SPECIFICITY OF ANTIBODY RESPONSES OF GOATS TO INFECTIONS WITH THREE SPECIES OF GASTROINTESTINAL NEMATODE

S.W. WALKDEN-BROWN and A.J. MASLEN

School of Rural Science and Agriculture, University of New England, Armidale, NSW 2351

The use of antibody responses to gastrointestinal nematode infection as a marker for host resistance offers potential advantages over faecal worm egg counts (FEC) but still requires a) confirmation of its efficacy in identifying resistant animals, and b) determination of the specificity of the antibody responses to different worm species, and thus the necessity for species-specific tests. This study addressed the latter issue for the IgG response of goats to infection with three key worm species.

Thirty feral goat kids were born to worm-free does and maintained worm-free by rearing indoors on slats from birth. At 72±2 days of age, kids were allocated to 4 infection treatments with stratification for body weight, sex and birth type. Treatments were uninfected (Control) or infected with *Trichostrongylus colubriformis* (*Tc*, 3000 L_3/week), *Haemonchus contortus* (*Hc*, 600 L_3/week) or *Ostertagia circumcincta* (*Oc*, 3000 L_3/week) in a single dose weekly for 12 weeks. All larvae were of the CSIRO McMaster strain. Faecal egg count (FEC) was determined fortnightly and a blood sample was collected weekly. Plasma was harvested after centrifugation and stored at –20 C for later determination of IgG concentrations by ELISA. All samples were assayed in our own ELISAs using antigen preparations from L_3 of *Tc*, *Hc* and *Oc* respectively (Gill, 1991) and conjugated monoclonal anti-goat IgG. The same standards, from goats with mixed infections, were used in each assay to construct the standard curve. A small number of samples was also submitted to a commercial laboratory for IgG determination using the ovine Host Resistance Test (HRT) ELISA for both *Hc* and *Tc* (Celentis, Upper Hutt, NZ). Untransformed data are presented as cube root transformation to ensure normality did not alter the outcome of the analysis. Results are summarised in Tables 1 and 2.

Table 1. Mean (±SEM) FEC and IgG concentrations. IgG concentrations were measured by ELISA with antigens from each nematode species. Cross reactivity between antigens is shown in parenthesis.

Infection treatment	n[1]	FEC (eggs/ g faeces)	IgG concentration (arb. units). [% cross reaction with homologous antigen]		
			Tc antigen	*Hc* antigen	*Oc* antigen
Control	6	0	287±29[a]	331±36[a]	298±28[a]
T. colubriformis	8	2828±677	2705±32[b] [100%]	2224±270[b] [83%]	1620±319[b] [60%]
H. contortus	8	375±107	234±20[a] [90%]	260±25[a] [100%]	224±16[a] [86%]
O. circumcincta	8	528±89	411±118[a] [125%]	398±92[a] [121%]	329±52[a] [100%]

[1]Number of animals. Number of samples per animal was 5 for FEC (wks 3-11) and 14 for IgG (Wks 1-14).
[a,b]Means within columns not sharing a common letter in the superscript differ significantly from the controls ($P<0.05$)

Table 2. Mean (±SEM) IgG concentrations in selected samples determined using the commercial HRT kit ELISA with antigen from *H. contortus* and *T. colubriformis.*

Infection treatment	Sample number	IgG concentration (% pos. std). [% cross reaction with homologous antigen]	
		Tc antigen	*Hc* antigen
T. colubriformis	16	30.5±8.1 [100%]	40.1±8.5 [131%]
H. contortus	7	17.5±7.3 [82%]	21.3±7.5 [100%]
O. circumcincta	7	18.7±8.3	21.7±9.2

Patent infections were induced in all infected kids and the specificity of the infections was confirmed by larval differentiation after each FEC. FEC and IgG levels were much higher in *Tc* infected kids than other infection groups. IgG levels in *Hc* and *Oc* groups did not differ from uninfected controls. Control kids may have retained some residual maternal antibody and the *Hc* and *Oc* infections clearly did not achieve the threshold necessary to trigger a humoral response. Consistent with other studies there was a high level of cross-reactivity between ELISAs (Molina *et al.*, 1999) including the HRT. In some cases heterologous rather than homologous antigen produced the highest response. These data suggest that the three trichostrongylid species used in this study share many common antigens and that species-specific ELISAs for IgG are unnecessary if crude antigen preparations are used.

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MOLINA, J.M., RUIZ, A., RODRIGUEZ-PONCE, E., GUTIERREZ, A.C., GONZALEZ, J. and HERNANDEZ, S. (1999) *Vet. Res.* **30**, 393-9.

Email: swalkden@metz.une.edu.au