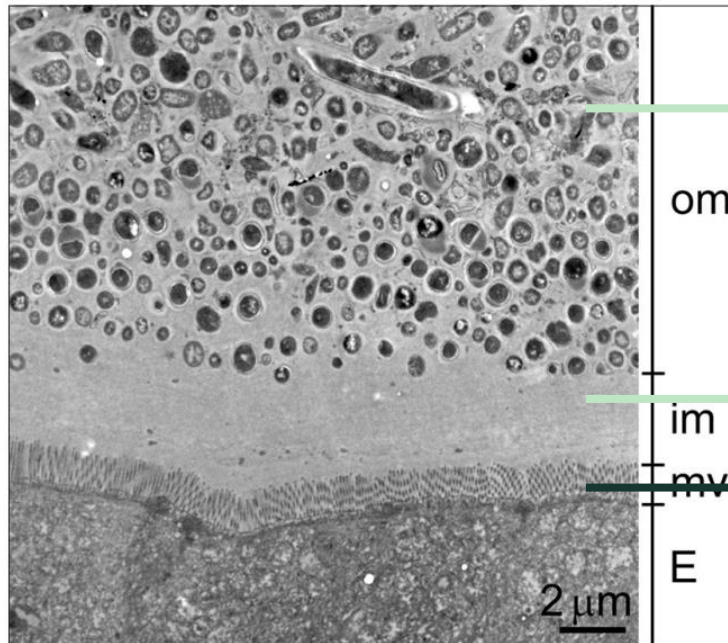
Original Article

Tzu Chi Medical Journal 2020; 32(2): 145-153



Visualizing the effects of antibiotics on the mouse colonic mucus layer

Chun-Yao Chen^a, Kai-Chieh Hsu^b, Hsuan-Yu Yeh^b, Han-Chen Ho^{a}*



Gut microbiota (good and bad microbials)

Physical barrier against microbials (part of innate immune system)

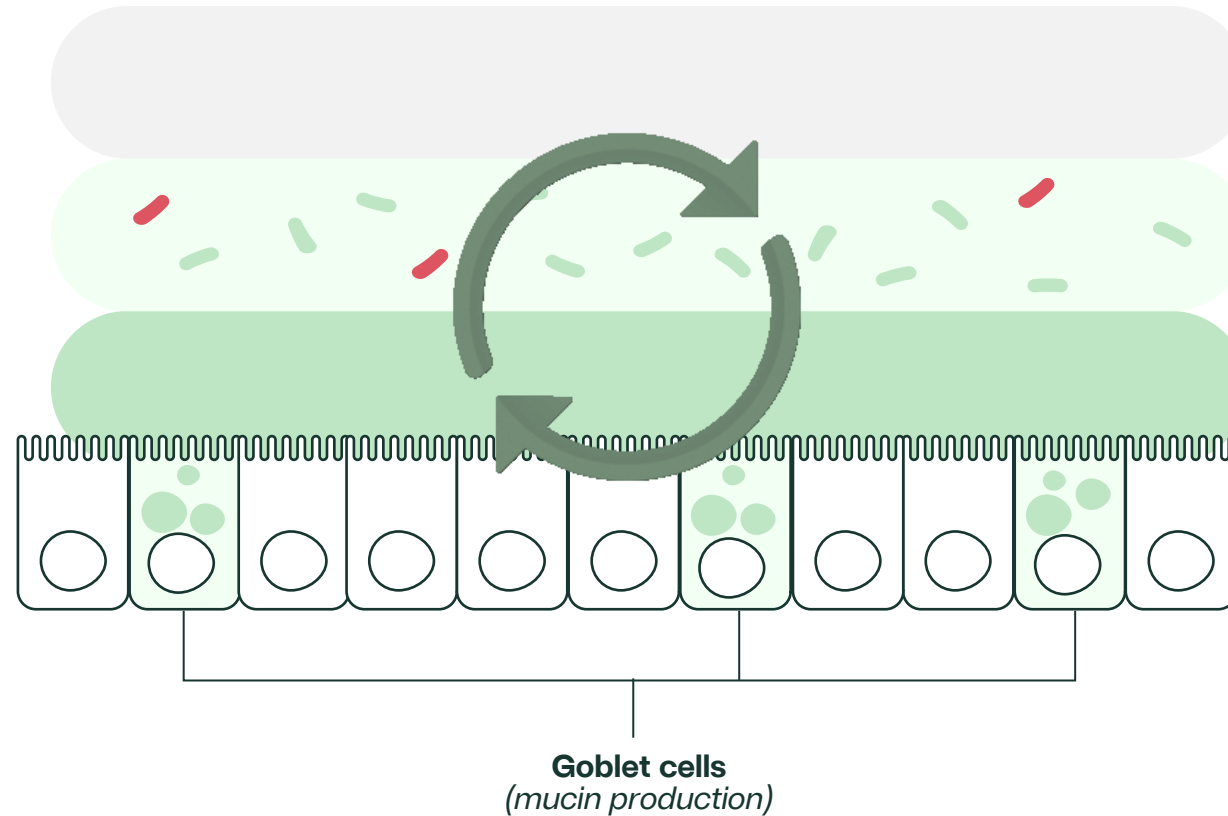
Gut Epithelium

Mucus layer & gut microbiota – a essential partner

Factors that affect gut microbiota robustness will also affect the efficacy of this system.

STRESS, ANTIBIOTIC, OTHER

Mucin is the basic substrate for gut microbiota activity



A balance gut microbiota is essential to trigger the MUC2 Gene activation for Mucin production



ROBUST MICROBIOME

→
Better Intestinal Health



Animal Performance

Digestibility of nutrients
Growth



Food Safety



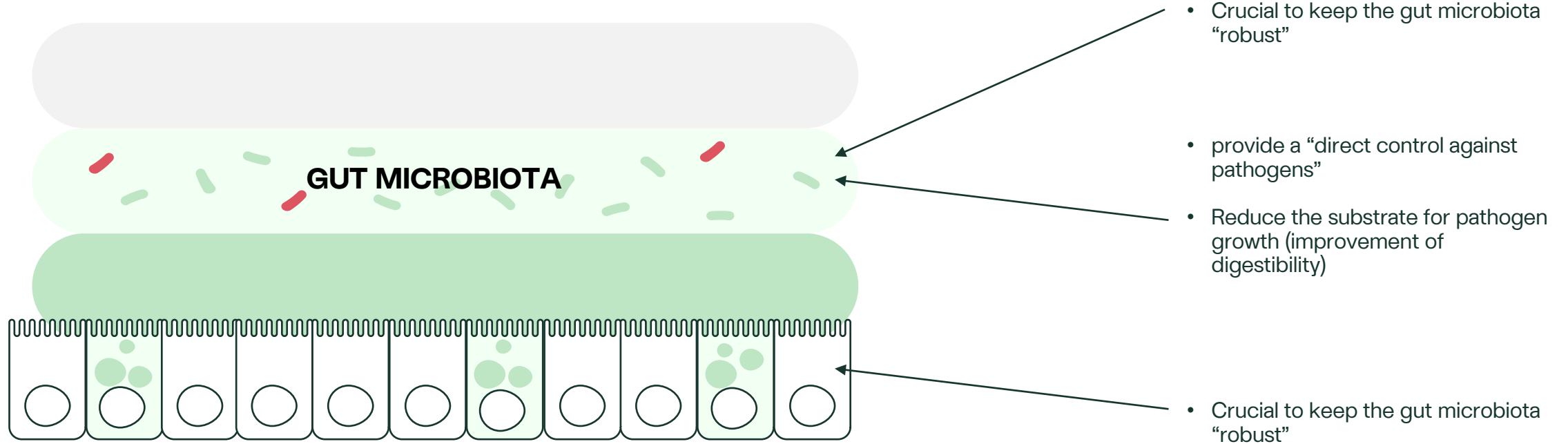
Animal Welfare Behavior



Economics

Increased production
Profitability

Take home message



- Performance (FCR, EPI) ↑
- Less diseases (NE, *E. coli*, etc)
- Lower ATB usage
- Lower carcass condemnation



- Gut integrity & health
- Better immune response
- Calmer birds (Welfare)



Take home message

**The right probiotics can be a tool to improve
bird health & performance...
and keep the microbiome and mucus layer
system robust.**



Thank you.