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News & Comments

A promising Vaccine Prototype: Recombinant Ehrlichia canis GP19 Protein

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CME (canine monocytic ehrlichiosis) is one of the most common infectious disorders that affect dogs worldwide. *Ehrlichia canis*, a rickettsial disease, causes CME, a multisystemic disease in dogs. Additionally, human, and wild mouse infections with *E. canis* have been observed. Recombinant P29 protein from Ehrlichia spp. was created and demonstrated in mice to have the ability to protect against Ehrlichia muris infection; however, there is no information on this sort of vaccination against *E. canis* infection. Recombinant protein GP19 (rGP19) was created and purified in the current investigation to be used as a vaccine prototype against *E. canis* infection in mice. Female BALB/c 40 mice aged 6 to 8 weeks were utilized in this investigation, and they were acquired from Mahidol University in Thailand's National Laboratory Animal Center. Prior to the trial, all mice were acclimated for a week. To evaluate antibody titers, sera from all mouse groups were taken before and after an *E. canis* challenge. The immunoplates were coated with rGP19 at a concentration of 10 g/ml during an internal indirect ELISA. Western blot analysis and examination of the purified rGP19 were performed. At a target molecular mass of roughly 20–25 kDa, the rGP19 showed the reactive protein bands that are typical of such proteins.

Although it was shown that *E. canis* GP19 has orthologs with *E. chaffeensis* VLPT, it lacked the tandem repeats (TRs) that were detected in *E. chaffeensis* VLPT. Additionally, the STE-rich area revealed O-linked glycosylation sites on the GP19 protein. The potential of the recombinant GP19 protein vaccination to protect mice against *E. canis* infection was examined in the current investigation. The rGP19, which has a molecular weight of about 20–25 kDa, was employed as a prototype vaccine to protect mice from *E. canis* infection. When *Ehrlichia* produces diverse soluble cell products, the activation of phagocytes and cell-mediated immune response play crucial roles in the fight.

TNF- is a cytokine that promotes inflammation that is mostly produced by macrophages. On day 14 of the post-infection period, the TNF gene in mouse blood samples revealed up-regulated expression in the E. canis-infected mice with the lack of rGP19 immunization. To produce vaccines in a reasonable manner, however, the connection between cytokine genes and the adaptive immune response needs to be further investigated. With the assistance of macrophages and lymphocytes, the analyses of the cytokine networks reveal that additional cytokines are involved in the immune responses to E. canis infection (T and B cells).

Recombinant protein GP19 (rGP19), a prototype vaccine, was created in this study to stimulate protective immune responses against E. canis in a mouse model. Evaluation of antibody responses

against E. canis showed that pre- and post-E. canis challenge, antibody levels in rGP19-immunized mice were considerably greater than those in adjuvant-immunized and naive mice. To calculate ehrlichial burdens, DNA was isolated from blood, liver, and spleen. Comparatively to adjuvant-immunized mice, the rGP19-immunized animals displayed considerably decreased ehrlichial burdens in blood, liver, and spleen DNA. The rGP19-immunized mice were next infected with E. canis, and on day 14 after infection, flow cytometry was used to identify the mice's IFN-producing memory CD4+ T cells.

Source: Veterinary Sciences

KEYWORDS

CME; Ehrlichia canis; GP19; mice; recombinant protein; vaccine prototype