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Immunisation using microspheres of poly glycidyl methacrylate functionalized with MSA-2 peptide to protect cattle from babesiosis

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Babesia bovis is a protozoan parasite transmitted by *Rhipicephalus microplus* ticks causing significant economic losses and limits cattle production in tropical and subtropical regions of the world. Vaccination with live attenuated parasites is an effective control method that protects susceptible cattle preventing babesiosis outbreaks in areas of enzootic instability, and protects animals raised in tick free zones when transferred into endemic areas. These live Babesia vaccines are usually effective but have a numerous disadvantages including reversion to virulence if transmitted by ticks. Additionally, vaccination is only safe in young bovines (~ 1 year old). The present study developed microspheres with ~1 μM size of poly glycidyl methacrylate (poly-GMA) that were functionalized by Click chemistry methodologies with highly immunogenic and protective B cell epitopes from the *B. bovis* merozoite surface antigen MSA-2. The peptide-functionalized microspheres were utilized in mouse inmmunisation experiment. Mouse anti-peptide antibodies recognized *B. bovis* merozoite extracts in ELISA screening. In addition, sera against the peptides inhibited erythrocyte invasion by cultured *B. bovis* merozoites in vitro. However, cattle immunized with the MSA-2 peptide-microparticles were not protected against challenge with the virulent *B. bovis* strain (Calliungal). Finally, further studies should be conducted in order to improve the development of a new generation of vaccine(s) against this apicomplexan protozoan parasite.

Biography

Veysel Kayser is an Associate Professor in the Faculty of Pharmacy at the University of Sydney. He received his Ph.D. from the University of Leeds (UK) and performed post-doctoral research at the Max-Planck Institute (Germany) and at MIT (US). Before joining the University of Sydney, he was a senior scientist at MIT. His research focuses on protein folding and aggregation, development and formulation of biopharmaceuticals (mAbs and vaccines), molecular engineering for biotherapeutics, virus and vaccine characterization. He has published numerous papers on the subject, supervised HDR students, and serves as a reviewer for various journals.

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