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31st Euro Global Summit and Expo on Vaccines & Vaccination & 4th World Congress and Exhibition on Antibiotics and Antibiotic Resistance June 14-16, 2018 Barcelona, Spain

Dendrimeric peptides can confer protection against foot-and-mouth disease virus in cattle

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P cont-and-mouth disease virus (FMDV) causes a highly contagious disease in cloven-hoofed animals. A synthetic vaccine candidate consisting of dendrimeric peptides harbouring two copies of a B-epitope [VP1 (136-154)] linked to a T-cell epitope [3A (21-35)] of FMDV confers protection to type O FMDV challenge in pigs. Herein we show in cattle that novel dendrimeric peptides bearing a T-cell epitope [VP1 (21-40] and two or four copies of a B-cell epitope [VP1 (135-160)] from type O1 Campos FMDV (termed B₂T and B₄T, respectively) elicited FMDV specific immune responses to similar levels to a commercial vaccine. Animals were challenged with FMDV and 100% of vaccinated cattle with B₂T or B₄T were protected to podal generalization. Moreover, bovines immunized with B₄T were completely protected against FMDV challenge (with no clinical signs), which was associated with titers of viral neutralizing antibodies in serum higher than those of B₂T group (p< 0.05) and levels of opsonic antibodies similar to those of animals immunized with FMDV in sera and in mucosa. When IgA in nasal secretions was measured, 20% or 40% of the animals in B₂T or B₄T groups respectively, showed anti-FMDV IgA titers. In addition, B₂T and B₄T peptides evoked similar consistent T cell responses, being recognized *in vitro* by lymphocytes from most of the immunized cattle in the proliferation assay, and from all animals in the IFN-γ production assay. Taken together, these results support the potential of dendrimers B₂T or B₄T in cattle as a highly valuable, cost-effective FMDV candidate vaccine with DIVA potential.

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