

Gut health from an omics point-of-view

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Factors of
GUT HEALTH

**Barrier
Function**

Microbiome

Nutrition



Known genetic markers of resistance to PWD

FUT1 marker – resistance to F18 ETEC

Located inside of *FUT1* -> candidate receptor

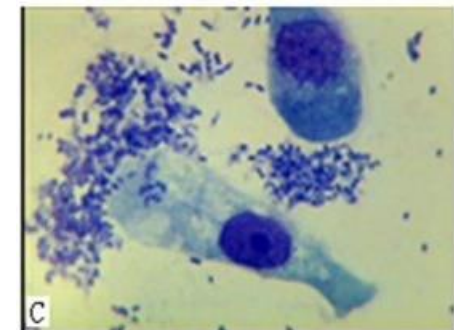
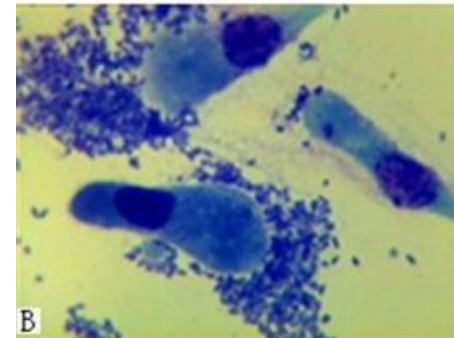
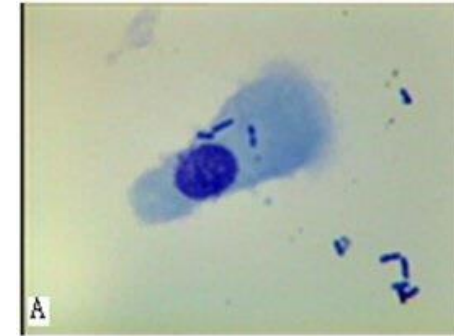
[Meijerink, 2000, Immunogenetics]

CHCF1 marker – resistance to F4 ETEC

Location continuously revised

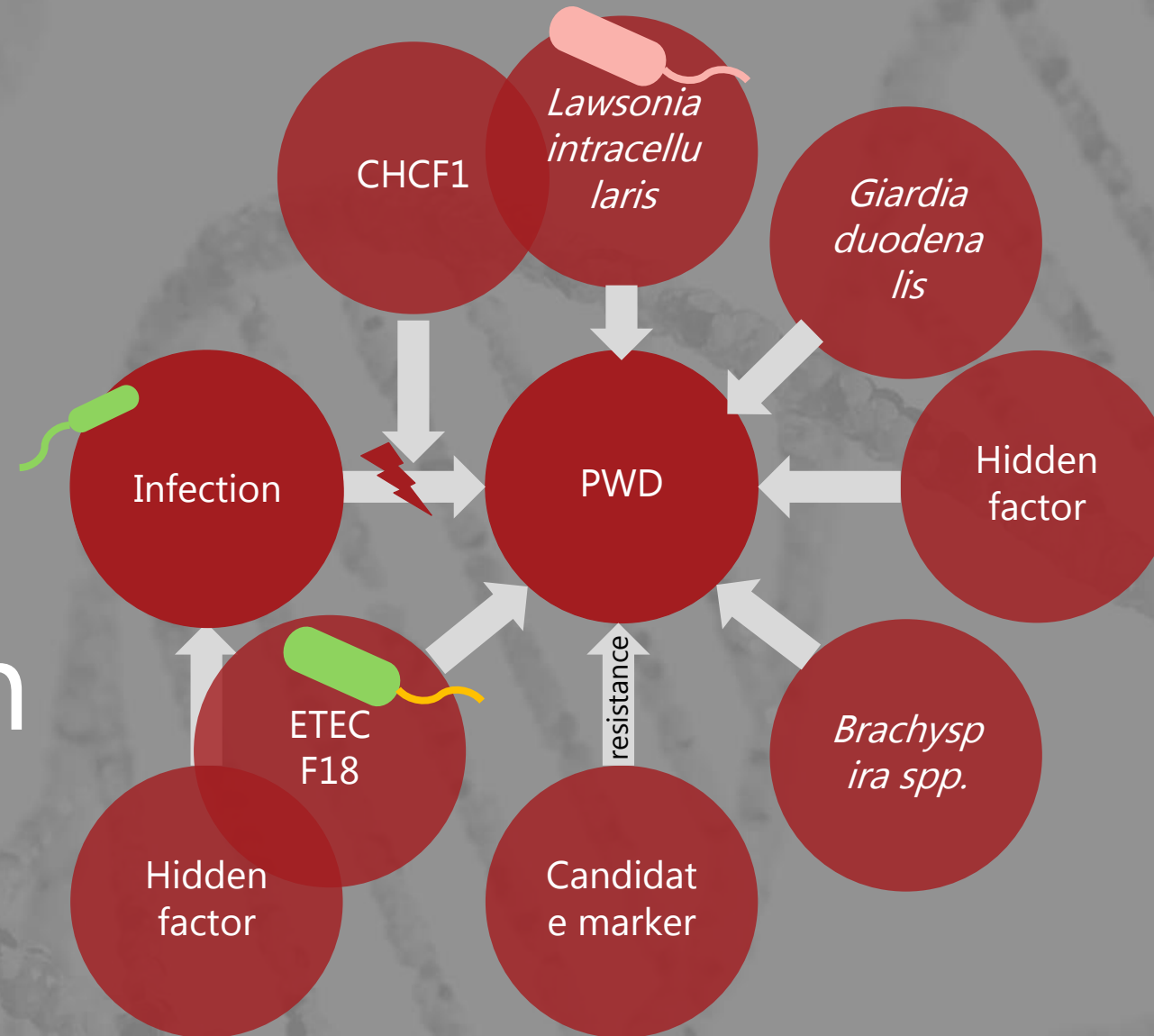
[Rydal, 2022, BMC Vet Res]

} Pathogen adhesion test

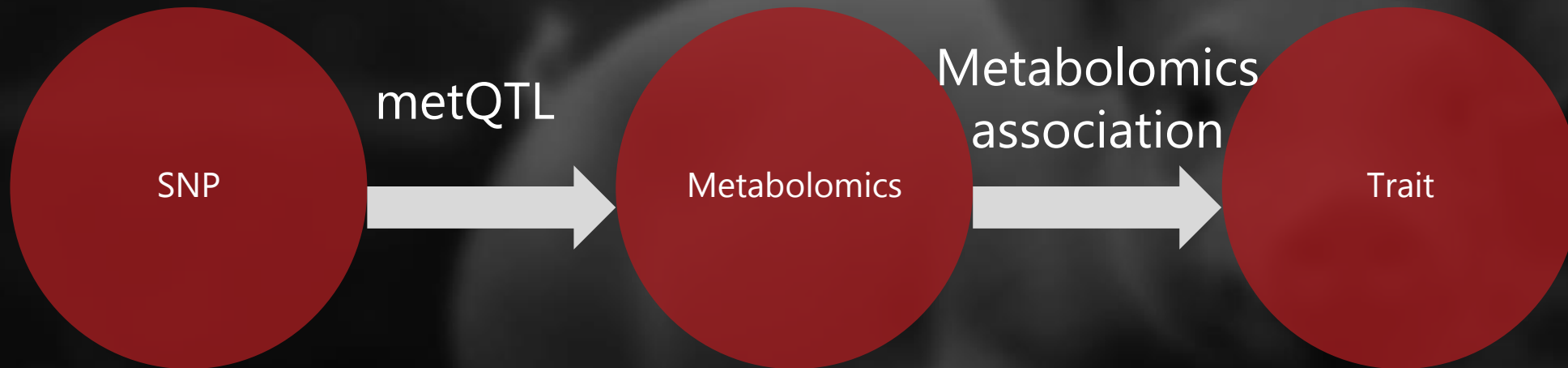


[Zhengchang Wu et al., 2016]

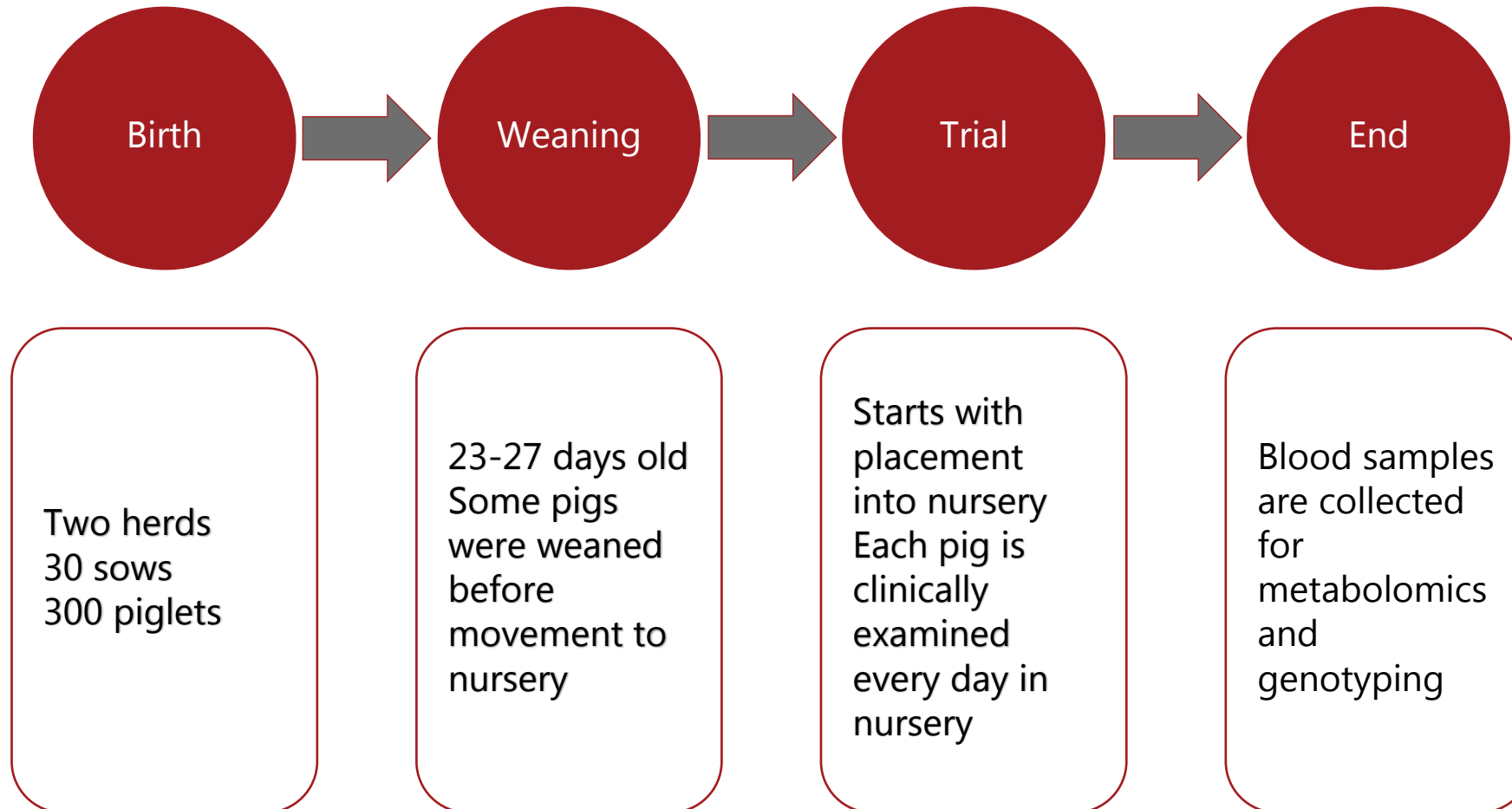
Biology behind Causation



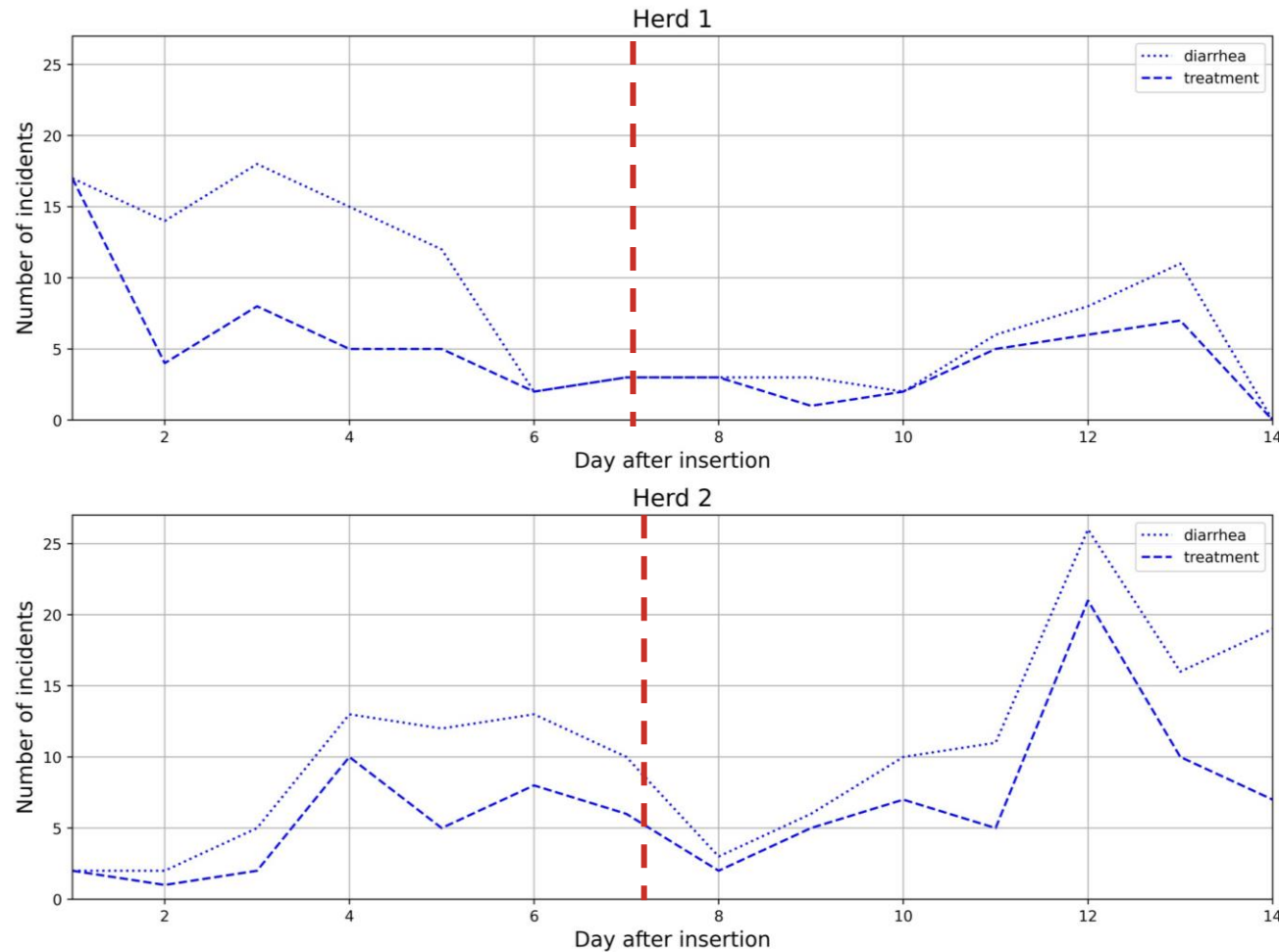
Omic data integration with GWAS



Study Design



Incidence waves

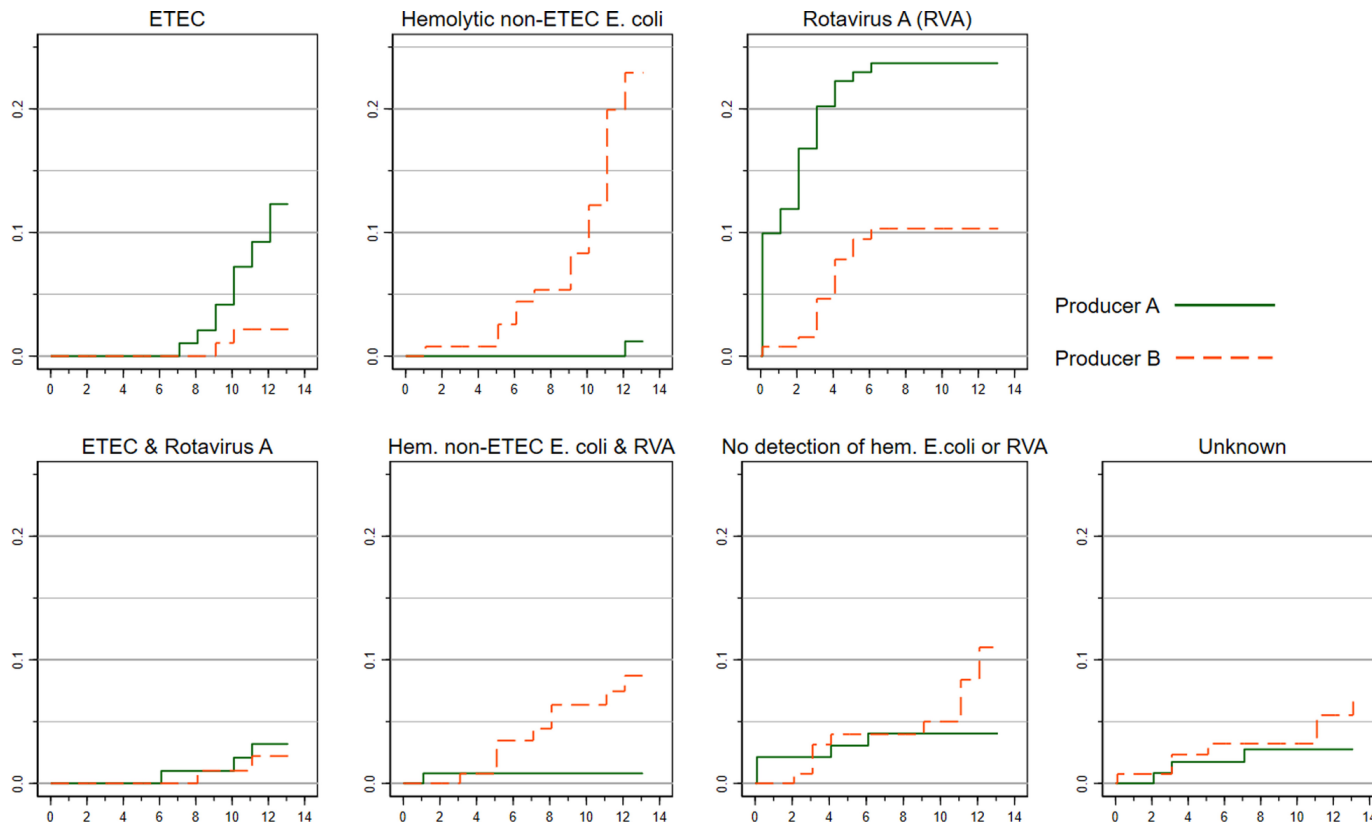


--- Threshold for definition of cases

Reason:
Early PWD incidence can be caused simply by environmental change

Bacterial shedding in the study

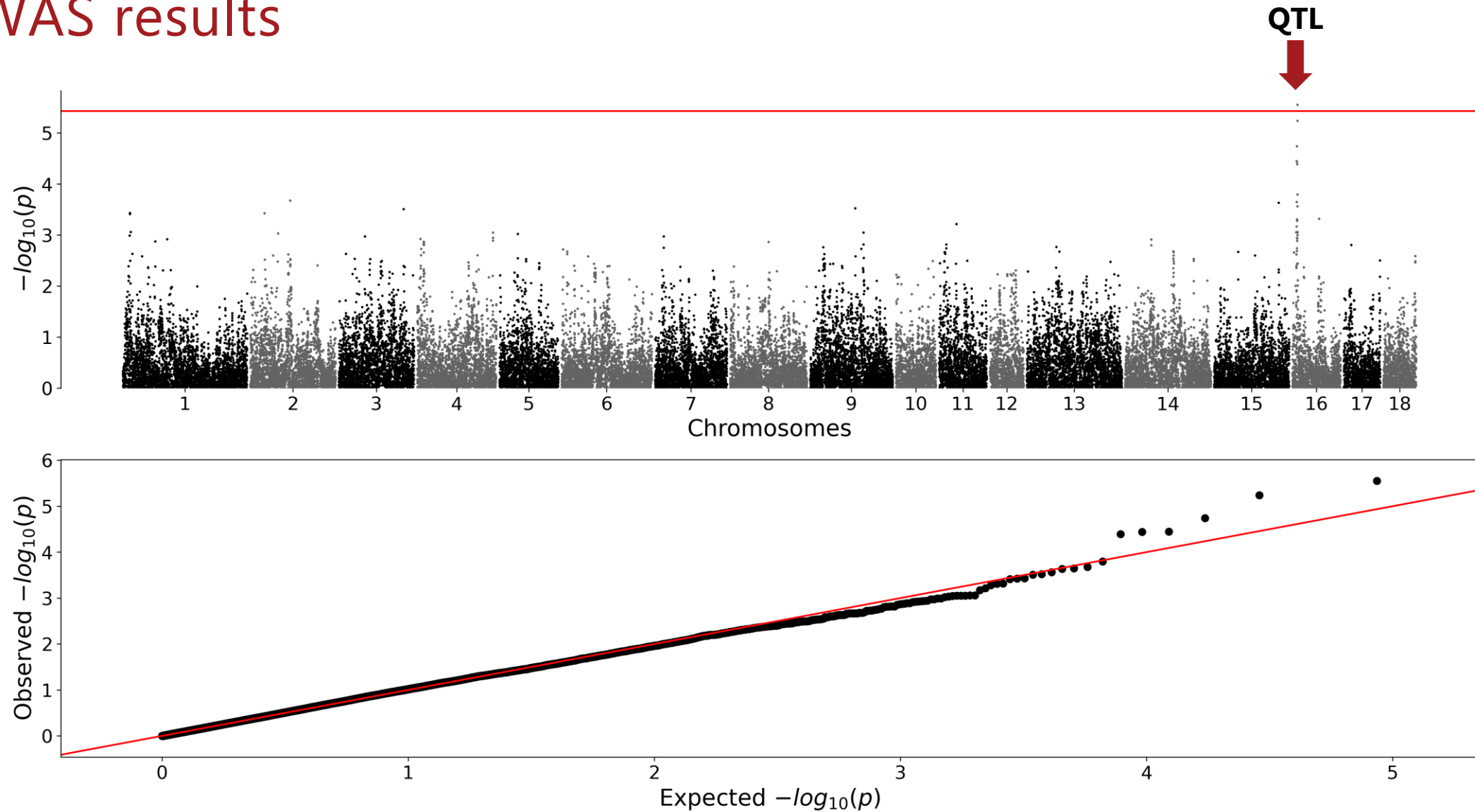
*Previous study on the same cohort



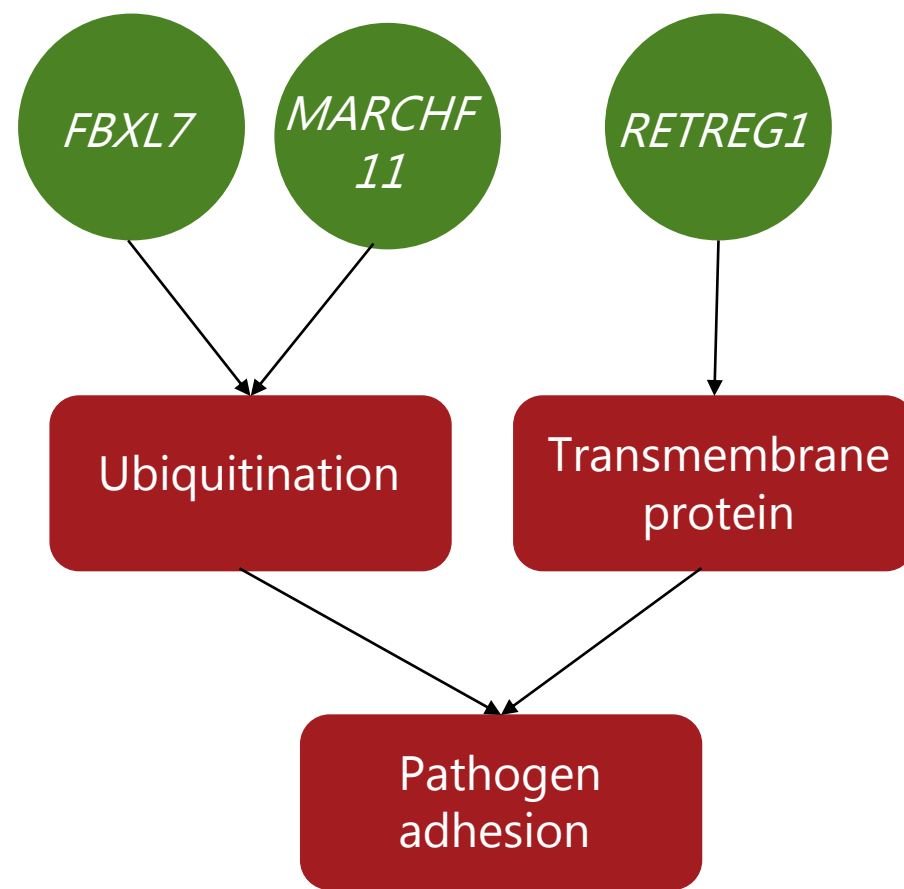
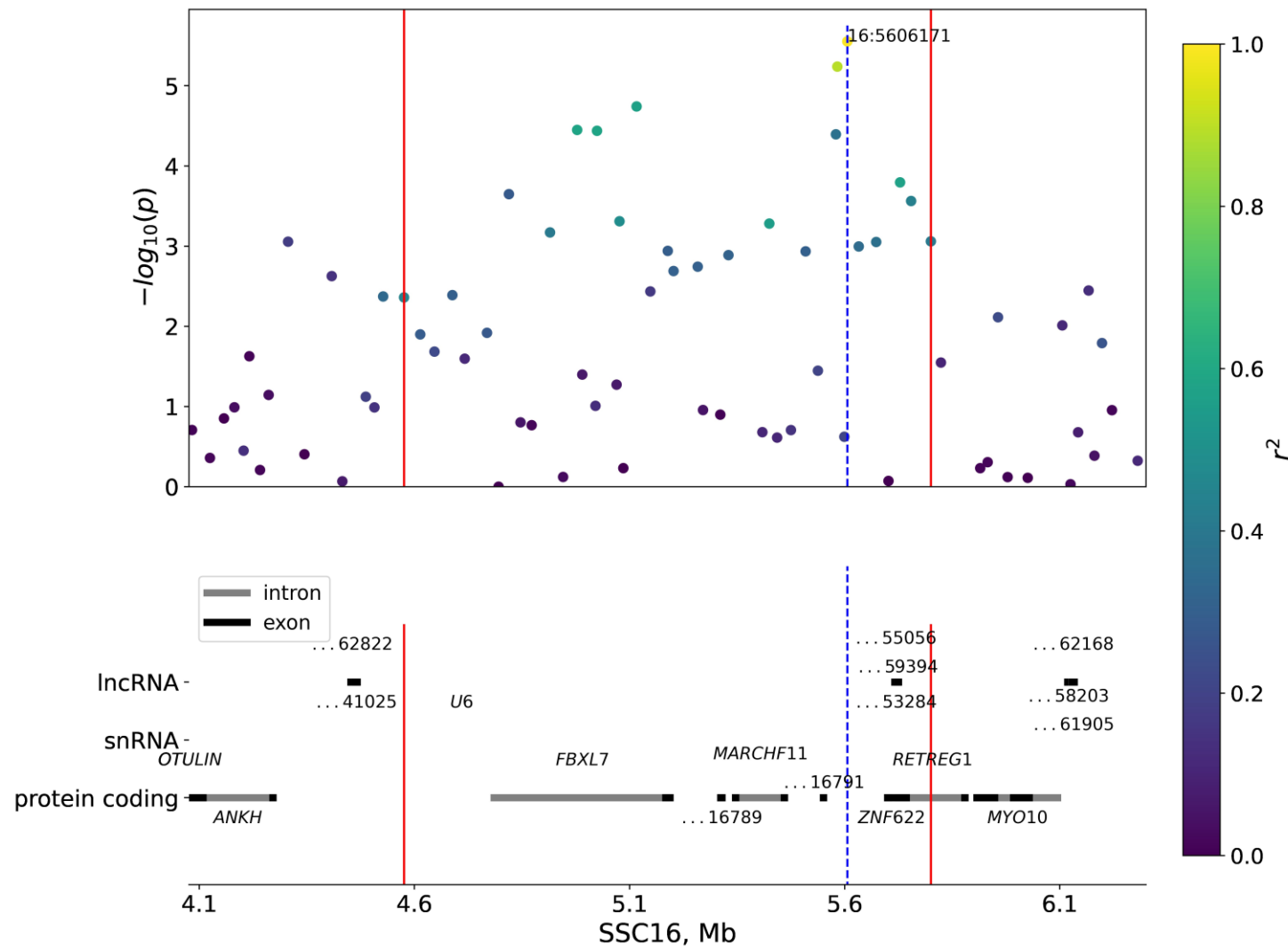
Shedding with known diarrhea-causing pathogens is increasing across the study.

[Eriksen, *et al.*, 2021, Porcine Health Manag]

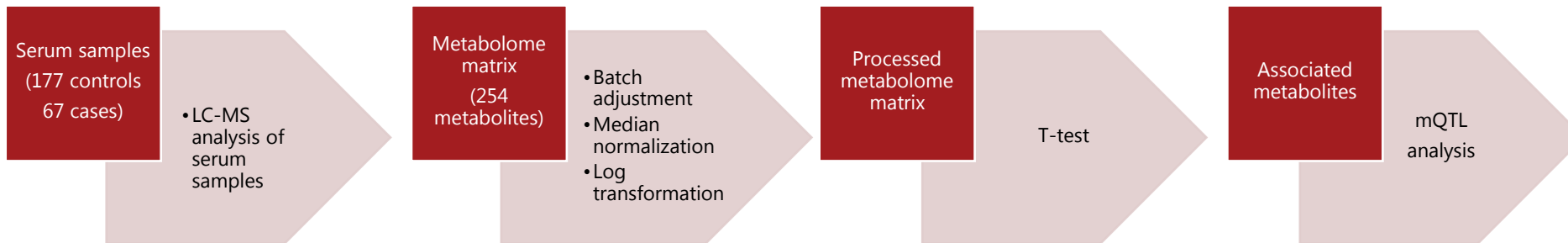
GWAS results



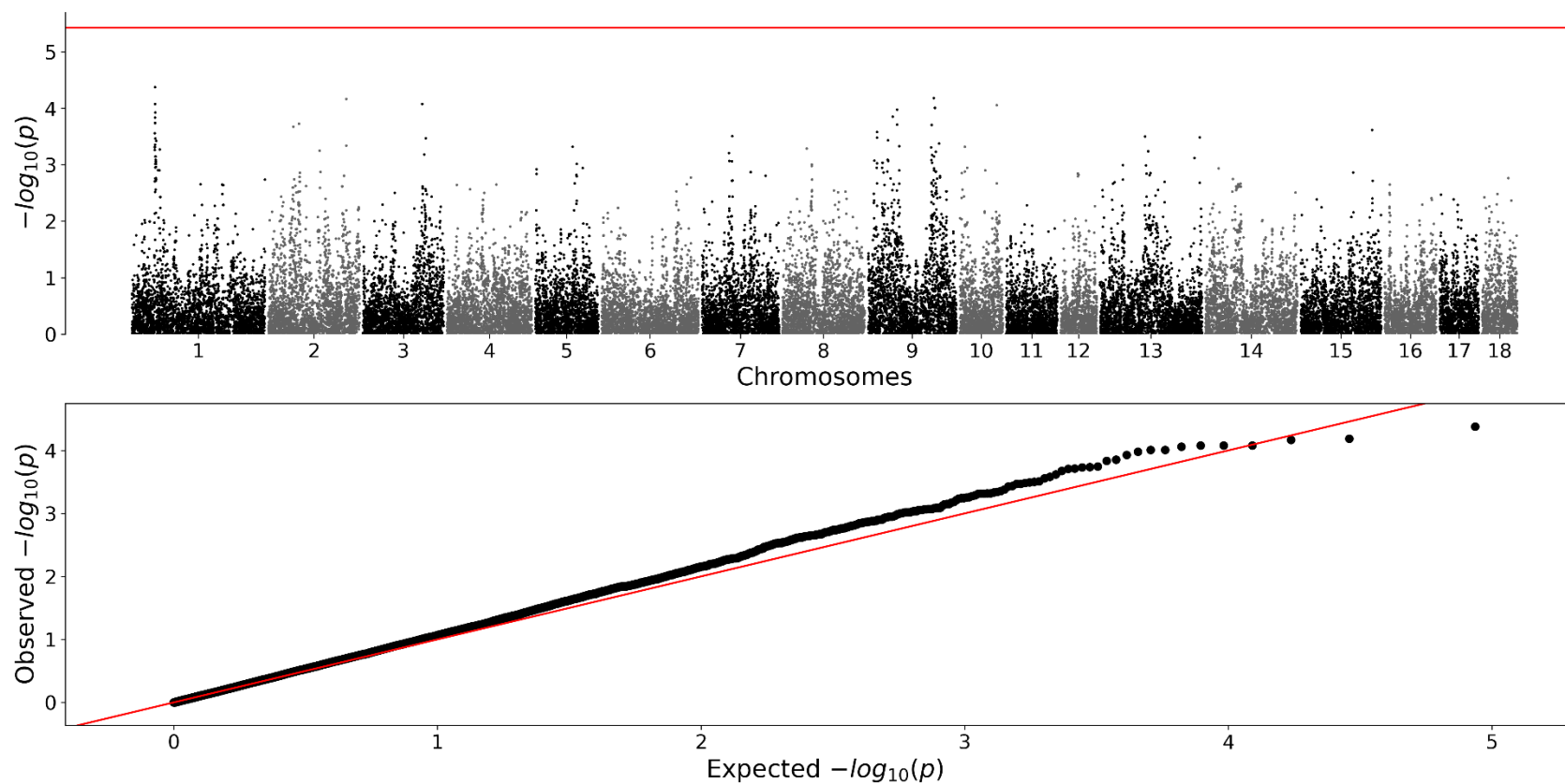
GWAS results



Metabolomics analysis



Pantothenic acid

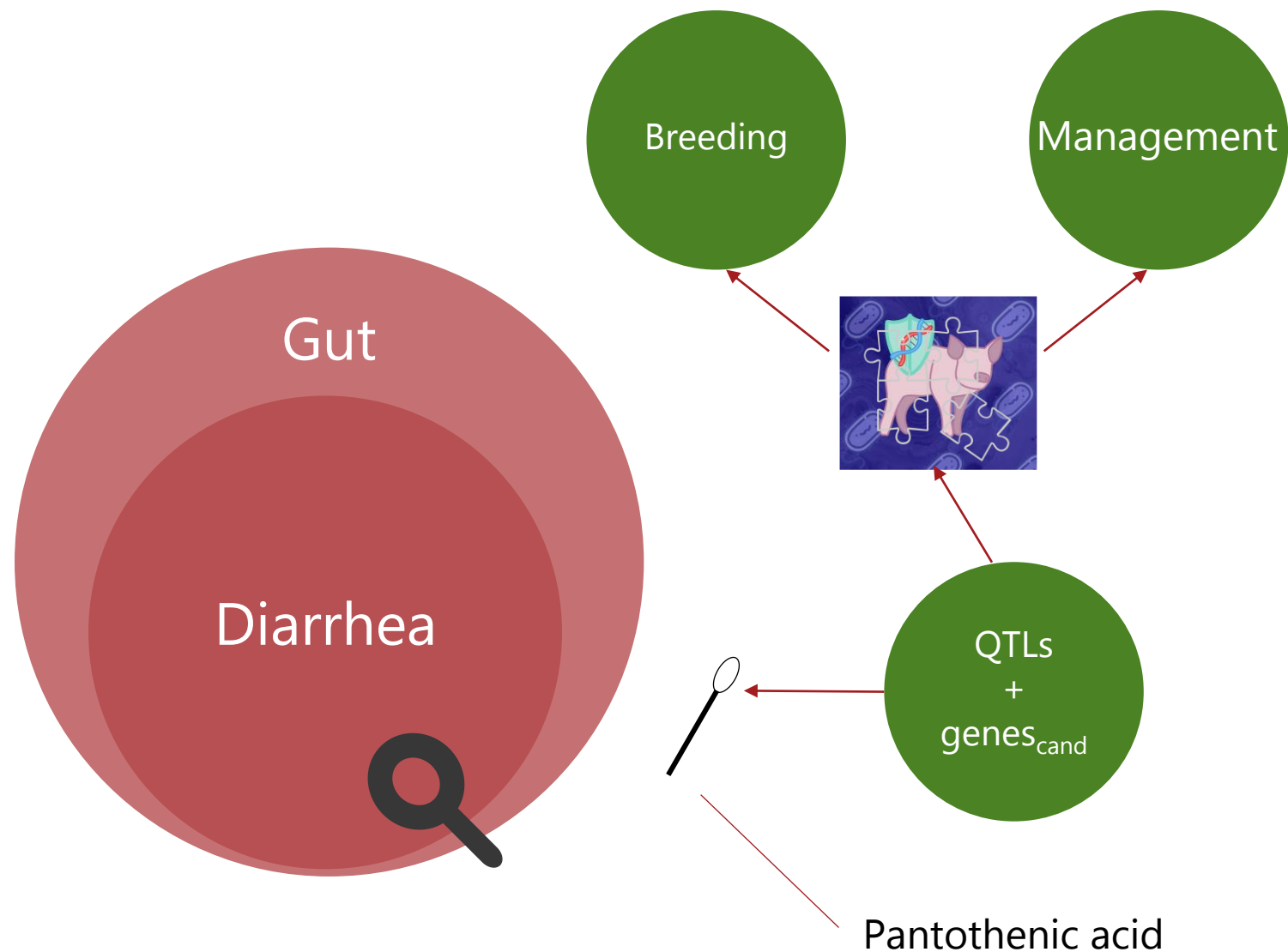


Conclusions

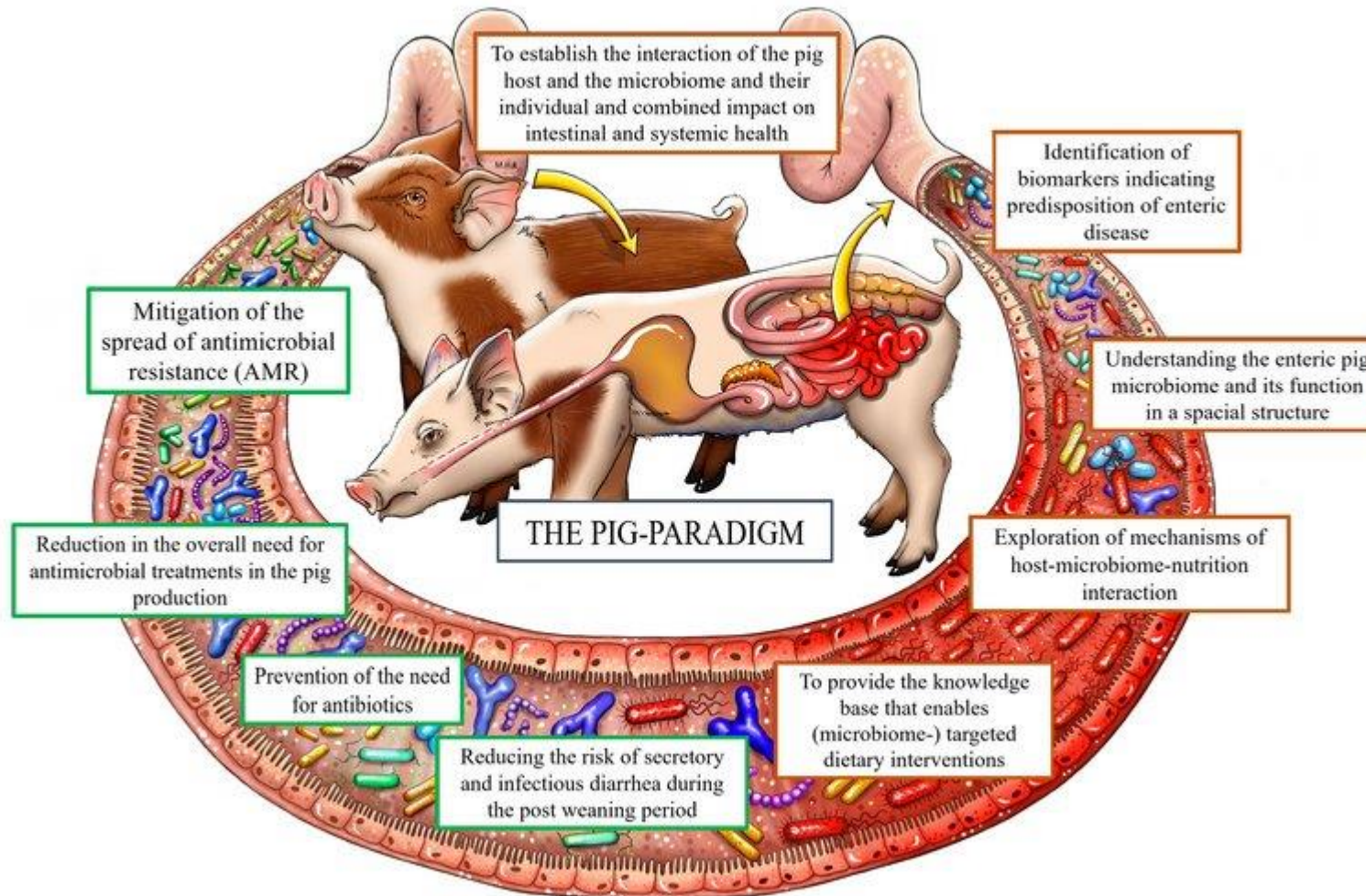
Daily monitoring of diarrhea can give a stringent definition of PWD

Identified novel QTL for diarrhea resistance

Panthenic acid is associated with diarrhea



To be continued ...



[Maria Høgh Kroier]

Acknowledgements. People

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- Rydal M.P., Gambino M., Jorgensen C.B., Poulsen L.L., Brondsted L. & Nielsen J.P. (2022) Pilot study on CHCF1 genotype in a pig challenge model for enterotoxigenic Escherichia coli F4ab/ac associated post-weaning diarrhea. *BMC Vet Res* **18**, 382.