

Caecal microbiota changes in an intestinal leakage model in broilers

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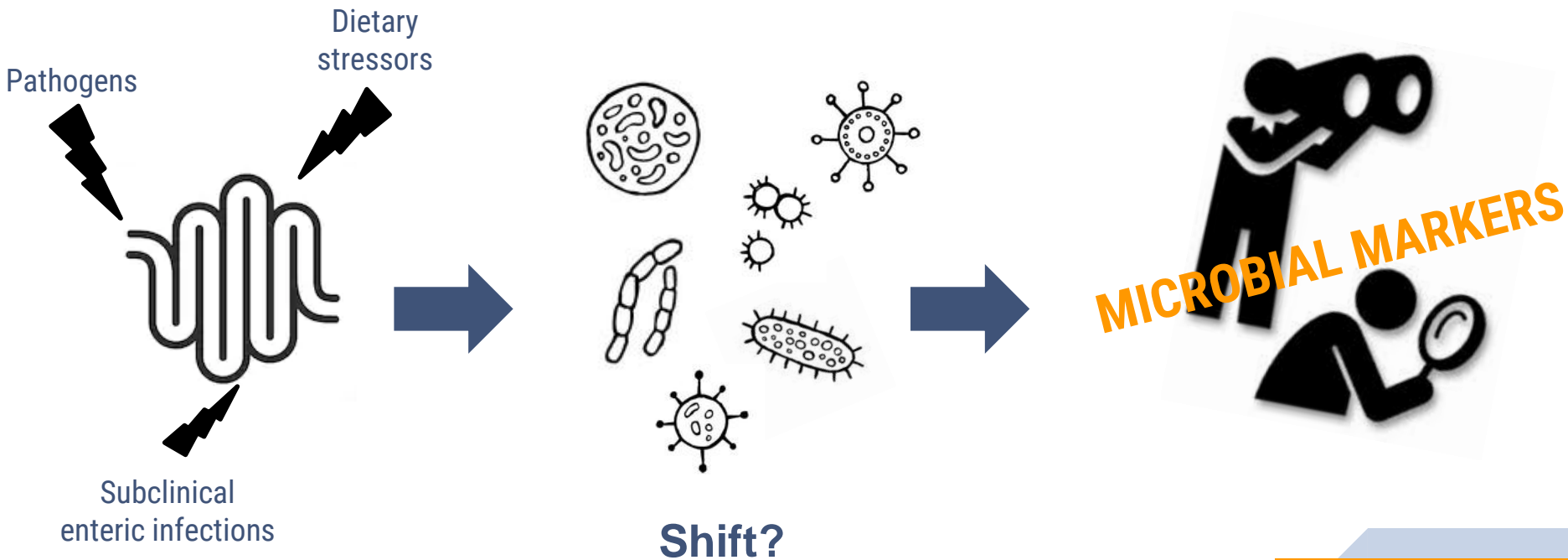


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Intestinal health





Identification of bacterial shifts in a developed *in vivo* model for gut damage

1) *In vivo* model



Performance



Macroscopic lesion scoring



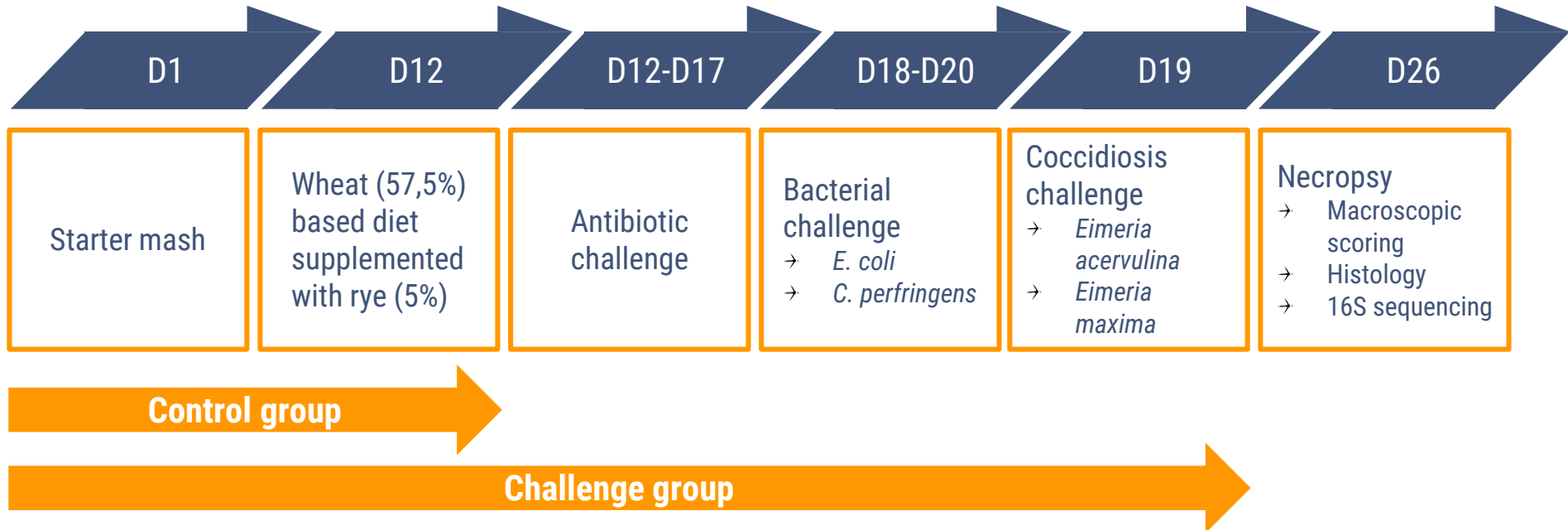
Morphology



Immunohistochemistry

2) 16S sequencing analysis

1 What is the effect of predisposing factors on intestinal health?





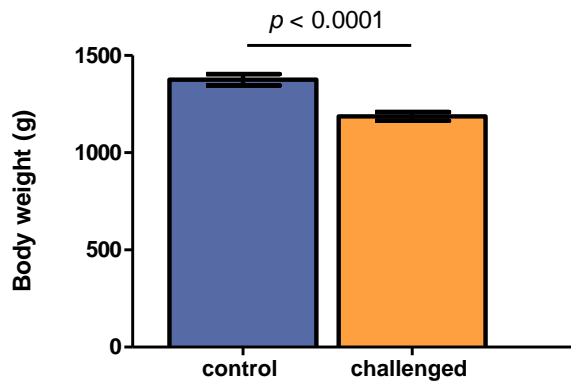
Performance



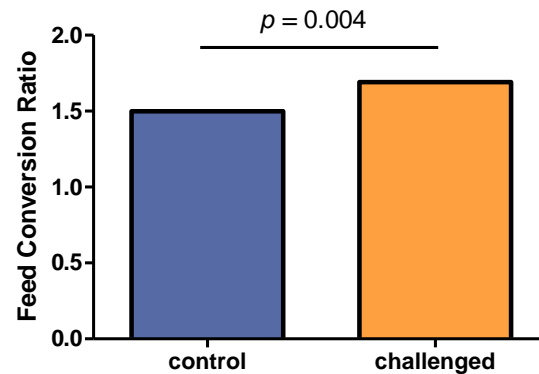
3 per replicate
9 replicates
2 treatments



Day 26



Decreased body weight



Increased feed conversion ratio

1) *In vivo* model



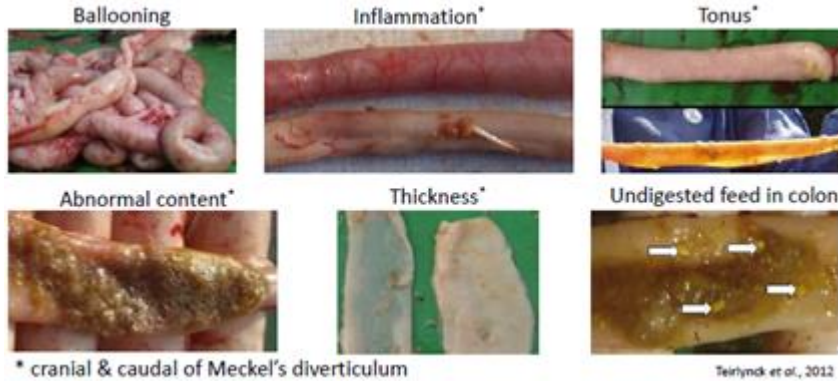
Macroscopic lesion scoring



3 per replicate
9 replicates
2 treatments

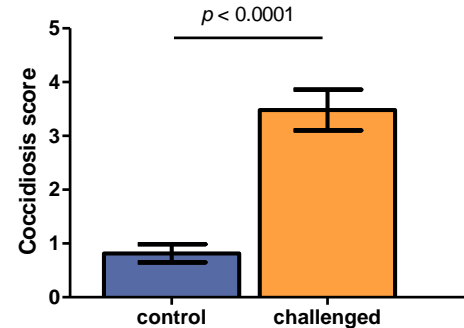
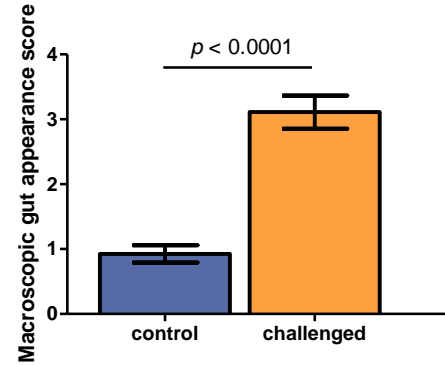


Day 26



Johnson & Reid (1970)

- *E. acervulina*
 - *E. maxima*
 - *E. tenella*
- } scored 0 (absent) to 4 (severe)
→ total score = sum



1) *In vivo* model



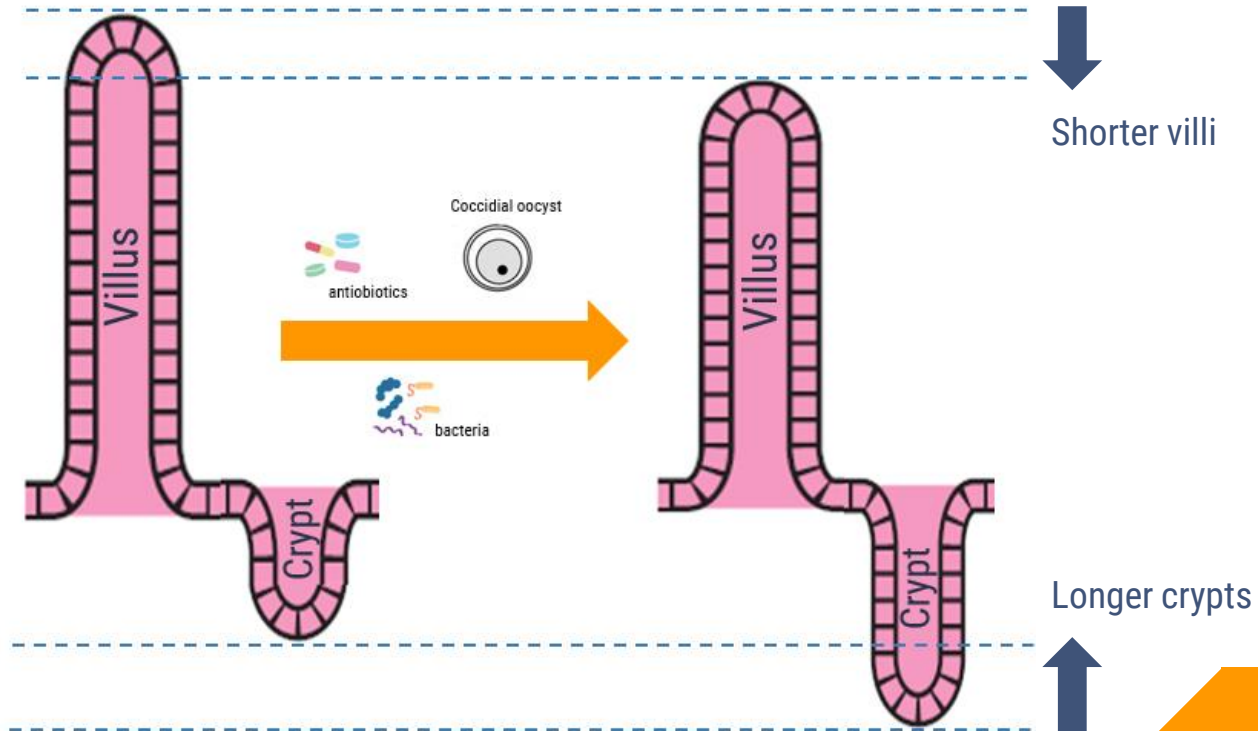
Morphology of duodenum



3 per replicate
9 replicates
2 treatments



Day 26



1) *In vivo* model



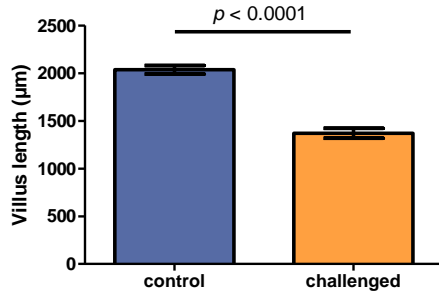
Morphology of duodenum



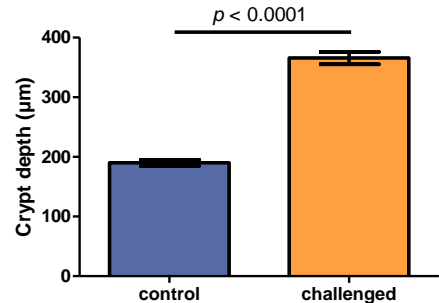
3 per replicate
9 replicates
2 treatments



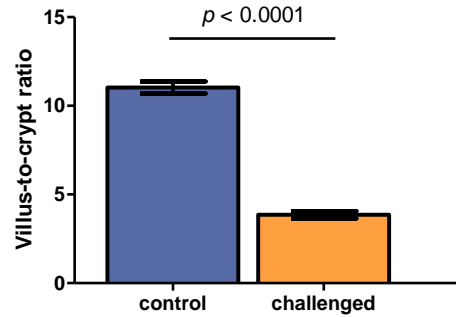
Day 26



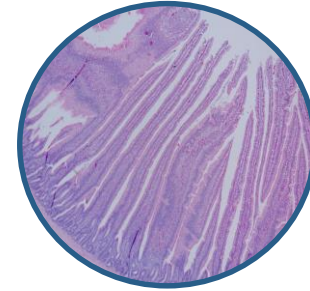
Decreased villus length



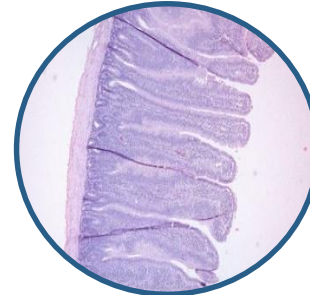
Increased crypt depth



Decreased villus-to-crypt ratio



Control



Challenge

1) *In vivo* model



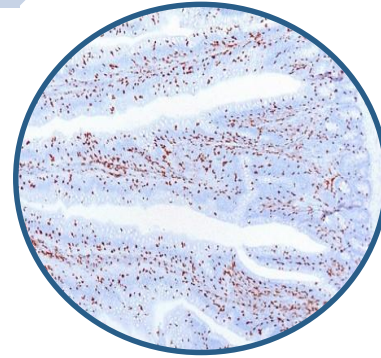
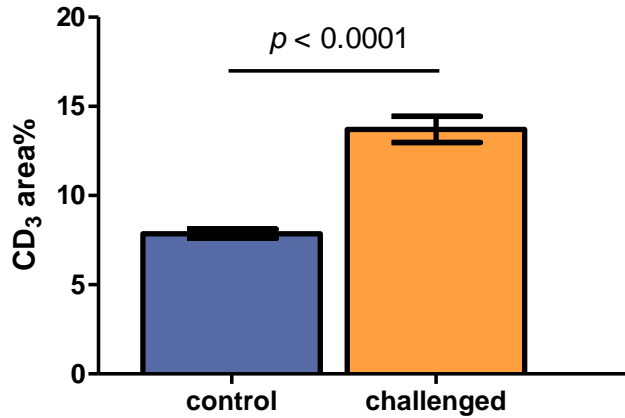
Immune cell infiltration in duodenum



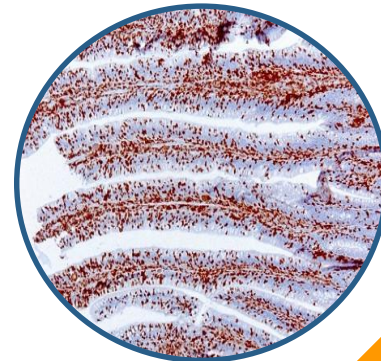
3 per replicate
9 replicates
2 treatments



Day 26



Control



Challenge

Increased inflammation

1) *In vivo* model

2 Identification of microbial markers

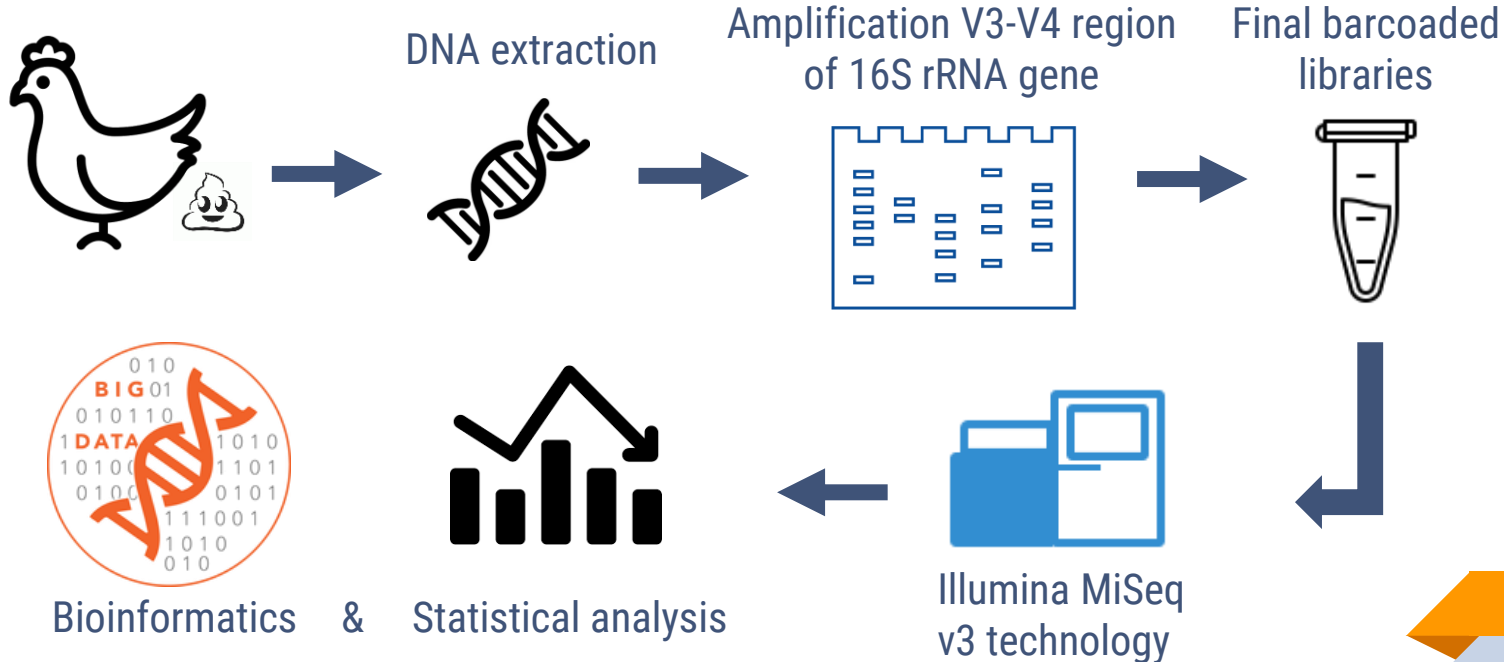


3 per replicate
9 replicates
2 treatments



Day 26

16S sequencing



2) Caecal microbiota



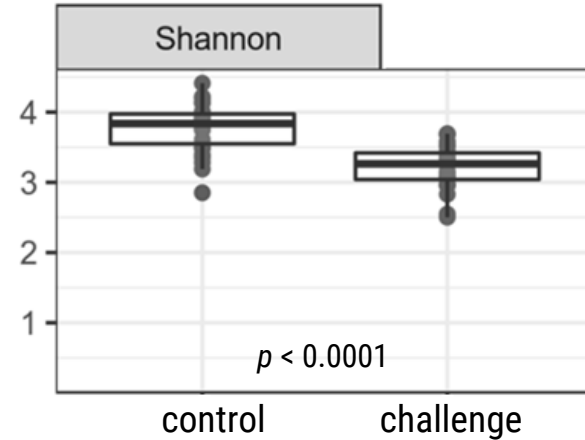
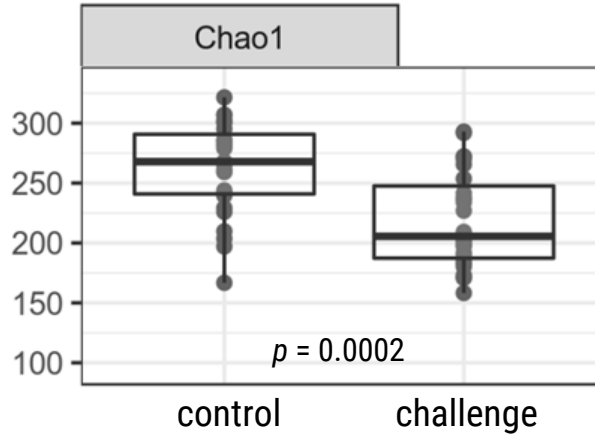
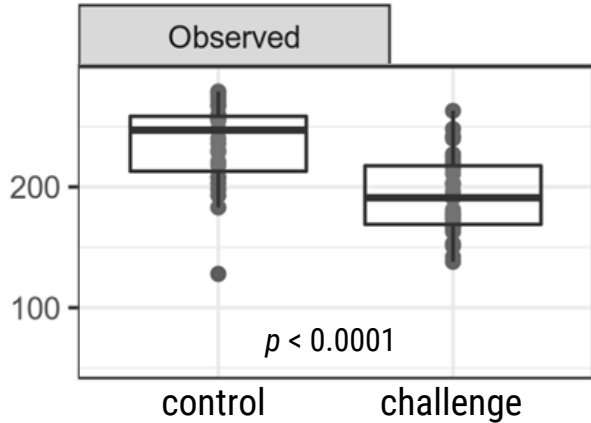
Alpha diversity measurements



3 per replicate
9 replicates
2 treatments



Day 26



Decreased species diversity & richness



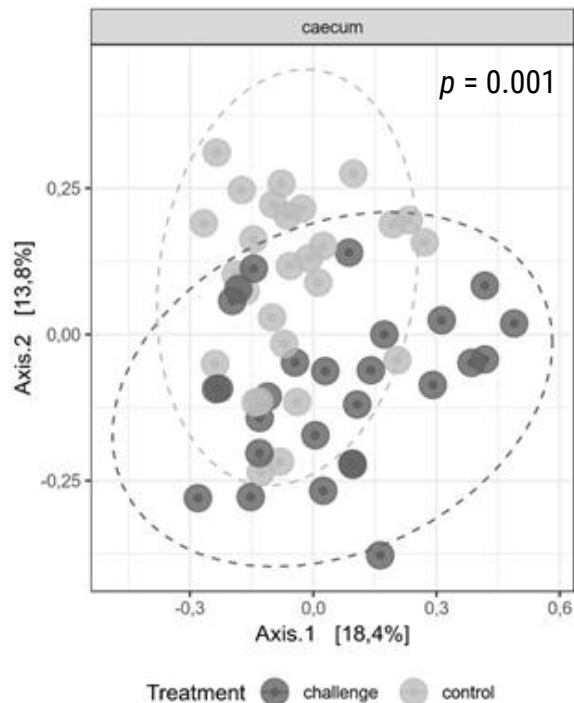
Beta diversity



3 per replicate
9 replicates
2 treatments



Day 26



Control

Significant different
microbial composition

Challenge

2) Caecal microbiota



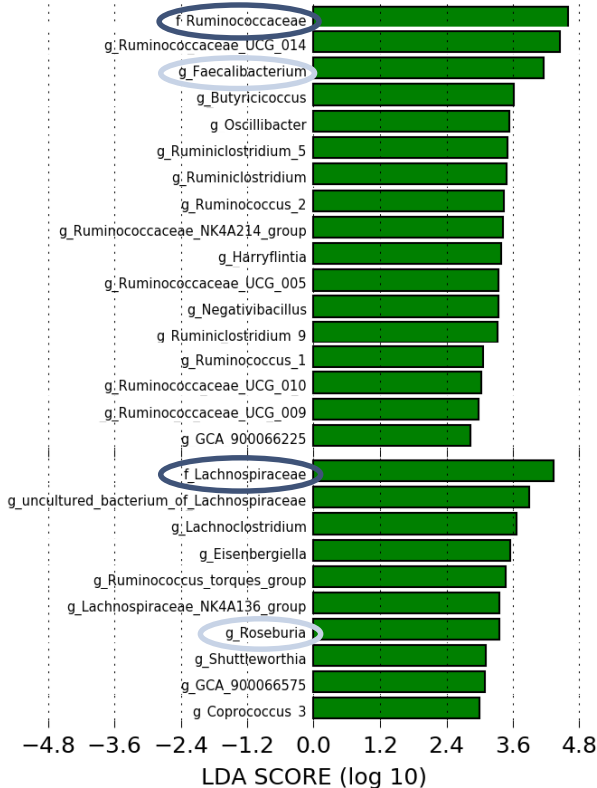
Linear discriminant analysis effect size (LEfSe)



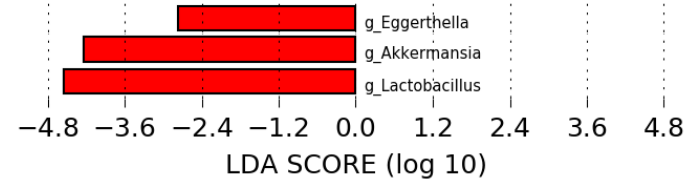
3 per replicate
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Day 26



Control v.s. Challenge



2) Caecal microbiota

Conclusion

1 Effects of predisposing factors on intestinal health



Lower body weight & higher feed conversion ratio



Worse gut condition



Less nutrient absorption and higher inflammation level



In vivo model can be used as tool to evaluate intestinal damage

2 Identification of microbial populations which describe condition of the gut

Thank you!



Department Pathology, Bacteriology
and Avian Diseases
Prof. Dr. Filip Van Immerseel
Prof. Dr. Richard Ducatelle



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