FINE STRUCTURE OF *Neospora caninum* IN A WHITE RHINOCEROS CALF

J.H. Williams, E.van Wilpe*

Department of Pathology and EM Unit*, Faculty of Veterinary Science, University of Pretoria, South Africa

INTRODUCTION

Neosporosis is an important multisystemic disease that affects a wide variety of animals but has only recently been reported in the white rhinoceros (*Ceratotherium simum*)[1]. The disease is caused by the apicomplexan protozoal parasite, *Neospora caninum*. This paper illustrates the fine structure of the parasite in a 16 day old white rhinoceros calf that died suddenly while in excellent condition and showing no obvious previous clinical signs[2]. The calf was born to a healthy mature adult female free-ranging with 11 other rhino as well as various other game species on a 2000 hectare Game Breeding Centre adjacent to the town of Lichtenburg and outlying cattle farmlands in the Northern Province of South Africa. Post mortem gross examination revealed a hypertrophic heart and signs indicative of heart failure, namely generalised cyanosis with pulmonary and hepatic congestion and oedema.

MATERIALS AND METHODS

The positive identification of the organisms in 10% formalin-fixed myocardial tissue as *Neospora* species was made light microscopically by using the immunhistochemical avidin-biotin technique[3,4], employing [illegible] murine monoclonal [illegible]. Tissue for [illegible] was further post-fixed in [illegible] ultrathin sections were [illegible] electron microscopic [illegible] in a Philips CM10 [illegible] microscope.

CONCLUSION

[illegible] histochemical and ultrastructural [illegible] bradyzoite-containing cyst and the [illegible] are largely consistent with those [illegible] for *Neospora caninum*, but also showed [illegible] overlap with the characteristics of *Toxoplasma* [illegible], in particular the smooth nature and dimension of the cyst wall and the fact that the rhoptries were not completely electron dense although the internal structure was indistinct.

RESULTS

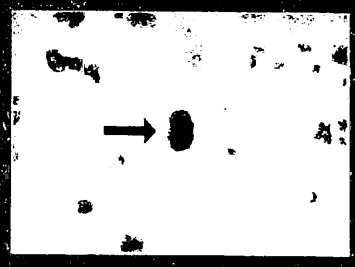

Fig 1. Light microscopical appearance of immunohistochemically-stained bradyzoite-containing cyst in myocardium

Fig 3. An enlarged region of the intracellular cyst illustrating the 0.35µm wide cyst wall (C) consisting of an electron-dense parasitophorous vacuolar membrane and a thick underlying granular layer. Cross-sections of zoites (Z) revealing a nucleus (N), dense granules (G), rhoptries (R) and amylopectin granules (A) are also visible. Note the perpendicular arrangement of the micronemes (M) to the zoite pellicle (P).

Fig 2. Low magnification electron micrograph of intramyocardial encysted bradyzoites. Cyst wall (C), bradyzoites (B), myofibril (M)

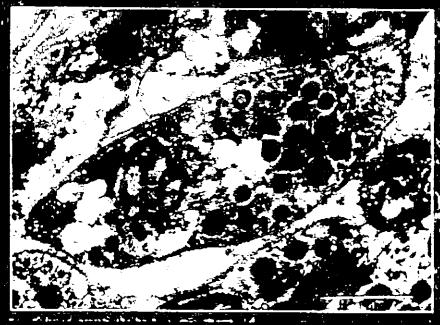

Fig 5: Higher magnification demonstrating a longitudinally sectioned zoite measuring 4.8 x 2µm and containing a subterminal nucleus (N), lipid bodies (L), dense granules (G), rhoptries (R) and micronemes (M).

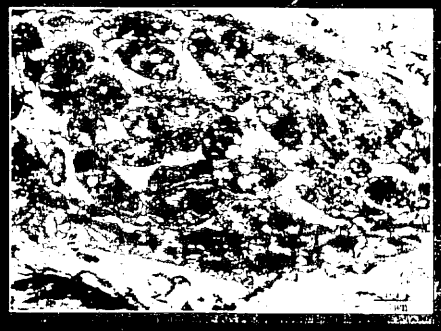

Fig 4: Low magnification micrograph of tachyzoites (T) lying free within the host cell cytoplasm. Note a dividing zoite (T)

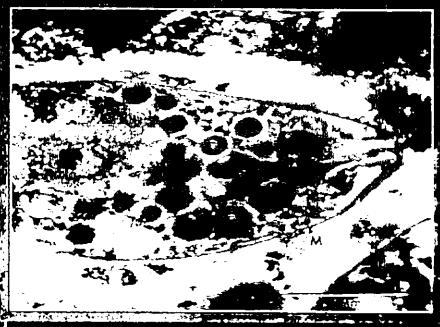

Fig 6: An enlargement of a tachyzoite showing the conoid (C) and a vesicular-membranous organelle (V), rhoptries (R), dense granules (G) and micronemes (M)

REFERENCES

1. Dubey, J.P. (1999) Veterinary Parasitology, 84:349.

2. Williams, J.H., Espie, I., Van Wilpe, E. and Matthee, A. (2002) J.S.Afr. Vet. Ass 73:38.

3. Lindsay, D.S., and Dubey, J.P. (1989) Am J of Vet Res 50, 1981.

4. Speer, C.A., Dubey, J.P., McAllister, M.M. and [illegible] J.A. (1999) Int J for Parasit 29, 1509.

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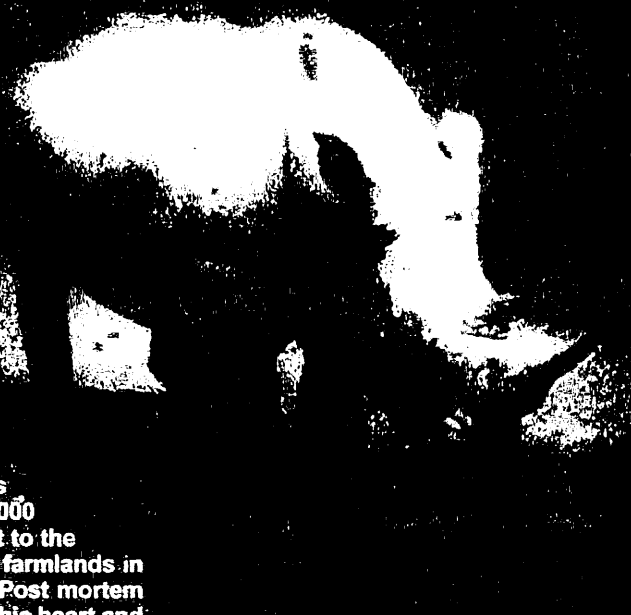

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RESULTS

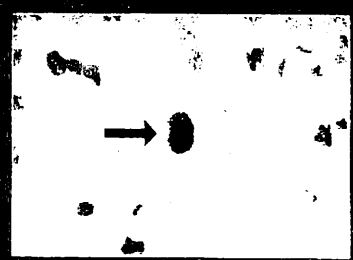


Fig 1: High dry magnification of immunohistochemically-stained tachyzoites (arrow) in the myocardium

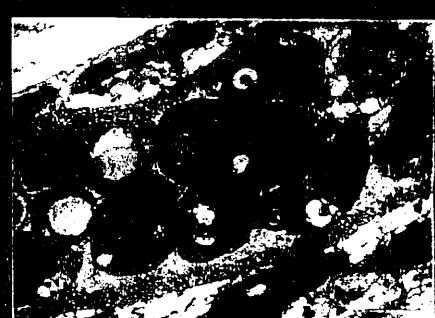
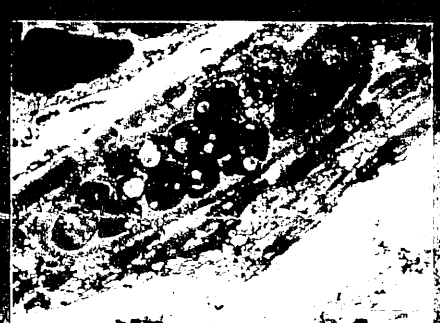


Fig 3: An enlarged region of the intracellular cyst illustrating the 0.35µm wide cyst wall (C) consisting of an evenly-thick parasitophorous vacuolar membrane and a thick underlying granular layer. Cross-sections of bradyzoites (B) revealing a nucleus (N), dense granules (G), rhoptries (R) and amylopectin granules (A) are also visible. Note the perpendicular arrangement of the micronemes (M) to the zoite periclein (P)



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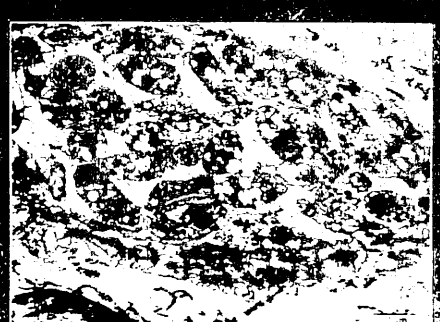

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Fig 6: An enlargement of a tachyzoite showing the conoid (C) and a vesiculo-membranous organelle (V), rhoptries (R), dense granules (G) and micronemes (M)