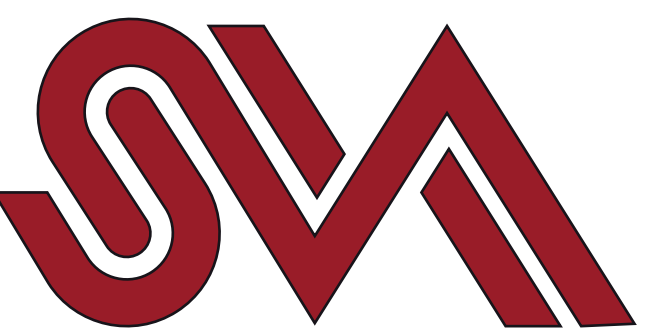


High protective efficacy of two new BRSV DIVA vaccines in calves with specific maternal antibodies







Blodörn, K.^a; Hägglund, S.^a; Fix, J.^b; Dubuquoy, C.^b; Makabi-Panzu, B.^c; Thom, M.^c; Karlsson, P.^d; Roque, J.L.^e; Karlstam, E.^f; Pringle, J.^a; Eléouët, J.F.^b; Riffault, S.^b; Taylor, G.^c; and Valarcher, J.F.^{da}

^a Swedish University of Agricultural Sciences, Host Pathogen Interaction Group, Department of Clinical Sciences, Sweden; ^b INRA, Unité de Virologie et Immunologie Moléculaires, France; ^c The Pirbright Institute, Pirbright, UK; ^d National Veterinary Institute, Department of Virology, Immunology, and Parasitology, Sweden; ^e Clinique Veterinaire des Mazets, France; ^f National Veterinary Institute, Department of Pathology and Wildlife Diseases, Sweden

Vaccines & Groups

Vaccines & Groups

			Post-vaccination day							
			0	7	14	21	28	35	42	
	ΔSHrBRSV	Live BRSV, SH-gene-deleted	n=5	intranasal			no boost			
	SUMont	<div>RSV-subunits</div> + Montanide ISA71	n=5	intramuscular			intramuscular			
	SUAbis		+ AbISCO-300	n=5	subcutaneous			subcutaneous		
	Controls	Adjuvant alone	n=5	subcutaneous			subcutaneous			

RSV-subunits (SU) = internal HRSV-proteins (N, P & M2-1) and BRSV-F &-G epitopes

Prime

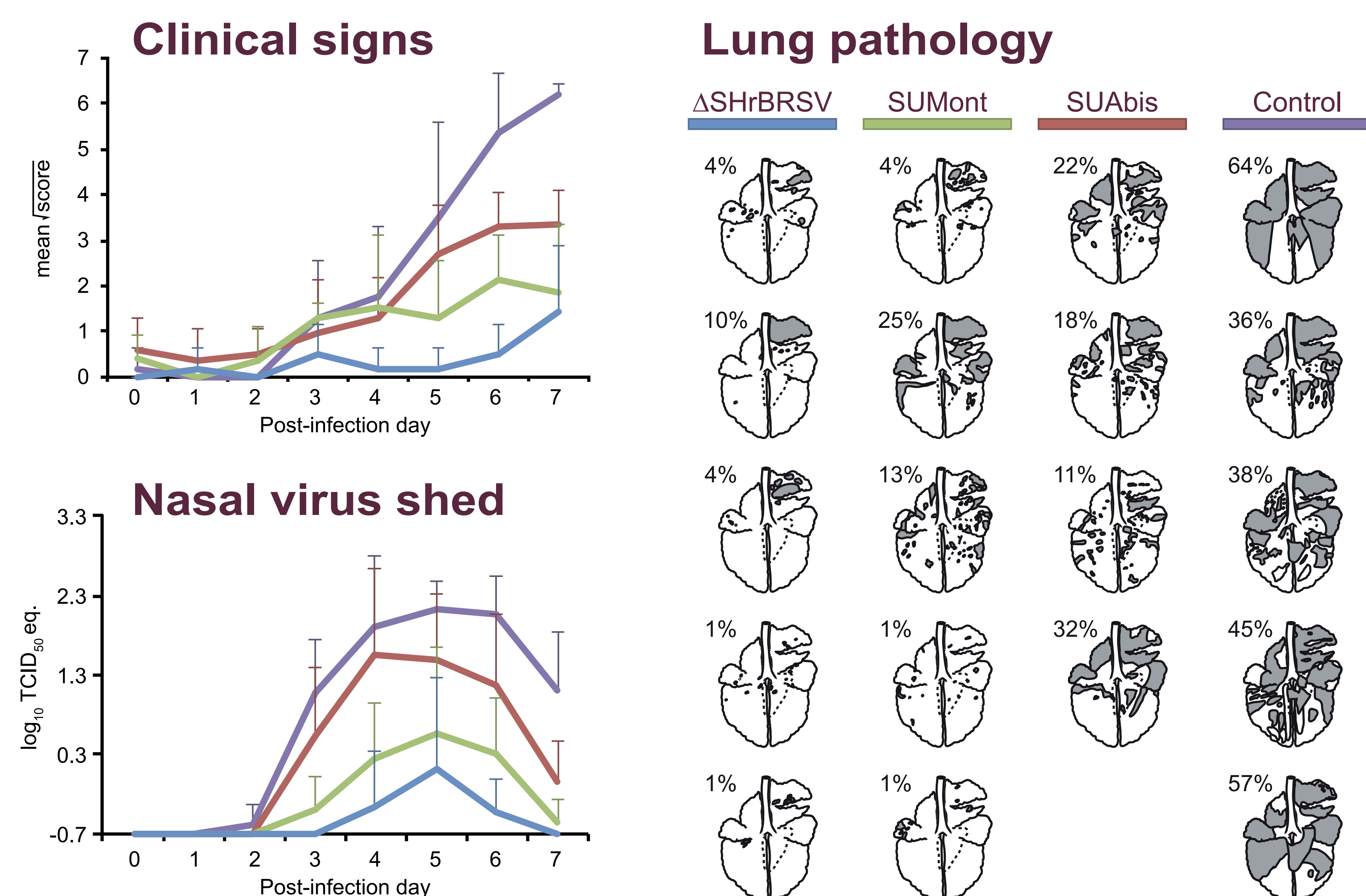
Boost

Challenge PM

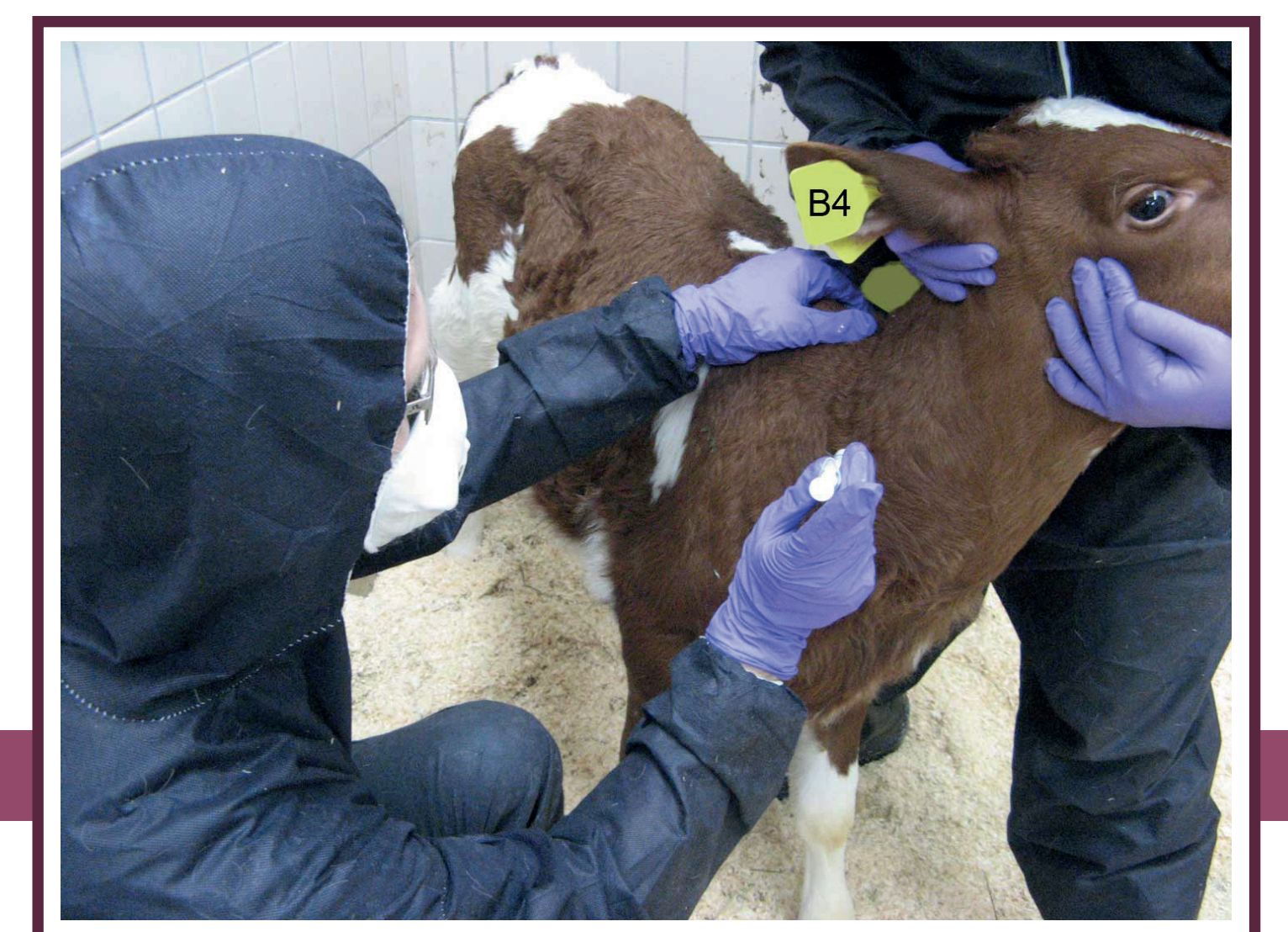
One live and two subunit vaccine formulations were evaluated in a virulent BRSV challenge model, in calves with maternal antibodies.



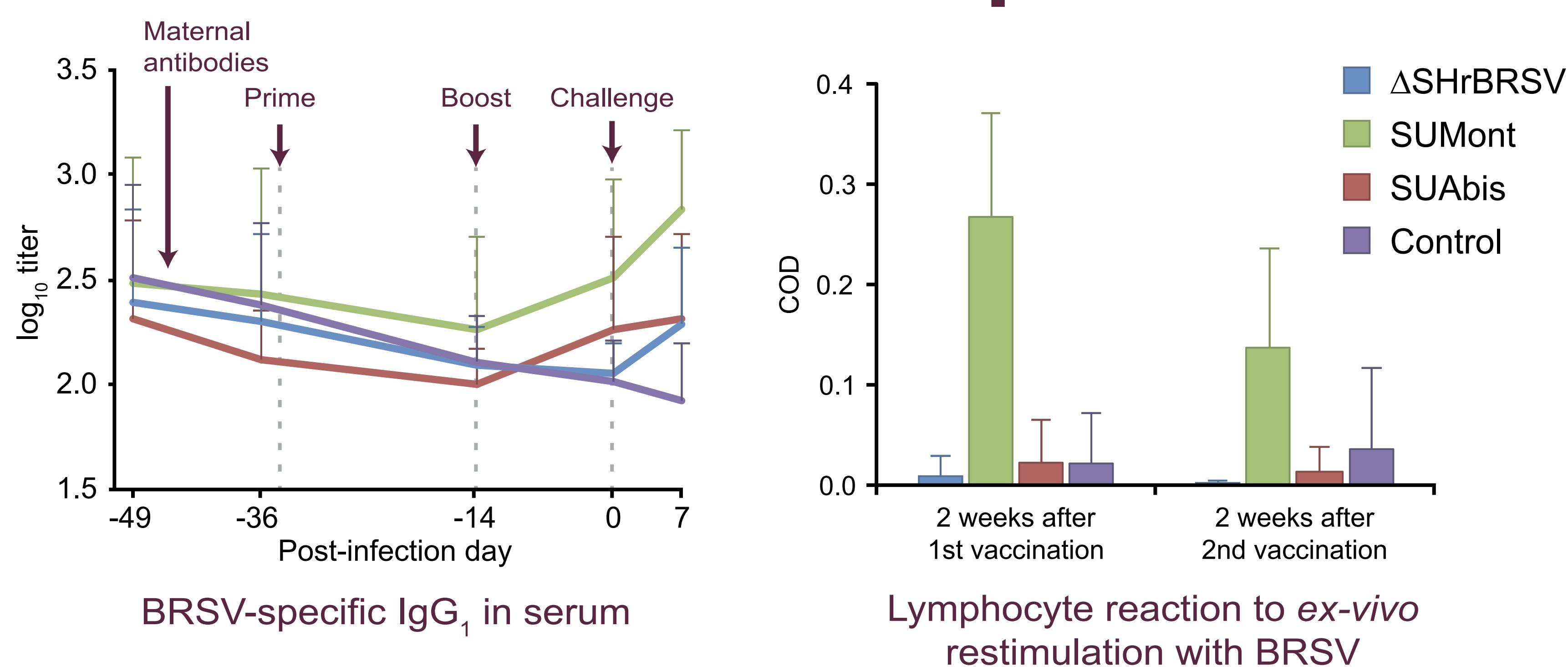
Protection in a severe BRSV challenge model



- ★ Control calves showed severe signs of BRSV infection, shed high amounts of virus, and had massive lesions in the lungs on post-mortem
- ★ ΔSHrBRSV-vaccinated calves were almost completely protected
- ★ SUMont-vaccinated calves were well protected
- ★ SUAbis-vaccinated calves were least, but still significantly, protected



Diverse immune responses



- ★ ΔSHrBRSV primed calves for a rapid protective immune response to challenge, with mucosal IgA and neutralizing serum antibodies, whereas no responses could be detected before challenge
- ★ Both SU vaccines induced non-neutralizing antibodies directed against human RSV proteins N, P and M2-1, but only SUMont induced a significant T-cell response

Conclusions

- ★ A single intranasal immunization with ΔSHrBRSV primed for anamnestic mucosal IgA and neutralizing serum antibodies, and almost complete protection against virulent BRSV challenge
- ★ Internal HRSV-proteins N, P and M2-1 in SUMont induced both T-cell and non-neutralizing humoral immune responses, and a good level of protection, after two intramuscular immunizations

Acknowledgements

This work was supported by the Swedish Research Council (Formas, Sweden), the Biotechnology and Biological Sciences Research Council (BBSRC, UK), and L'Agence Nationale de la Recherche (ANR, France), through EMIDA ERA NET (Grant no FP#87). We thank the technical staff at SVA for maintaining the challenged animals, Annika Rikberg and Karin Selin-Wretling at KV, SLU, for helping with logistics and the preparation of histological samples, Prof L. E. Larsen, DTU, Denmark for generously sharing the BRSV isolate no. 9402022, as well as Dr. Dolores Gaviera-Widen for coordinating histological work.

