Effect of *H. contortus* infection on parasitological and local cellular responses of Creole kids

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Introduction

- Small ruminants (goats and sheep) are constantly exposed to gastrointestinal nematode infections
  - ➢ Major cause of morbidity and mortality: profitability
- Anthelmintics resistance is a widespread problem

Need for alternative control strategies:
To reach a favorable equilibrium for animal production between nematode parasites and their host

Introduction

Control strategies:

1) Reducing the use anthelmintics

3) Enhancing host response

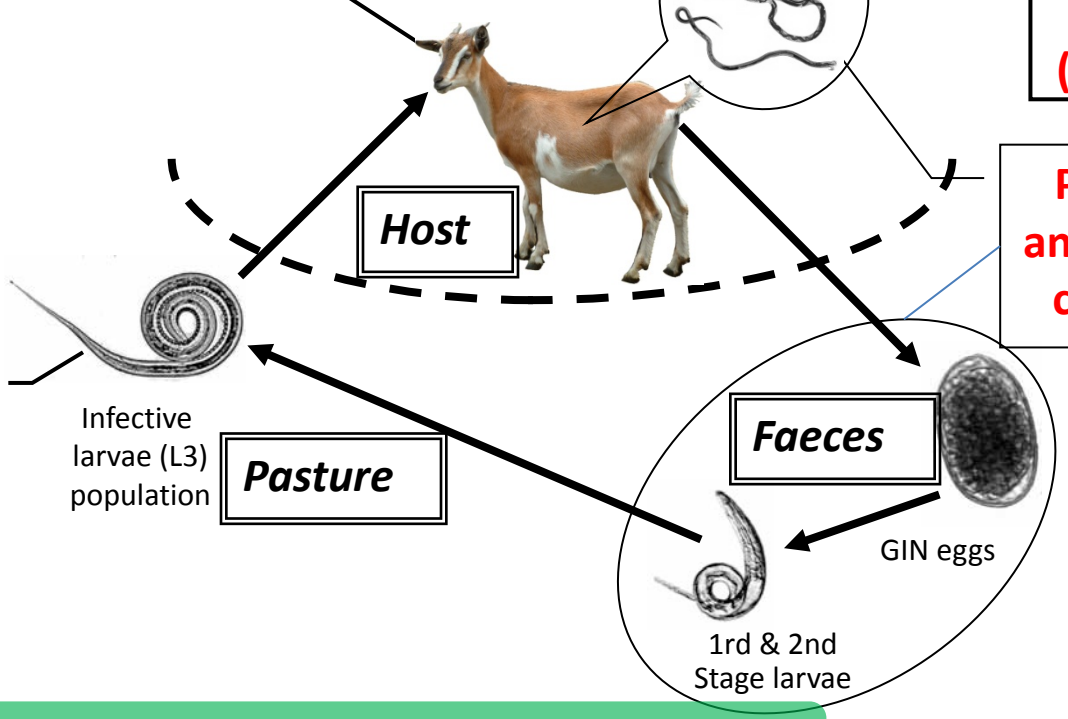
Genetic selection

Protein and energy supplementation

Targeted Selective Treatment (Famacha©…)

Plant tannins and other active compounds…

Pasture and grazing management



2) Decreasing host-Nematode contact probability

Genetic variability of resistance to GIN in goats and sheep

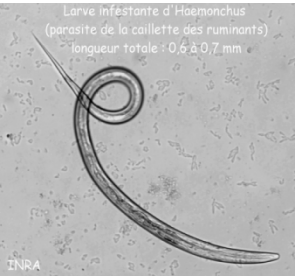
- Intra and inter-breed genetic variability :
  - Goats: $0.15 < h^2 < 0.2$
  - Sheep: $0.3 < h^2 < 0.4$

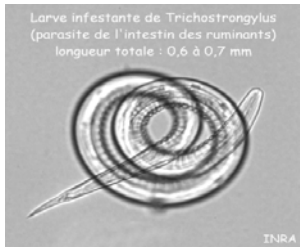
- Closely associated with the host immune response

- Mechanisms underlying genetic resistance?
  - Most of the studies in sheep
  - Limited knowledge of the goat response

The experimental model

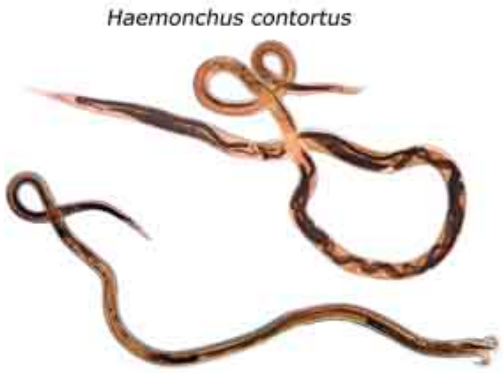
- Creole goats of Guadeloupe
  - Local crossbred meat breed maintained in a production flock
  - Grazed all year on pasture under natural mixed infection (*H. contortus, T. colubriformis*)
  - Genetic variability available for selection
  - Underlying mechanisms under investigation

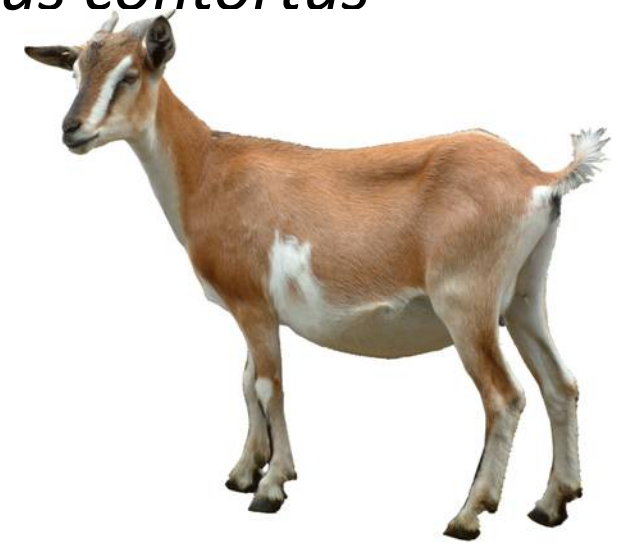




Objective of this study

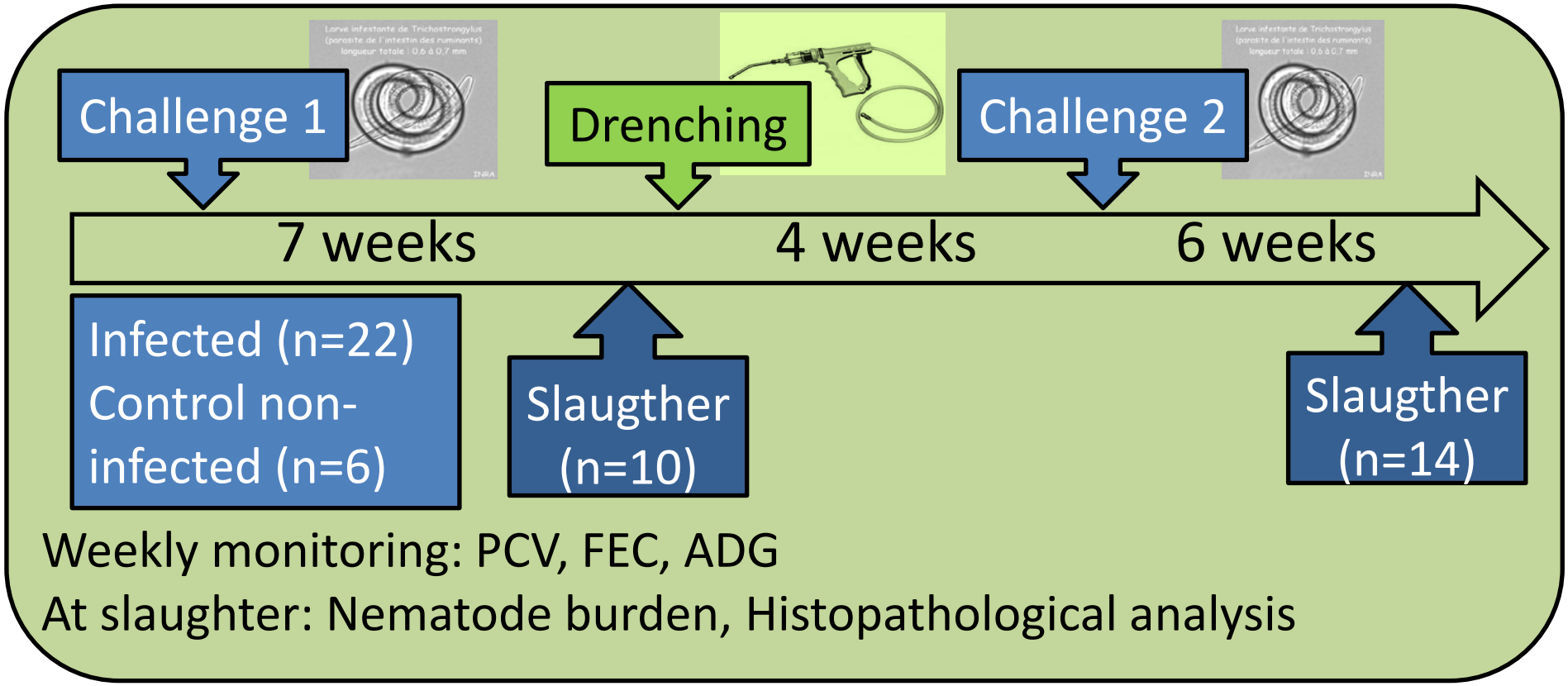
To evaluate the relationships of cellular changes in the abomasal mucosa and parasitological parameters by comparing resistant and susceptible kids after experimental infection with *Haemonchus contortus*



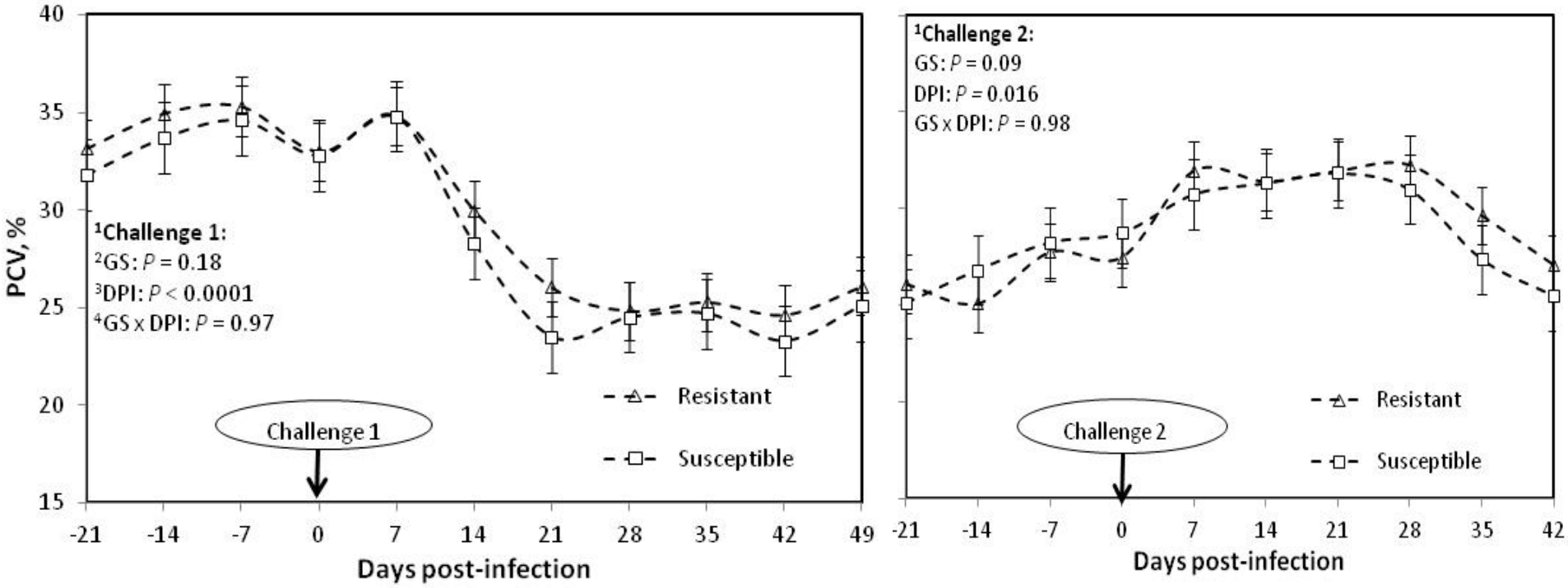


Animals and experimental design

- Growing female Creole kids at 8-month old (n=28)
  - Maintained nematode-free (naïves)
  - Average predicted breeding values on FEC distant of 1.04 genetic standard deviation
  - Experimental *H. contortus* infection (10,000 L3)

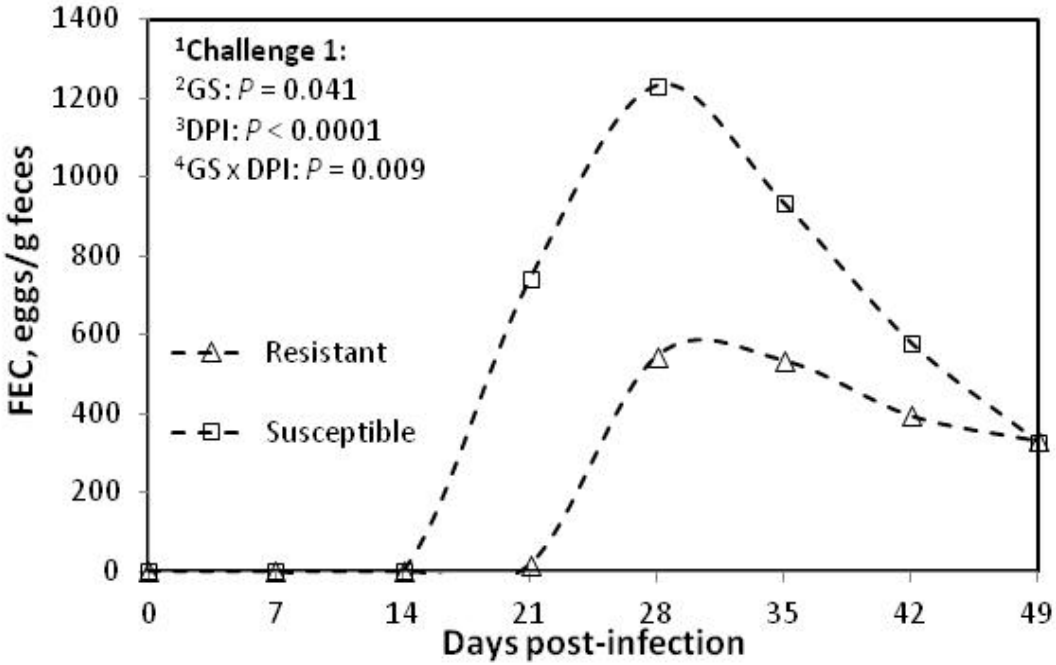


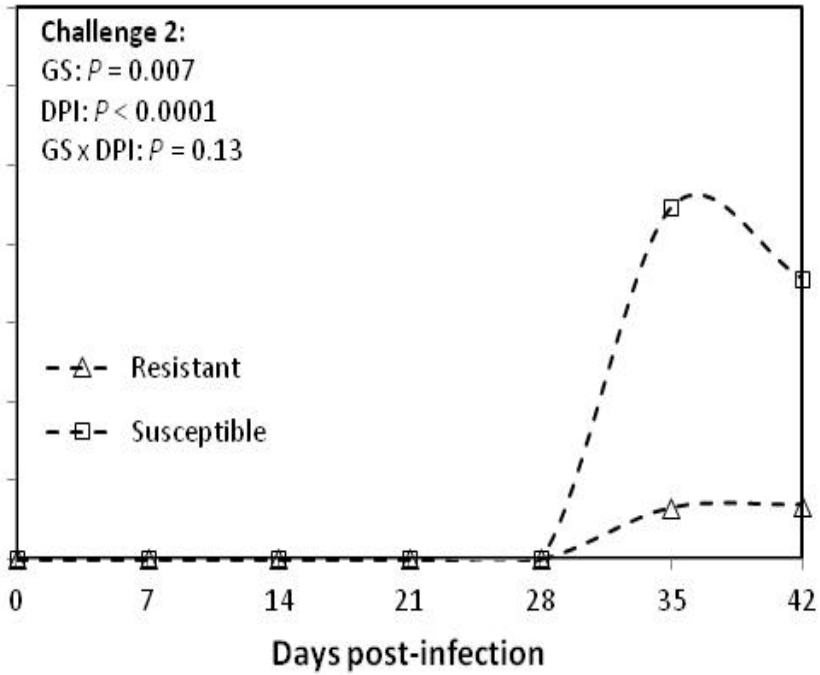
PCV



- Anaemia observed after challenge 1 but not challenge 2
- No difference between resistant and susceptible kids

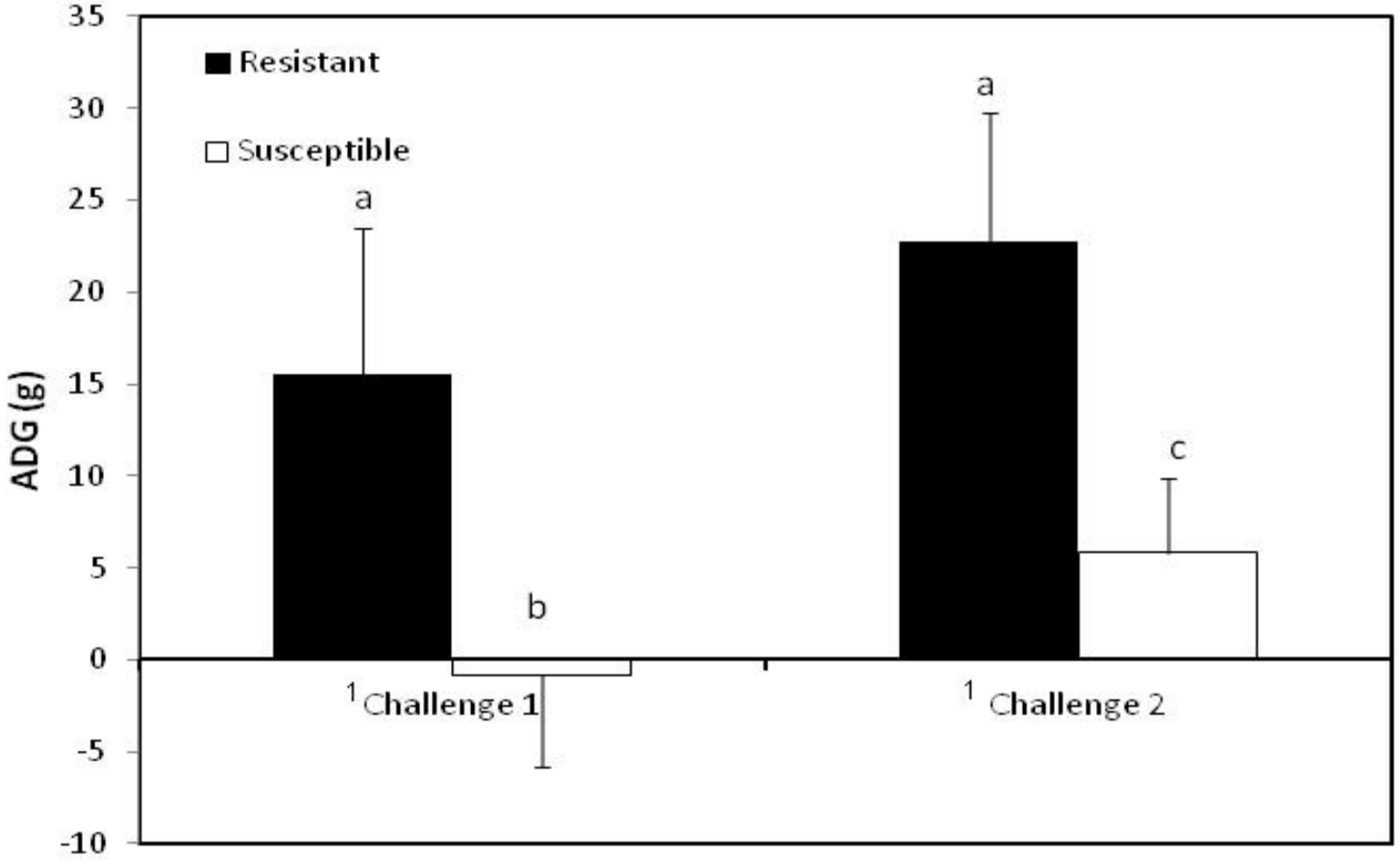
FEC





- FEC higher after challenge 1
- FEC higher in susceptible kids after both challenges

ADG



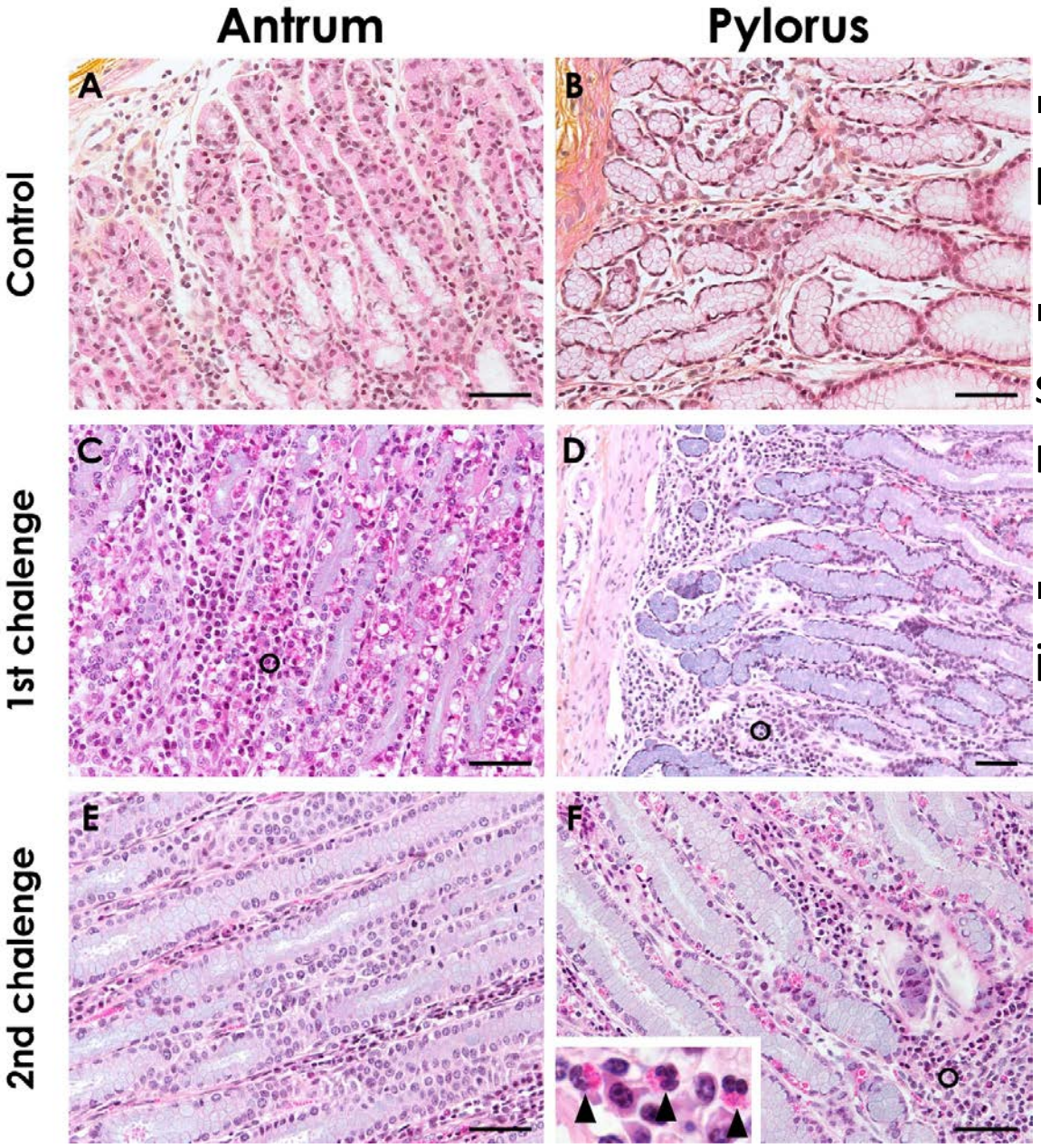
- ADG lower in susceptible kids after both challenges

Nematode burden

	Challenge 1			Challenge 2			[5]*P* value
	[1]R	[2]S	[3]*P* value	[1]R	[2]S	[4]*P* value	
[6]Male	234±66	120±147	0.49	203±66	195±65	0.93	0.81
[7]Female	241±59	118±72	0.19	234±59	178±59	0.51	0.45
[8]Immature male	5±7	31±8	0.65	15±8	36±9	0.21	0.02
[9]Immature female	19±18	24±22	0.56	46±18	71±18	0.53	0.05
[10]Female length	18.8±0.5	21.0±1.0	0.07	18.0±5	18.2±0.6	0.8	0.02

- No effect of the genetic status:
  - low number of animal/group?
- After challenge 2: higher number of immature nematode
  reduction of female length
  - Protective immune response?

Histopathological analysis



- Cellular infiltration more pronounced after challenge 1
- No effect of the genetic status for eosinophils and mononuclear cells
- Globule leucocytes infiltration higher in resistant

➢ **Cellular functionality?**

Conclusion

- Analysis of the global response resulting from the interaction nematode-host: FEC and ADG
  - ➢ Significant differences are evidenced

BUT

- Analysis of « finer » responses : Histopathological changes at targeted time point
  - ➢ differences are less marked

- Characterisation/understanding of the complex cross-talk between two organisms:
  - ➢ **<u>Dynamic</u>** of finer responses more pertinent than targeted time point ?
  - ➢ Need for development of alternatives experimental strategies

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SEVENTH FRAMEWORK PROGRAMME

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