

Detection of *Trichinella spiralis nativa* Antibodies in Porcine Sera by ELISA using *T. spiralis spiralis* Excretory-Secretory Antigen

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ABSTRACT

Enzyme-linked immunosorbent assay examination of sera from pigs vaccinated with *T. spiralis nativa* infective larvae and/or challenged with *T. spiralis spiralis* larvae using a *T. spiralis spiralis* excretory-secretory antigen showed a significant cross-reaction between the two species of *Trichinella*. Eight of 12 pigs vaccinated with a high dose of *T. spiralis nativa* reacted positively 28 days postvaccination while the remaining four pigs had high but negative ELISA optical density readings. Five of six pigs challenged with the homologous species reacted positively 28 days postchallenge but the sixth pig remained negative despite having a muscle infection of 5.6 larvae/g of musculature.

Key words: *Trichinella spiralis spiralis*, *Trichinella spiralis nativa*, ELISA, cross-reaction.

RÉSUMÉ

L'épreuve du sérum de deux groupes de porcs vaccinés avec des larves infectantes de *Trichinella spiralis nativa*, dont l'un subit ultérieurement une infection de défi avec des larves infectantes de *Trichinella spiralis spiralis*, au moyen de la technique ELISA qui fait appel à un antigène composé d'excréments et de sécrétions de *T. spiralis spiralis*, révéla une réaction croisée significative entre les deux espèces de trichines précitées. Huit des 12 porcs vaccinés avec une forte dose de *T. spiralis nativa* réagirent de façon positive, 28 jours

après leur vaccination, tandis que les quatre autres donnèrent une réaction négative. Cinq des six porcs non vaccinés et soumis à l'infection de défi avec *T. spiralis spiralis* réagirent de façon positive, au bout de 28 jours, mais le sixième réagit de façon négative, en dépit du fait que sa musculature contenait 5,6 larves/g.

Mots clés: *Trichinella spiralis spiralis*, *Trichinella spiralis nativa*, ELISA, réaction croisée.

It has been shown that pigs vaccinated with high doses of *Trichinella spiralis nativa* larvae are protected from *Trichinella spiralis spiralis* challenge 28 days postvaccination (1). In that trial the three groups of six pigs each were either vaccinated nonchallenged, vaccinated challenged or nonvaccinated challenged as outlined in Table I. Groups 1 and 3 were bled prior to vaccination or challenge and then 28 days later. Group 2 pigs were bled prior to vaccination, 28 days postvaccination and 28 days postchallenge. Pigs were killed 28 days after vaccination or challenge and the infections (larvae per gram of musculature) determined. As it had been shown that the ELISA using a *T. spiralis spiralis* excretory-secretory (ES) antigen is a sensitive and specific test for the detection of *T. spiralis spiralis* antibodies, if present, (2,3) the test was applied to the sera collected from the pigs in the vaccination trial outlined above.

The results are included in Table I. The preinfection sera for all three groups of pigs were negative for *Trichinella* antibodies. Twenty-eight

days postvaccination with 23,000 *T. spiralis nativa* infective larvae, five of six group 1 pigs and three of six group 2 pigs were positive by ELISA using the heterologous *T. spiralis spiralis* ES antigen and a criterion of $\geq 5X$ optical density (OD) of the mean of three normal swine sera as a positive reading. The remaining four animals in the two groups gave high negative OD readings. Following challenge with *T. spiralis spiralis* larvae, all pigs in group 2 gave positive ELISA readings. Twenty-eight days postchallenge with the homologous species, *T. spiralis spiralis*, five of six nonvaccinated group 3 pigs gave positive ELISA reactions. The sixth pig had not seroconverted by day 28 postinfection, although it had a muscle infection of 5.6 larvae/g of musculature. This finding is consistent with previous findings that the development and/or rate of development of *Trichinella* antibodies in swine is dependent upon the magnitude of the infection established, the age of the infection when the animal is tested and the immunoresponse of individual animals (3). In that study one animal, which subsequently was shown to have an infection of 28 larvae/g of musculature, seroconverted between 30 and 37 days postinfection (3).

The results of this study indicate that a significant cross-reaction exists between *T. spiralis spiralis* and *T. spiralis nativa*. The ELISA using a *T. spiralis spiralis* ES antigen will readily detect *T. spiralis nativa* antibodies. Since high vaccination doses of *T. spiralis nativa* larvae were used, it is not known what is the minimal dose of

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TABLE I. ELISA Reactions using a *Trichinella spiralis spiralis* ES Antigen in Swine Vaccinated with *T. spiralis nativa* and/or Challenged with *T. spiralis spiralis*

Group	Pig	Vaccination Dose <i>T.</i> <i>spiralis</i> <i>nativa</i>	Challenge Dose <i>T.</i> <i>spiralis</i> <i>spiralis</i>	Infection Estab. larvae/g ^a	ELISA Findings		
					0 Day Post- infection	28 Days Post- vaccination	28 Days Post- challenge
1	1	23000	-	0.436	-	+	N/A
	2	23000	-	0.002	-	+	N/A
	3	23000	-	0.006	-	+	N/A
	4	23000	-	0	-	+	N/A
	5	23000	-	0.062	-	- ^b	N/A
	6	23000	-	1.040	-	+	N/A
2	1	23000	5500	0.01	-	- ^b	+
	2	23000	5500	0.0075	-	+	+
	3	23000	5500	0	-	+	+
	4	23000	5500	0.12	-	+	+
	5	23000	5500	0.02	-	- ^b	+
	6	23000	5500	0.0025	-	- ^b	+
3	1	-	5500	95.3	-	N/A	+
	2	-	5500	22.5	-	N/A	+
	3	-	5500	5.4	-	N/A	+
	4	-	5500	21.2	-	N/A	+
	5	-	5500	43.0	-	N/A	+
	6	-	5500	5.6	-	N/A	-

^aGroup 1 — 28 days postvaccination; Group 2 — 56 days postvaccination and 28 days postchallenge; Group 3 — 28 days postchallenge

^bHigh but negative OD readings

T. spiralis nativa larvae required to stimulate antibody development in pigs. It should be noted that all vaccinated pigs gave ELISA reactions (positive or high negative OD readings) despite negligible or negative muscle infections. While it seems highly unlikely or most unusual for pigs to have access to *T. spiralis nativa* infected musculature, such exposure undoubtedly could give rise to false positive ELISA reactions.

REFERENCES

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