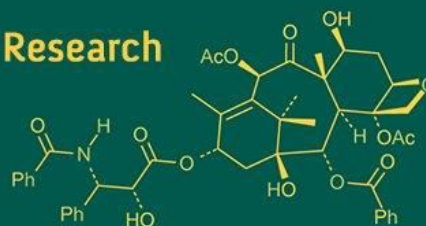
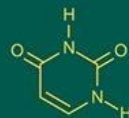


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Serum erythropoietin levels in babesia affected dogs

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Abstract

Canine babesiosis is a hemoprotozoan disease characterized by anemia leading to hypoxia. The present study aimed to estimate serum EPO levels in Babesia-infected dogs using a canine-specific ELISA kit. Serum samples from PCR-confirmed Babesia-infected dogs and healthy controls were analyzed. The mean serum EPO level in PCR-positive dogs (87.0 ± 2.68 mU/mL) was significantly higher ($p < 0.05$) compared to healthy controls (16.44 ± 0.63 mU/mL). Among Babesia-infected dogs 68.18 percent exhibited elevated EPO, 22.73 percent had normal levels and 9.09 percent exhibited very low or undetectable levels of EPO. The findings of study revealed that Babesia infection predominantly induces EPO synthesis as a compensatory response to anemia.

Keywords: Canine babesiosis, erythropoietin, anemia, hypoxia, Babesia infection, ELISA

Introduction

Babesiosis in dogs is caused mainly by *Babesia canis vogeli* and *Babesia gibsoni* (Irwin, 2009; Solano-Gallego and Baneth, 2011) [2, 6]. Canine babesiosis is a significant tick-borne disease associated with hemolysis, anemia and systemic complications (Taboada and Lobetti, 2006 and Jacobson, 2006) [7, 31]. EPO plays a central role in erythropoiesis by stimulating red blood cell precursors in the bone marrow (Hattangadi and Lodish, 2007) [11]. Information on EPO levels specifically in Babesia-infected dogs remains limited. This study was therefore undertaken to estimate serum EPO concentrations in canine babesiosis using a sensitive ELISA method and to assess the variability in its expression among babesia infected and control groups.

Materials and Methods

Sample Collection and Preparation

Blood samples were collected aseptically from 22 PCR-positive canine babesiosis dogs and 10 PCR-negative apparently healthy dogs presented to the Department of Veterinary Medicine, Veterinary College, Hebbal, Bengaluru. The samples were subjected to erythropoietin estimation. Serum was separated after clotting by centrifugation at $1000 \times g$ for 20 minutes and stored at -20°C until analysis. Prior to the assay, the samples were thawed and prepared for erythropoietin estimation. Serum EPO levels were measured using a commercial canine ELISA kit (Lablisa® Dog EPO ELISA Kit, Cat. No. LAB5665, Labrecon), with a sensitivity of 13.7 pg/mL (equivalent to 2.08 mU/mL) and a detection range of 31.25-2000 pg/mL (4.74-303 mU/mL). The assay was based on a sandwich ELISA format.

Results

In 22 Babesia affected dogs ($n = 22$), the mean serum EPO concentration was 87.0 ± 2.68 mU/mL, which was significantly higher ($p < 0.05$) than that of the healthy control group ($n = 10$, 16.44 ± 0.63 mU/mL).

Discussion

The increased EPO level could be due to hypoxia-induced stabilization of hypoxia-inducible factor (HIF), which upregulates renal EPO synthesis during hemolytic anemia. Among 22 PCR-confirmed cases, 68.18 percent had elevated EPO, 22.73 percent had normal levels and 9.09 percent had undetectable levels.

The dogs with undetectable EPO indicate inadequate compensatory response despite anemia or renal involvement caused by Canine Babesiosis. Thus indicates that most Babesia-affected dogs will have either increased or normal erythropoietin (EPO) production. Only 9.09 percent of dogs with canine babesiosis will have low serum EPO levels, suggesting the need for external erythropoietin supplementation in such cases.

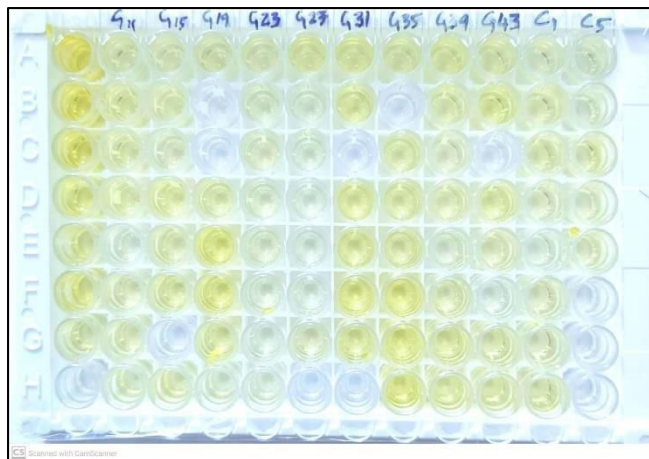


Fig 1: Canine specific Erythropoietin ELISA kit after addition of stop reagent

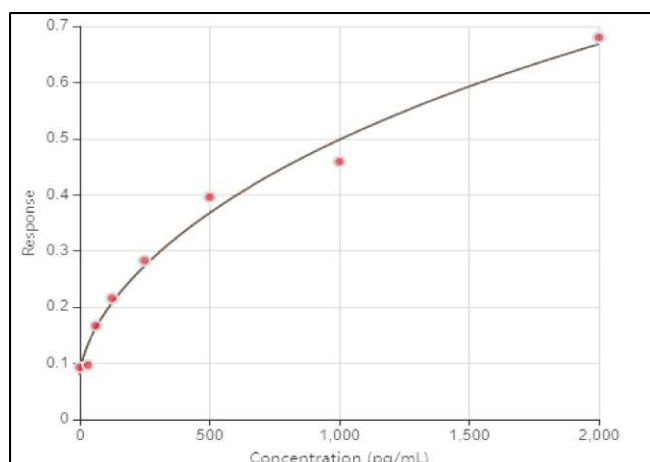


Fig 2: Picture representing Graph in which concentration of EPO plotted against OD values

Conclusion

Erythropoietin estimation in canine babesiosis revealed that most infected dogs had elevated or normal serum EPO concentrations, indicating a compensatory response to hemolytic anemia. However, a small proportion of dogs showed undetectable levels, suggesting inadequate response due to severe anemia or renal involvement. These findings suggest that monitoring EPO levels can help to assess disease severity, prognosis and identify cases that may require therapeutic supplementation of external erythropoietin.

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