



RESEARCH COMMUNICATION

Morphological evidence for infection of impala, *Aepyceros melampus*, platelets by a rickettsia-like organism

L. DU PLESSIS¹, F. REYERS² and K. STEVENS¹

ABSTRACT

DU PLESSIS, L., REYERS, F. & STEVENS, K. 1997. Morphological evidence for the infection of impala, *Aepyceros melampus*, platelets by a rickettsia-like organism. *Onderstepoort Journal of Veterinary Research*, 64:317–318

Ultrastructural studies revealed the presence of a parasite, believed to be *Ehrlichia platys*, in the blood platelets of impala. At the time of blood sampling all the animals appeared healthy. This is the first report on the presence of this rickettsia in these animals, previously described in canine platelets.

Keywords: Electron microscopy, *Ehrlichia platys*, impala, parasite, platelets, rickettsia

Ehrlichia platys is a rickettsial parasite known to infect canine platelets, causing thrombocytopenia (Harvey, Simpson & Gaskin 1978; Baker, Simpson, Gaunt & Corstvet 1987; Bradfield, Vore & Pryor 1996). It is platelet specific and does not appear in other blood cells, organs or tissues in the body, although the antigen has been found in the liver, spleen and bone marrow during severe infection (Simpson & Gaunt 1991). The diagnosis of infected platelets in blood smears by light microscopy is often complicated because the granularity of the platelets makes it difficult to observe *E. platys* inclusions.

Recently, while conducting an investigation into the morphology of impala, *Aepyceros melampus*, platelets from the southern part of the Kruger National Park, South Africa, the presence of a rickettsia-like parasite was noted in some of the platelets under investigation. All the animals were examined and declared healthy by a veterinarian at the time the blood samples were taken. The blood samples were im-

mediately fixed in glutaraldehyde and processed for electron microscopy (Du Plessis, Botha & Stevens 1997).

Seven of the 12 animals used in this study displayed morulae with elementary bodies similar to those of *E. platys* (Jain 1993) in many of their platelets when viewed by transmission electron microscope (Fig. 1). Some platelets contained a single subunit micro-organism, while other platelets displayed a morula with more (two to six) subunits, or elementary bodies. Occasionally more than one morula was seen inside a platelet. Each subunit was surrounded by a single membrane, while the whole morula was surrounded by a double membrane. The subunits, varying in size but mostly round to oval shaped, had a fibrillar appearance, often with a small electron-dense granule.

This is the first report of the presence of this parasite, believed to be *E. platys*, in impala platelets. It is not entirely surprising that the parasite was noted only at the ultrastructural level, as impala platelets are extremely small (Du Plessis *et al.* 1997), which would make the detection of the parasite on a normal blood smear, viewed by light microscopy, almost impossible. Although the natural mode of transmission of the parasite is unknown, it is believed to be transmitted by a tick (Kontos, Papadopoulos &

¹ Haematology Department, Institute for Pathology, P.O. Box 2034, University of Pretoria, Pretoria, 0002 South Africa

² Department of Medicine, Faculty of Veterinary Science, Private Bag X4, Onderstepoort, 0110 South Africa

Accepted for publication 30 October 1997—Editor

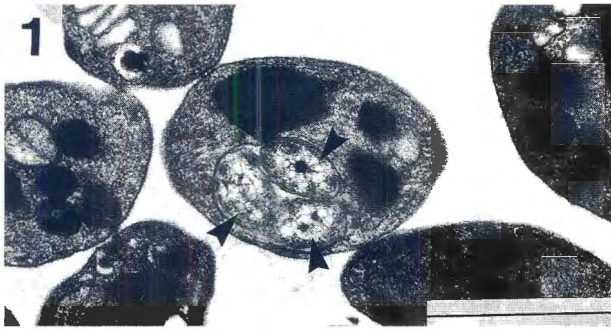


FIG. 1. Section through an impala platelet displaying a morula similar in appearance to that of *E. platys*. Three subunits (arrowheads) are visible within the morula. Bar = 1 μ m

French 1991; Bradfield *et al.* 1996), but this thought has been questioned by Simpson, Gaunt, Hair, Kocan, Henk & Casey (1991). The impala showed no sign of thrombocytopenia, the typical result caused by *E. platys* infection in dogs (Harvey *et al.* 1978; Baker *et al.* 1987; Bradfield *et al.* 1996). However, according to Bradfield *et al.* (1996) thrombocytopenia and parasitemia do not necessarily correlate, as thrombocytopenia occurs only after recent infections. Another possible explanation for the apparently healthy condition of the impala is that these animals are natural hosts of the parasite.

Follow-up studies need to be done to determine whether the latter statement is valid or whether any epidemiological or geographical distribution factors are of importance. Furthermore, serological studies need to be done to verify the identity of the parasite. For this purpose, fresh samples will need to be obtained and studied in the Kruger National Park as all

the present material was fixed in glutaraldehyde before leaving the park, as is required by the National Parks Board.

ACKNOWLEDGEMENTS

The authors wish to thank Dr C. Raath of the Kruger National Park for his help in obtaining the blood samples.

REFERENCES

- BAKER, D.C., SIMPSON, M., GAUNT, S.D. & CORSTVET, R.E. 1987. Acute *Ehrlichia platys* infection in the dog. *Veterinary Pathology*, 24:449–453.
- BRADFIELD, J.F., VORE, S.J. & PRYOR, W.H. 1996. *Ehrlichia platys* infection in dogs. *Laboratory Animal Science*, 46:565–568.
- DU PLESSIS, L., BOTHA, A.J. & STEVENS, K. 1997. Impala, *Aepyceros melampus*, platelets: count, morphology and morphometric observations. *Tissue and Cell*, 29:217–220.
- HARVEY, J.W., SIMPSON, C.F. & GASKIN, J.M. 1978. Cyclic thrombocytopenia induced by a *Rickettsia*-like agent in dogs. *Journal of Infectious Diseases*, 137:182–188.
- JAIN, N.C. 1993. *Essentials of Veterinary Hematology*. Philadelphia: Lea & Febiger.
- KONTOS, V.I., PAPADOPOULOS, O. & FRENCH, T.W. 1991. Natural and experimental canine infections with a Greek strain of *Ehrlichia platys*. *Veterinary Clinical Pathology*, 20:101–105.
- SIMPSON, R.M. & GAUNT, S.D. 1991. Immunocytochemical detection of *Ehrlichia platys* antigens in canine blood platelets. *Journal of Veterinary Diagnostic Investigation*, 3:228–231.
- SIMPSON, R.M., GAUNT, S.D., HAIR, J.A., KOCAN, K.M., HENK, W.G. & CASEY, H.W. 1991. Evaluation of *Rhipicephalus sanguineus* as a potential biological vector of *Ehrlichia platys*. *American Journal of Veterinary Research*, 52:1537–1541.