

Effect of cow vaccination against BRSV and PI3 on immune status *ante partum* and the transfer of colostral antibodies to calves

Makoschey B.¹, Brunner R.², König M.³, Gumpert C.⁴ and Heckert H.⁴

¹ Intervet / Schering-Plough Animal Health, Int. Marketing, Boxmeer, Netherlands

² Intervet / Schering-Plough Animal Health, Businessunit Cattle, Unterschleissheim, Germany,

³ Justus-Liebig-University Gießen, Faculty of Veterinary Medicine, Institute of Virology, Gießen, Germany

⁴ Freie Universität Berlin, Clinic for Ruminants and Pigs, Berlin, Germany



Objectives

To determine effect of immunization of pregnant cows with an inactivated vaccine containing bovine respiratory syncytial virus (BRSV) and parainfluenza type 3 (PI3) on

- antibody levels in
 - o serum
 - o colostrum
- transfer of the colostral antibodies to the newborn calves

Material and Methods

Experimental animals:

Pregnant cows (n=45) on a commercial dairy farm. Dams and their calves are housed at two different locations.

Vaccines:

Inactivated vaccine containing antigens of BRSV, PI3 and *Mannheimia haemolytica* (*M. haemolytica*) (Bovipast® RSP / Bovigrup RSP plus, Intervet / Schering-Plough Animal Health)

Experimental Design

Group	Number	Time to expected calving date		
		6-8 weeks	4-6 weeks	2-4 weeks
Vaccinated	26	Respiratory disease*	Neonatal diarrhea**	Respiratory disease
Control	19	None	Neonatal diarrhea	None

* Vaccination against respiratory disease was performed with Bovipast® RSP / Bovigrup RSP plus, Intervet / Schering-Plough Animal Health

** Vaccination against neonatal diarrhoea was routinely performed with Rotavec® Corona, Intervet / Schering-Plough Animal Health

Colostrum Management

- Colostrum was collected from each cow
- Fed to the respective calf at a volume of at least 4 liter within the first 12 hours of life

Samples for antibody testing

- Blood samples dams: at first vaccination and at calving
- Blood samples calves: two days after birth

Neutralising antibody titers against BRSV and PI3 were measured. Titers are expressed as $\log_{10} \text{ND}_{50}$

Results

- BRSV
 - o Variation in pre-vaccination antibody levels: some animals with very low titers but at the same time high titers in a certain proportion of animals (see fig. 1)
 - o Prevacination titers in both groups had significant ($p < 0.0001$ controls, $p = 0.008$ vaccinated) effects on antibody titers at calving (see fig. 1 for correlation between pre vaccination titers and titers at calving)
 - o Adjusted* BRSV antibody titers at calving in vaccinated group significantly higher than in controls ($p = 0.0147$) (*Adjusted by subtraction of individual pre vaccination values)
 - o Good correlation ($p < 0.001$) between BRSV antibody titers in the cows at calving and the titers measured in the calves (see fig. 2)
- PI3
 - o Vaccination of dams resulted in a booster of neutralizing antibodies, antibody titers at calving were significantly higher ($p < 0.0001$) in vaccinated group (figl 3)
 - o Antibody titres in calves from vaccinated dams significantly higher ($p = 0,0075$) than in control group
 - o Good correlation ($p < 0,001$) between PI3 antibody titers in the cows at calving and the titers measured in the calves (see fig. 4)

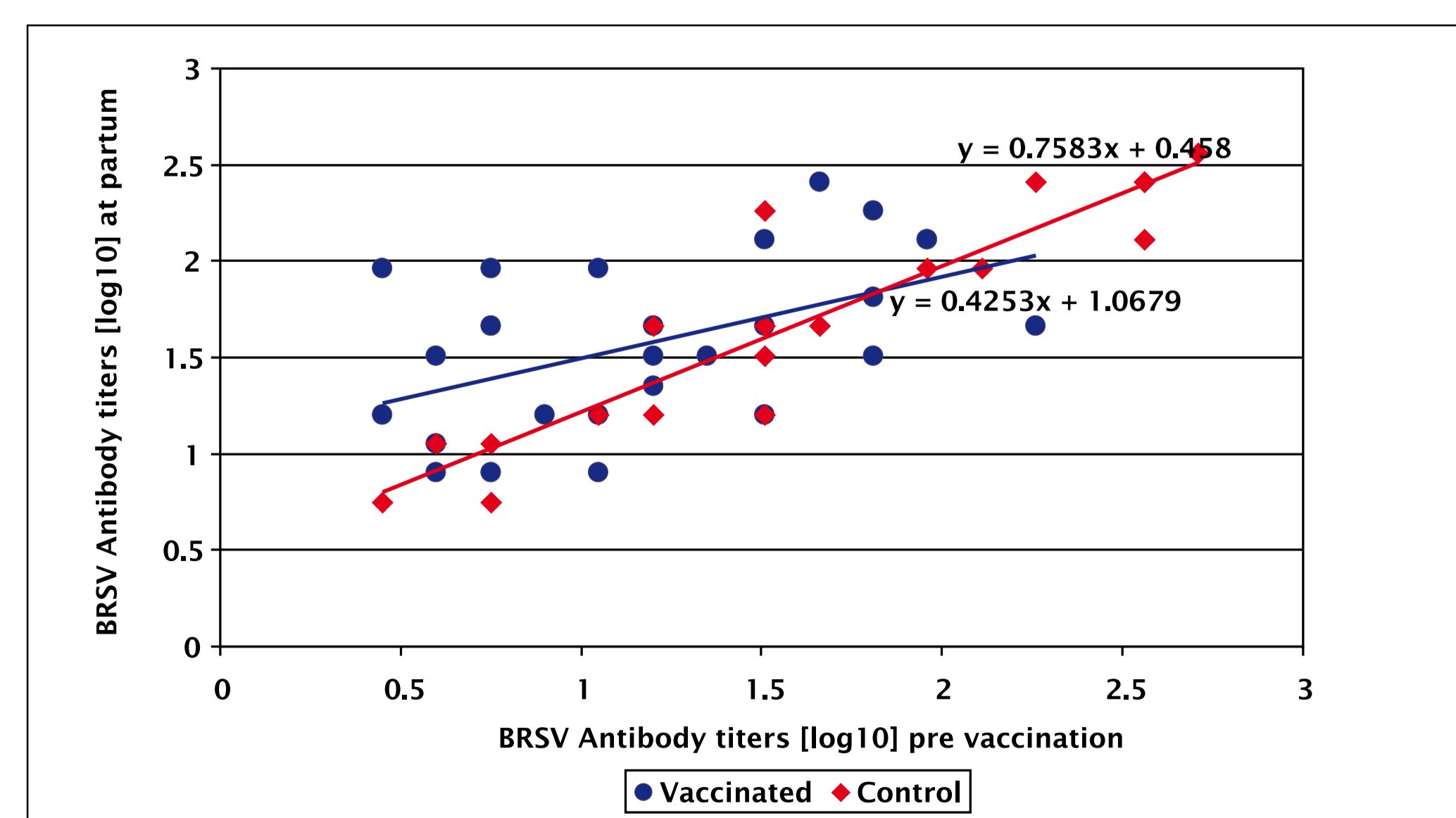


Fig. 1: Correlation between antibody titres against BRSV prior to vaccination and at calving

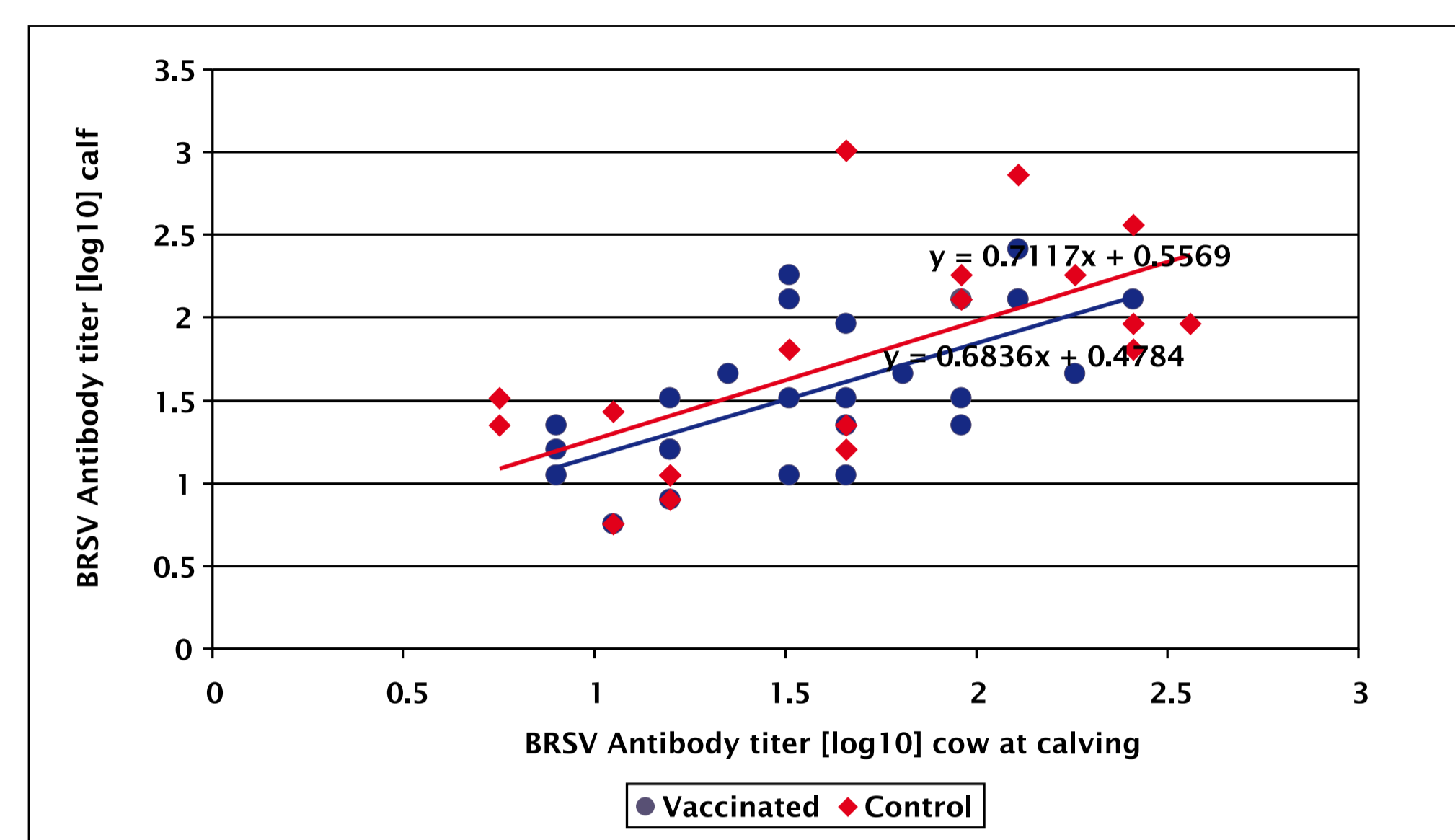


Fig. 2: Correlation between antibody titres against BRSV of the cows at calving and antibody titers in the calves

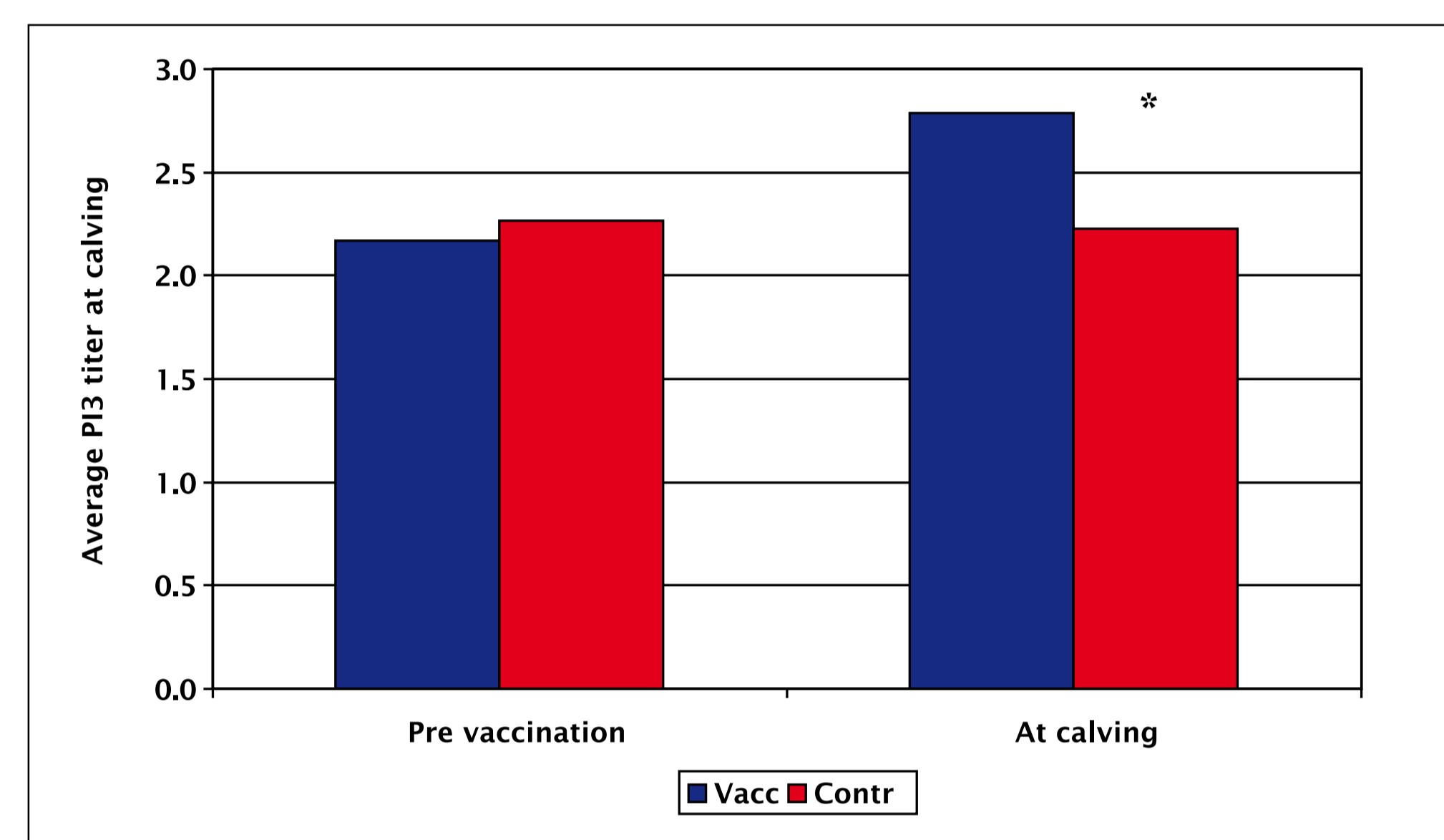


Fig. 3: Comparison antibody titres against PI3 of the cows prior to the vaccination and at calving

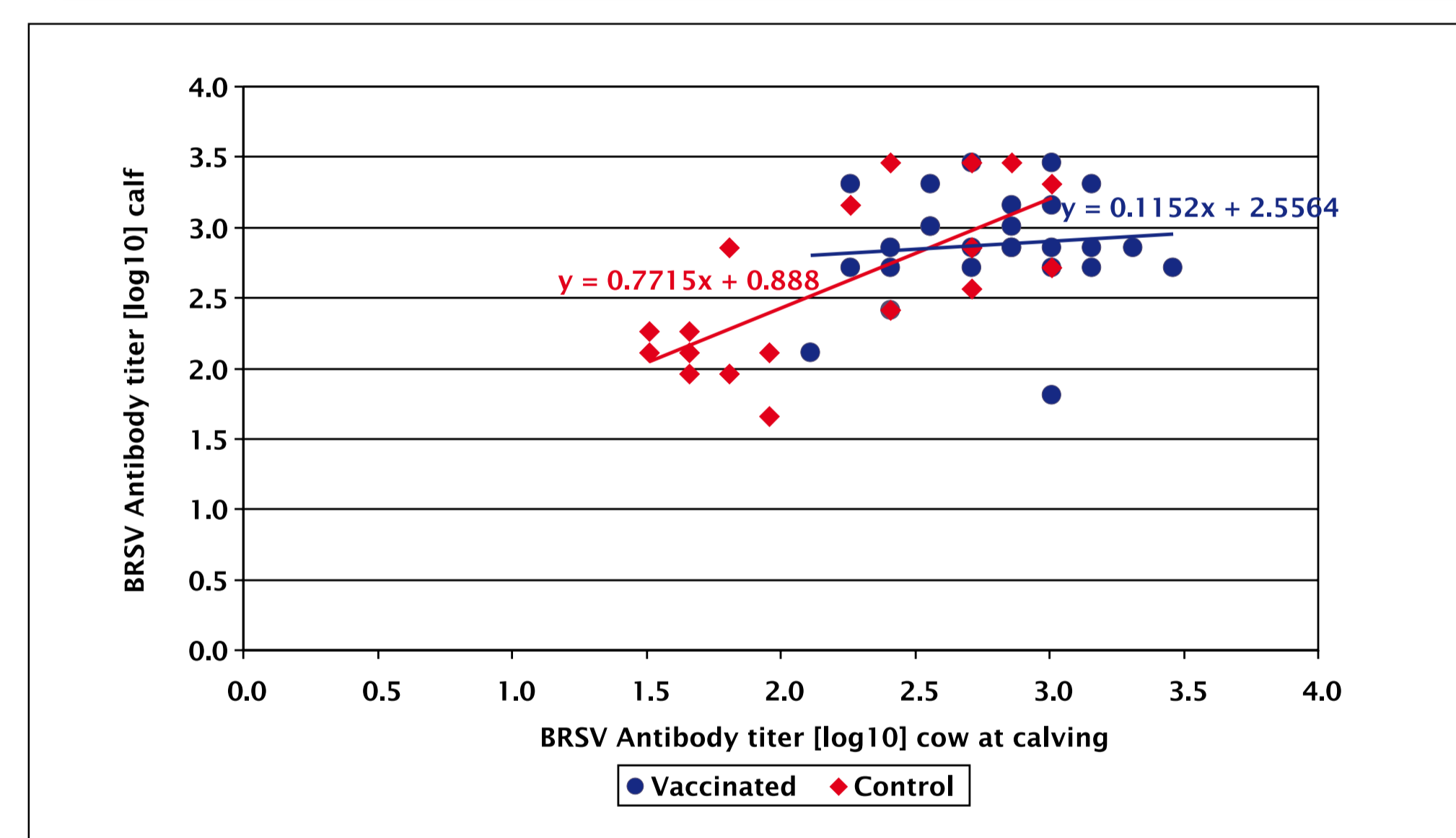


Fig. 5: Concept of cow vaccination against respiratory pathogens

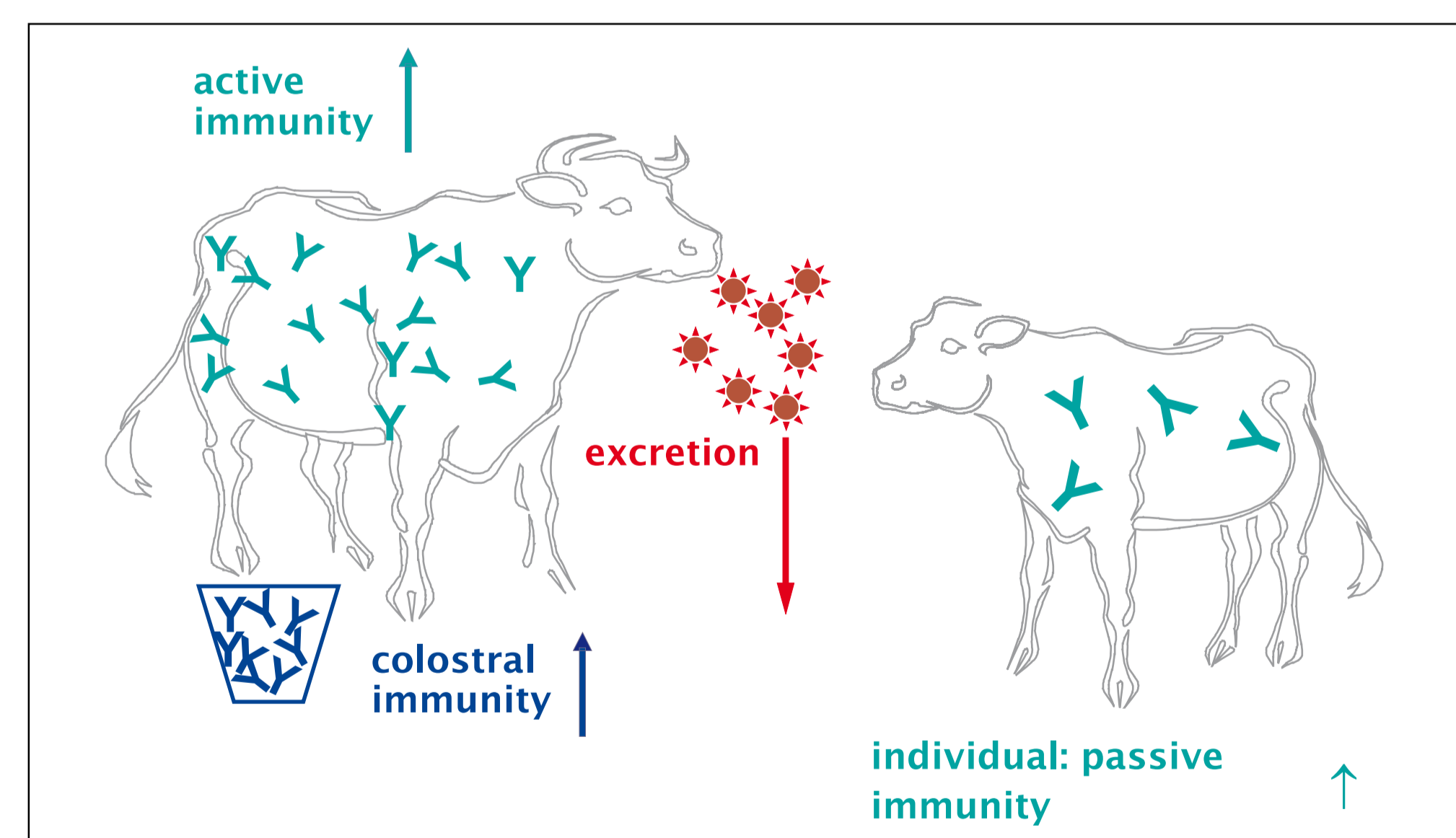


Fig. 4: Correlation between antibody titres against PI3 of the cows at calving and antibody titers in the calves

Conclusions

Cow vaccination prior to parturition with an inactivated vaccine against BRSV and PI3 in combination with proper colostrum management could be a strategy to achieve more homogeneous antibody levels in the serum of the dams and their calves and can therefore complement the active immunisation program in the calves (fig 5).