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FACTORS AFFECTING THE MULTIPLICATION OF
BABESIA GIBSONI WITHIN ERYTHROCYTES

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Some dogs possess genetically determined erythrocytes characterized by high potassium (K) and low sodium (Na) concentrations (HK cells), high Na,K-ATPase activity, and high concentration of reduced glutathione (GSH). To clarify the mechanism which regulates the growth and multiplication of *Babesia gibsoni* in canine erythrocytes, the features of multiplication of the parasites in HK and LK cells (normal canine erythrocytes) were evaluated and compared, using an established culture system. The results were as follows: 1) The rate of multiplication of parasites was consistently higher in HK cells than in LK cells. 2) Treatment of these cells with several proteases and glycosidases, which appeared to affect the invasion of the parasites into erythrocytes, had no effect on multiplication in HK cells. 3) Immunoblotting analysis using anti-canine globin serum demonstrated that covalent binding of hemoglobin to erythrocyte membrane proteins generated by the oxidative damage was considerably lower in HK cells than in LK cells. 4) Ouabain, which depresses ATP consumption in HK cells, but not in LK cells, through its inhibitory action on Na,K-ATPase accelerated the multiplication of the parasites in HK cells.

These results indicated that the oxidative damage caused by the parasite was less in HK cells than in LK cells during the process of infection and multiplication of *B. gibsoni*, resulting in an increased growth of the parasites in HK cells.

This suggests that the redox system involving GSH in the host cells plays an important role in prevention of oxidative damage to the parasites as well as to the red cells themselves.

Based on these findings, it is concluded that the detoxication system against oxidative stress in erythrocytes is implicated in multiplication of *B. gibsoni*.