Canine monocytic ehrlichiosis (CME) is a tick-borne disease enzootic in the African continent, caused by the bacteria *Ehrlichia canis*. The pathogenesis of the disease involves an incubation period of 8–20 days, followed by three consecutive phases: acute, subclinical, and sometimes chronic [1]. Infected dogs with a subclinical or a mild asymptomatic chronic stage of CME could be considered as reservoirs for the pathogen, hence the importance of screening animals as a preventive measure. The objective of our study was to determine the seroprevalence of *E. canis* among apparently healthy dogs in Africa (Gabon and the Ivory Coast), and compare their biochemical data with their serological status.

The study was carried out in 187 apparently healthy working dogs belonging to surveillance companies in Abidjan (n = 76) and in Libreville (n = 111). Dogs from Abidjan (64% males and 36% females) were between 9 months and 12 years old, with an average of approximately 3.8 years. Dogs from Libreville (58% males and 42% females) were between 11 months and 15 years old, with an average of approximately 3.9 years. The dogs didn’t have any anti-infection treatment. Blood was collected from the cephalic vein, samples were centrifuged and the serum was submitted for biochemical analysis, or stored at −20°C for serology. Serum samples were assayed for antibodies to *E. canis* using the reference method, i.e., indirect fluorescent antibody test (IFAT). Titres ≥1/80 were considered as positive [2]. Seropositive dogs were divided into two subgroups: low and medium titres (1/80–1/1280) and high titres (≥1/2560). Seronegative dogs were used as the control group.

Catalytic concentrations of aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase were determined on a COBAS INTEGRA 800 analyser (Roche Diagnostics, Meylan, France), using the method recommended by the International Federation of Clinical Chemistry. Serum proteins were separated by electrophoresis with the semi-automated HYDRASYS instrument. The electrophoretograms were evaluated visually for pattern abnormalities. The different groups were compared with each other, for each parameter, using the f-test or analysis of variance (ANOVA), and non-parametric tests when Bartlett’s test indicated heterogeneous variances and ANOVA was not appropriate. All statistical tests were carried out using the Epi Info Software (CDC, Atlanta, GA, USA). Statistical significance was defined as p <0.05.

IFA tests showed that 80% (149/187) of the sera were reactive with *E. canis* antigens at a dilution of 1/80 or above. The 74% (56/76) seroprevalence in dogs from Abidjan was not significantly different from the 84% (93/111) in dogs from Libreville (p 0.1). No correlation was found between *E. canis* antibody titres and age or sex (p 0.6 and 0.14, respectively). Table 1 shows blood biochemical parameters (mean ± standard deviation) in *E. canis* seropositive and seronegative dogs, as well as summarised comparisons between seronegative, low or medium seropositive, and high seropositive dogs. Certain intrinsic factors, such as age and sex, may cause variations in serum protein concentrations, but no significant influence of these parameters was shown here.

The very high seroprevalence (80%) of *E. canis* may be explained by the fact that dogs lived in a biotope favourable to the development of its vector, *Rhipicephalus sanguineus*. The life conditions of dogs housed together also favour the
transmission of the infection. Animals included in our study were apparently in good health. Seropositive dogs were assumed to be in a subclinical or chronic asymptomatic phase of CME, or to have eliminated E. canis while retaining an aberrant immune response. It is difficult to explain the high prevalence of asymptomatic ehrlichiosis without assuming that the canine population acquires some degree of immunity due to close and repeated contacts with the antigen. Recent studies suggest that dogs infected with E. canis develop an immune response that does not protect them against re-infection and does not reduce clinical signs [3]. Infected dogs may act as a source of infection. The control of canine monocytic ehrlichiosis must take into account this role of healthy carriers and include prophylactic measures.

The infected dogs were found to have a significant hypoaibuminemia, hyperglobulinemia and hypergammaglobulinaemia compared with the control dogs, and there may be a link between the deterioration of biochemical parameters and the rise in anti-E. canis antibodies. Studies have shown that in dogs with asymptomatic ehrlichiosis, hypergammaglobulinaemia results mainly from a rise in G gammaglobulins. In the different phases of symptomatic and asymptomatic ehrlichiosis, IgG2 are predominant in the humoral immune response compared with IgG1 [4]. The literature does not describe hypergammaglobulinaemia as being directly related to the titre of anti-E. canis antibodies determined by IFAT, but these studies were carried out on a smaller number of dogs, mostly in the acute phase of the disease [5]. In our study, gammaglobulin concentrations were significantly elevated (p <0.0001) in dogs with a high titre compared with the other seropositive animals, and we found that there was a connexion between the production of antibodies and gammaglobulin blood levels.

ACKNOWLEDGEMENTS

We would like to thank H. Richet from UMR 6236 (Marseille, France) and E. Carme from IMTSSA (Marseille, France) for their collaboration.

REFERENCES