# Age, sex and breed effect on laboratory parameters in natural *Babesia canis* infection


## Abstract

We tested the hypothesis that age, breed, and sex are related to hematology, biochemistry, acute phase proteins (APPs), seroreactivity and level of parasitemia in dogs with an acute phase response (APR) due to Babesia canis infection. The study enrolled 61 privately owned dogs that naturally acquired B. canis infection. Groups were formed according to the age: young dogs less than one year, and adult dogs more than one year old. Moreover, the group of males was compared to females and purebred to mixed breed dogs. Seroreactivity was tested with immunofluorescence antibody test, level of parasitemia with real-time polymerase chain reaction (real-time PCR), hematology, and biochemistry with automatic analyzers, serum amyloid A with enzyme-linked immunosorbent assay, fibrinogen with heat precipitation and ceruloplasmin and paraoxonase-1 with manual spectrophotometric methods. For protein separation agarose gel electrophoresis was used. The main changes in the whole population of B. canis-infected dogs were fever, pancytopenia, and change in APPs level. One-third of young, and 96% of adult dogs were seropositive ($P < 0.001$). The level of parasitemia was higher in the young dogs ($P < 0.001$). Erythroid lineage parameters ($P < 0.01$), and leukocytes ($P < 0.05$) were lower in the young, when compared to the adult dogs. Young dogs had lower total globulins ($P < 0.001$), β- and γ-globulins ($P < 0.001$), and higher α-globulins ($P = 0.022$) than adult dogs. Young dogs had higher concentrations of phosphate ($P = 0.003$) and cholesterol ($P < 0.001$) and lower amylase ($P = 0.014$) and lipase activity ($P = 0.020$) than adult ones. Male dogs had lower neutrophil count than females ($P = 0.035$), and purebred dogs had more band neutrophils than mixed breed dogs ($P = 0.004$). In conclusion, dogs with natural Babesia canis infection at a young age have more severe anemia and APR including leukopenia than adults. Male and purebred dogs might also have more severe APR than females and mix-breeds, as they have more pronounced changes related to the myeloid lineage.