Brucella spp are a diverse group of gram negative pathogens causing disease in many hosts including humans. Vaccination against animal brucellosis is an important control strategy to prevent the disease. Research for novel vaccines has focused upon the development of live vaccine strains1. Based on their different clearance pattern in mice, some of the new Brucella species described lately2,3, were selected for being potential candidate vaccines against brucellosis. THE AIM OF THIS WORK is to evaluate the protection induced by B. microti, B. ceti and B. pinnipedialis, against B. melitensis, in a murine model of infection.

MATERIALS AND METHODS

Kinetics of infection. Female balb/c mice were intraperitoneally (ip) inoculated with 10⁴ colony forming units (cfu) of B. microti or 10⁴ cfu of the following strains: B. ceti 12891, B. pinnipedialis 12890, and B. pinnipedialis 22F1. At selected times post inoculation animals were euthanized and their spleen and liver removed to determine cfu/organ (Figure 1).

In vivo protection studies. In parallel, mice were vaccinated with the same strains and doses using the standard vaccine Rev 1 inoculated ip or subcutaneously (sc) as vaccine control. A lot remained unvaccinated. Half of the vaccinated animals were ip challenged 4 weeks later with 10⁵ cfu of B. melitensis 16M wild type and the other half were similarly challenged 22 weeks later. One week after the challenge, spleens were aseptically removed and weighed to determine the number of cfu/organ (Figure 3).

In vitro studies. Correlates of protective immunity were evaluated via splenocyte cytokine memory responses at 4 and 22 weeks. Splenocytes isolated from vaccinated mice were stimulated with Heat Killed B. melitensis for 72 h and IFN-γ and TNF-α production was measured (Figure 2).

Data are represented as Mean±SEM. * p<0.05, ** p<0.01, *** p<0.001.

RESULTS

The used strains showed different multiplication patterns (Figure 1). All the new strains of Brucella tested induced protection against B. melitensis 16M at 4 and 22 weeks after vaccination independently on the clearance pattern (Figure 2). It was a correlation between protection induced and cytokine production at both time points (Figure 3).

CONCLUSION

The new species of Brucella tested could be considered as potential candidates vaccines against B. melitensis. Moreover, cytokine production reflected a memory response with subsequent protection against challenge.

REFERENCES


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