COMPARATIVE ANALYSIS OF SELECTED IMMUNE PARAMETERS IN BLOOD OF THE MAJAHEEM AND MAGATEER DROMEDARY CAMEL BREEDS

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ABSTRACT

The present study investigated the composition of blood leukocytes in the Magateer and Majaheem camel breeds using immune cell labeling and flow cytometry. In addition, the phagocytosis activity of blood neutrophils and monocytes were compared between the two breeds. Although the total number of leukocytes did not differ significantly between the two camel breeds, a significantly higher fraction and absolute number of neutrophils was observed in blood of the Majaheem breed compared to the Magateer breed. In contrast to this, the fraction of eosinophils was significantly lower in blood of the Majaheem than the Magateer breed. The comparison of lymphocyte composition between the two breeds revealed significantly more B cells (relative and absolute count) in blood of the Magateer breed camel than the Majaheem camels. The two breeds showed comparable phagocytosis activity for their neutrophils and monocytes. Collectively, the present study compared selected cellular immune parameters between the two main breeds of the dromedary camel and identified similarities and differences.

Key words: Breed, dromedary camel, immune parameters, flow cytometry, leukocytes, Magateer, Majaheem

The impact of animal breed on innate and adaptive immunity has been investigated for several species (Schilling et al, 2019; Khatab et al, 2021; Lin et al, 2022; Ordónez et al, 2022; Ortega et al, 2022). In the dromedary camel, several components of the immune system have been recently characterised (Hussen and Schuberth, 2020). The phenotype and function of leukocytes are influenced by several physiologic (Gaashan et al, 2020) and pathologic factors (Hussen et al, 2018 and Hussen, 2019). Animal breed is one of the most important factors with key effect on the immune competence.

In the dromedary camel, several immuno-genomic studies have described the genomic diversity of immunity-related genes in domesticated and wild camels, including genes encoding for B cell receptors, T cell receptors and MHC molecules (Antonacci et al, 2011; Vaccarelli et al, 2012; Ciccarese et al, 2014; Plasil et al, 2016; Futas et al, 2019; Plasil et al, 2019; Lado et al, 2020; Ming et al, 2020). Animal breeding programmes have traditionally focused on animal selection based on animal production capacity. However, intensive research is currently undertaken on selecting animal breeds with higher immune competence and disease resistance (Gavora and Spencer, 1983; Nino-Soto et al, 2008; Begley et al, 2009; Cartwright et al, 2011). For the dromedary camel, several breeds have been characterised based on animal size, coat colour and linear measurements (Kohler-Rollefson, 1993; Al-Atiyat et al, 2016; Meghelli et al, 2020).

Studies on the impact of dromedary camels breed on the cellular immune system are scarce. Therefore, the aim of the present study was to comparatively analyse the cellular composition of leukocytes in blood samples collected from the Magateer and the Majaheem dromedary camel breeds. In addition, the phagocytosis activity of blood phagocytes, including neutrophils and monocytes was compared between the two breeds.

Materials and Methods

Animals and blood sampling

Blood samples from jugular vein were collected into vacutainer tubes containing EDTA from 33 apparently healthy dromedary camels (n=33) including 15 animals of the Magateer breed (n=15) (mean age 9.3 ± 2.4 years) and Majaheem breed (n=18) (mean age 9.6 ± 2.1 years) from three camel farms in Al-Ahsa region in eastern Saudi Arabia. Cell separation from the collected blood samples was performed within one hour from the sampling.