

Studies on the Morphological Characteristics of the *Hemobartonella*-like Organisms in a Equine Erythrocytes by Scanning Electron Microscope

Chi-Chung Chou^{1,2}, Kwong-Chung Tung^{1,2}, Wei-Ming Lee^{1,2}, Yang-Tsung Chung¹, and Chau-Loong Tsang^{1,2*}

¹Department of Veterinary Medicine, College of Veterinary Medicine, National Chung Hsing University, Taichung, Taiwan

²Veterinary Teaching Hospital, College of Veterinary Medicine, National Chung Hsing University, Taichung, Taiwan

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ABSTRACT

The morphological characteristics of the hemobartonella-like organisms were observed as following by the scanning electron microscope from a spontaneously infected case in the equine erythrocytes: coccoid, oval or rod-shape organisms, 0.1-0.5 μm in diameter, one to several parasites were located in the central or peripheral areas of the host erythrocytes, some pathogens were undergoing multiplication. © JADM 2009. All rights reserved.

Keywords: *Equine hemobartonella-like organisms; Scanning electron microscope; Erythrocytes.*

INTRODUCTION

Hemobartonellosis is a blood-borne disease of the domestic animals, which includes cattle (Brocklesby, 1970; Nicholas et al., 2005), caprines (Mukherjee, 1952; Tsang, 1989a), dogs (Chalker, 2005; Messick, 2003; Tsang et al., 1986) and cats (Sykes, 2003; Tsang, 1987; Messick, 2003). Subclinical infections in these animals are common, some severe infection cases are also found in the animals in the situation of complication and stress. The major clinical signs of this disease were fever, anorexia and mild anemia; the severe cases were lethal or fatal. The adult animals were highly resistant to this pathogen, but the young and splenectomized animals were highly sensitive to this disease.

The hemobartonella-like organisms were not previously reported in the horse, either had any references by the scanning electron microscope yet. In this research, the morphological characteristics (sizes, shapes, numbers, locations and multiplications) of these organisms were observed in these equine erythrocytes by scanning electron microscope.

MATERIALS AND METHODS

The patient was a ten year-old castrated warm-blooded breed horse. The blood sample was sent to our laboratory for routine health examination. The hematological and clinical biochemistry data were in the normal range, but some hemobartonella-like organisms were observed in the equine erythrocytes. Ten milliliter blood sample was obtained from the jugular vein, which was anti-coagulated with EDTA. Part of the blood sample was treated for this research. Instrument: ABT-32 (Japan Co.) scanning electron microscope was used in this research. The procedures and scanings of the blood sample were described as Tsang's reports (Tsang, 1989a; Tsang 1989 b).

RESULTS

Size: The sizes of the small hemobartonella-like organisms in the host erythrocytes were 0.1-0.5 μm in diameter (Fig. 5); the size of the largest pathogen in the equine erythrocytes was 0.7-1.5 μm in diameter (Fig. 1).

Shape: The shapes of the organisms were polymorphous, such as oval (Fig. 1), coccoid (Fig. 2) and rod-shaped (Fig. 1) which were commonly observed in the erythrocytes.

Number: Only one hemobartonella-like organism was often seen in most of the erythrocytes (Figs. 1-3), how-

* Corresponding author: Department of Veterinary Medicine, College of Veterinary Medicine, National Chung Hsing University, 250 Kuo Kuang Road, Taichung 40228, Taiwan
E-mail address: cltsang@mail.v.m.n.chu.edu.tw

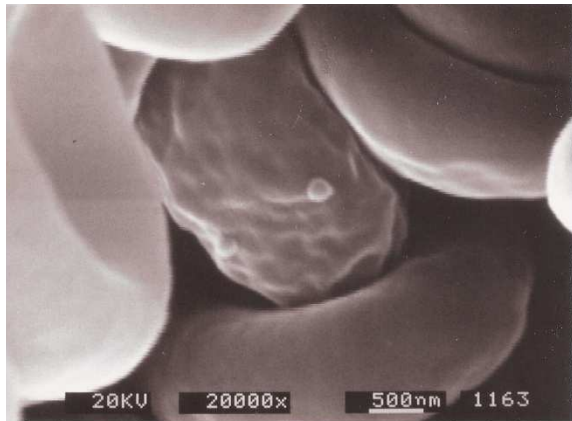


Fig. 1 The polymorphous shapes of the hemobartonella-like organisms were parasited in the equine erythrocytes.

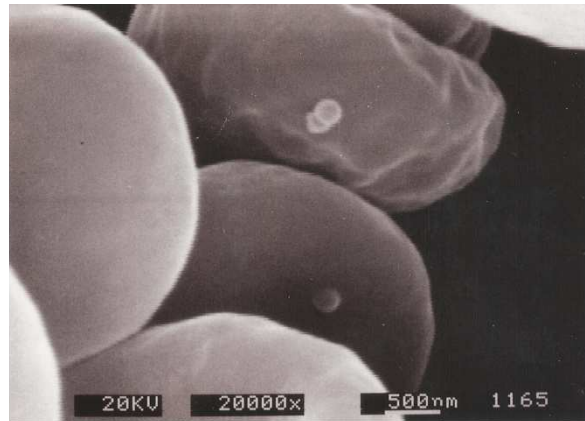


Fig. 2 The coccoid-shape hemobartonella-like organisms were observed in the peripheral erythrocyte.

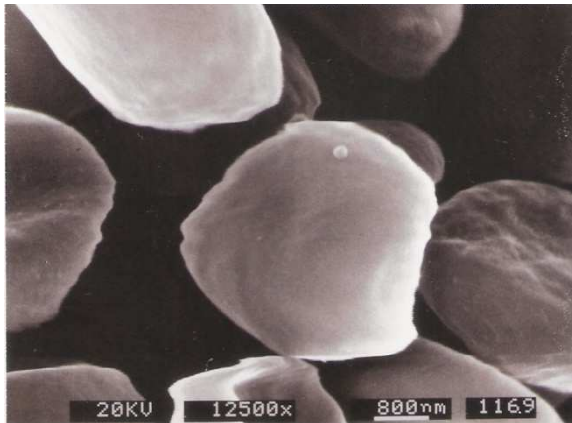


Fig. 3 The multiplication of the hemobartonella-like organisms were found in the equine erythrocyte (upper)

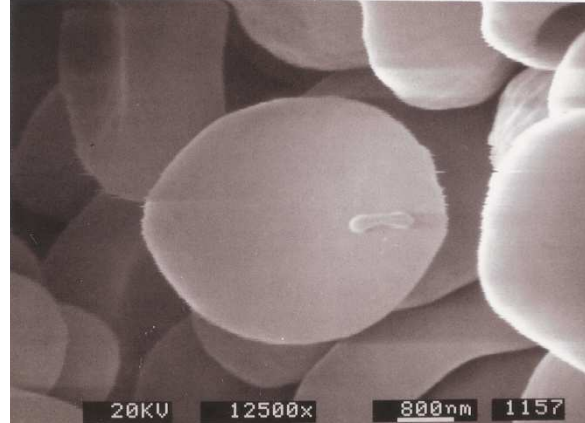


Fig. 4 The long rod-shape hemobartonella-like organisms were parasited in the equine erythrocyte.

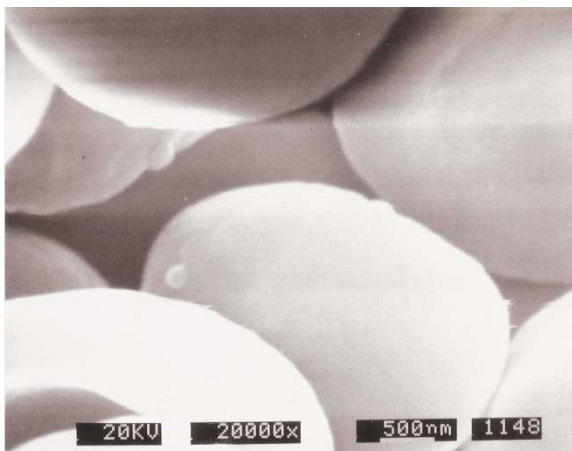


Fig. 5 Two coccoid-shape hemobartonella-like organisms were librated in the equine erythrocytes.

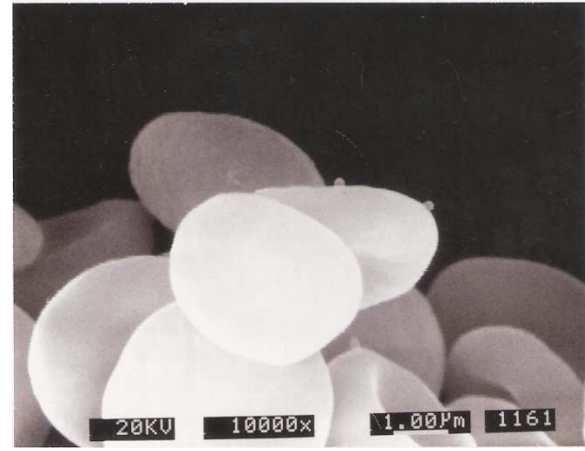


Fig. 6 Two coccoid-shape hemobartonella-like organisms were librated in the equine erythrocytes.

ever, two pathogens were also observed in some cases (Figs. 3, 6). Multiple parasites were shown in Fig. 1.

Location: The organisms were located at the central (Figs. 1-2) or peripheral area (Figs. 2-3) of the parasited erythrocytes.

Multiplication: The multiplication of the equine hemobartonella-like organisms was shown in Figs 1, 3 and 4 which under- went binary fission. The sizes and the shapes of the organisms changed during the fission.

DISCUSSION

The equine hemobartonella-like organisms were not previously reported. On this case, we found many pathogens in a castrated male warm-blooded breed equine erythrocytes. He had not shown any abnormality. The transmission route might be due to the contaminated surgical apparatuses which were used for castration. It was worthwhile for further studying.

Identification of the Howell-Jolly bodies and the organisms in the equine erythrocytes were as the following: 1. The former is larger than the organisms; 2. The former is common oval or ring-shaped, but the organisms are polymorphorous; 3. The former is usually observed individually in the erythrocytes, the organisms are one to several in number; 4. The former is rarely seen at the stage of binary fission.

The organisms might form variable lengths of chain-like structures or even filament-like ones. Hemobartonella multiplies itself by two means, budding and binary fission, with the latter observed in this research.

The normal size of the hemobartonella was 0.1-0.8 μm in diameter. The sizes of the organisms of the equine erythrocytes were larger than 1 μm in diameter, because the pathogens were found in the host erythrocytes, some parasites were also distributed in the entire erythrocytes.

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