

Supplementary Table S1. Sample dilution used to determine immunoglobulin concentration.

Samples	Sampling time	Immunoglobulin	Dilution
Nasal secretion	S1- S5	IgG ₁	1: 500
	S1	IgA	1: 500
	S2-S5		1:1 000; 1:3 000; 1:5 000*
Saliva	S1-S5	IgA	1: 750
Serum	S1-S5	IgG ₁	1: 50 000
		IgG ₂	1: 15 000
		IgM	1: 5 000
		IgA	1: 500
Whey colostrum	-	IgG ₁	1: 100 000; 1:300 000*
		IgG ₂	1:20 000; 1:50 000*
		IgM	1:20 000
		IgA	1:20 000

Legend: S1-S5: sampling. Samples were obtained: S1: before the first intranasal immunization (24-48 hours of life); S2: two weeks after the first immunization (14-16 days of age); S3: two weeks after the second intranasal immunization (28-30 days of age); S4: two weeks after the third subcutaneous immunization (42-44 days of age); S5: two weeks after S4 (59-61 days of age); *dilution depends on samples- different dilutions were done for samples with immunoglobulin concentrations above the last point of the standard curve.

911 Supplementary Table S2. Detection of specific antibodies against BHV-1, BVDV, BRSV, PI-3V and
 912 *M. bovis* in calves serum.

Group	Calves no	Sampling	BHV-1 Ab	BVD-Ab	BRSV-Ab	PI-3- Ab	M. bovis
CpG	1	S1	4	0	4	3	0
		S3	2	0	3	0	0
		S5	2	0	3	3	0
	2	S1	3	1	4	4	0
		S3	2	0	4	3	0
		S5	2	0	3	2	0
	3	S1	2	0	3	1	0
		S3	1	0	1	0	0
		S5	1	0	1	1	0
	4	S1	4	1	4	4	1
		S3	3	0	3	2	0
		S5	3	1	1	3	0
	5	S1	4	0	3	4	0
		S3	4	0	3	4	0
		S5	3	0	1	2	0
	6	S1	4	0	2	4	1
		S3	5	0	1	5	0
		S5	5	0	0	4	0
	7	S1	3	0	4	3	1
		S3	2	0	2	2	0
		S5	1	0	0	0	0
	8	S1	5	0	4	5	1
		S3	5	0	3	4	0
		S5	4	0	2	2	0
	9	S1	3	1	5	4	0
		S3	3	0	5	4	0
		S5	2	0	3	2	0
	10	S1	3	1	4	4	2
		S3	4	0	3	5	0
		S5	3	0	1	3	0
	11	S1	5	0	5	5	3
		S3	5	0	4	4	0
		S5	4	0	1	0	0

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Group	Calves no	Sampling	BHV-1 Ab	BVD-Ab	BRSV-Ab	PI-3- Ab	M. bovis
Con	1	S1	4	0	4	4	0
		S3	3	0	3	3	0
		S5	2	0	2	1	0
	2	S1	5	0	4	5	0
		S3	5	0	4	4	0
		S5	5	0	3	3	0
	3	S1	2	0	4	3	0
		S3	5	0	3	3	0
		S5	4	0	1	2	0
	4	S1	3	2	3	3	0
		S3	2	1	2	2	0
		S5	1	0	1	1	0
	5	S1	4	0	4	5	0
		S3	3	0	3	4	0
		S5	2	0	2	2	0
	6	S1	3	0	3	2	0
		S3	2	0	2	0	0
		S5	1	0	1	1	0
	7	S1	3	1	3	4	0
		S3	3	0	2	2	0
		S5	2	0	1	1	0
	8	S1	0	0	0	0	0
		S3	0	0	0	0	0
		S5	0	0	0	0	0
	9	S1	2	2	4	4	3
		S3	2	0	3	4	0
		S5	1	0	1	2	0
	10	S1	3	1	3	2	0
		S3	4	0	2	2	0
		S5	2	0	0	0	0
	11	S1	5	0	4	5	2
		S3	5	0	3	3	0
		S5	4	0	1	1	0

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Group	Calves no	Sampling	BHV-1 Ab	BVD-Ab	BRSV-Ab	PI-3- Ab	M. bovis
MPLA	1	S1	3	0	3	3	1
		S3	3	0	3	2	0
		S5	2	2	2	1	0
	2	S1	2	0	4	2	1
		S3	2	0	3	1	0
		S5	1	0	2	1	0
	3	S1	5	0	5	5	4
		S3	3	0	3	3	1
		S5	3	0	2	2	0
	4	S1	3	2	4	3	0
		S3	5	1	3	4	0
		S5	4	0	0	3	0
	5	S1	3	0	2	1	0
		S3	2	0	2	0	0
		S5	2	0	1	0	0
	6	S1	4	0	3	3	0
		S3	3	0	1	2	0
		S5	1	0	0	0	0
	7	S1	2	0	3	4	0
		S3	2	0	2	3	0
		S5	1	0	1	1	0
	8	S1	3	0	3	3	0
		S3	2	0	1	2	0
		S5	2	0	1	2	0
	9	S1	2	0	2	3	0
		S3	2	0	1	1	0
		S5	1	0	0	0	0
	10	S1	3	3	2	3	0
		S3	3	1	1	1	0
		S5	2	0	0	0	0
	11	S1	1	1	2	1	0
		S3	0	0	0	0	0
		S5	0	0	0	0	0

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929 Legend: CpG, Con, MPLA: individual study groups. S1-S3-S5: sampling. Sera were obtained as
930 follows: S1: immediately before the first intranasal immunization (24-48 hours of life); S3: two weeks
931 after the second intranasal immunization (28-30 days of age); S5: two weeks after S4 (59-61 days of
932 age); BHV-1 (Bovine Herpesvirus-1); BVDV (Bovine Viral Diarrhea Virus); BRSV (Bovine
933 Respiratory Syncytial Virus); PI-3V (Bovine Parainfluenza-3 virus); *M. bovis* (*Mycoplasma bovis*). A
934 seroconversion and a decrease in specific antibodies were bolded.