

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

Patricia Zamorano¹, Ivana Soriana¹, Valeria Quattrocchia, Cecilia Langellottia¹, Mariela Gammella², Sebastian Digiacomoa, Beatriz Garcia de la Torrec, David Andreuc, Maria Montoyad, Francisco Sobrinoc and Esther Blancof

¹Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina

²Instituto Nacional de Tecnología Agropecuaria (INTA), Argentina

³Universitat Pompeu-Fabra, Spain

⁴Pirbright Institute, UK

⁵Centro de Investigación en Sanidad Animal (CISA-INIA), Spain

Foot-and-mouth disease virus (FMDV) causes a highly contagious disease in cloven-hoofed animals. A synthetic vaccine candidate consisting of dendrimeric peptides harboring 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 commercial vaccine. Bovines vaccinated with both dendrimeric peptides presented high levels of IgG1 anti 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.

zamorano.patricia@inta.gov.ar

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