# Exploring Novel Respiratory Viruses in Dairy Calves: Associations with Clinical Signs and Inflammatory Response

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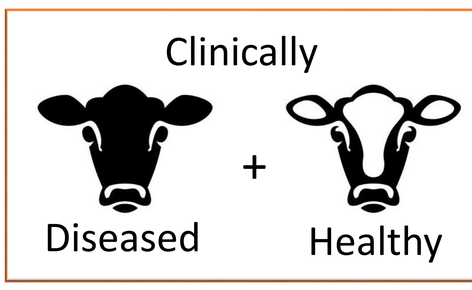
## BACKGROUND

- Bovine Respiratory Disease (BRD) is a burdening global problem affecting animal health and welfare, favours the (over)use of antimicrobials and entails economic consequences.
- Current understanding about the BRD etiology could be complemented by using next generation sequencing.

## METHODS

20 large-scale dairy herds



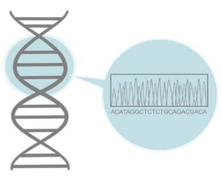

5 +5 calves sampled from each farm

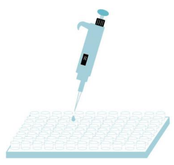
Clinical signs

Blood samples

BAL-sample

Farm-based pooled BAL-samples of healthy & diseased calves analysed for viruses using Illumina metagenome sequencing





Blood and BAL-samples analysed for acute phase proteins and cytokines


Six selected viruses more prevalent in pooled samples were analysed from individual BAL-samples using PCR

Associations with clinical respiratory disease signs (temp ≥39.5 and/or increased respiratory rate) and inflammatory markers

## AIMS

Explore the virome of dairy calf lower respiratory tract.

What is their clinical relevance?

Which infections induce inflammatory response?

## RESULTS

Viruses identified in pooled samples using sequencing:

- Severe acute respiratory syndrome-related coronavirus
- Betacoronavirus 1
- Bovine rhinitis B virus
- Ungulate copiparvovirus 1
- Bovine mastadenovirus B
- Bopivirus A
- Bovine rhinitis A virus
- Bovine copiparvovirus 3
- Ungulate copiparvovirus 5

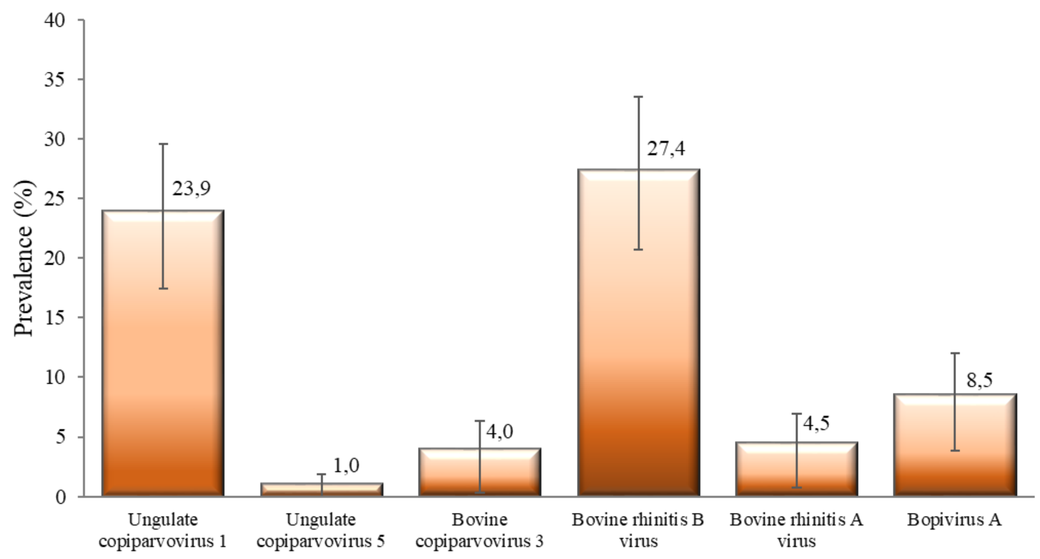
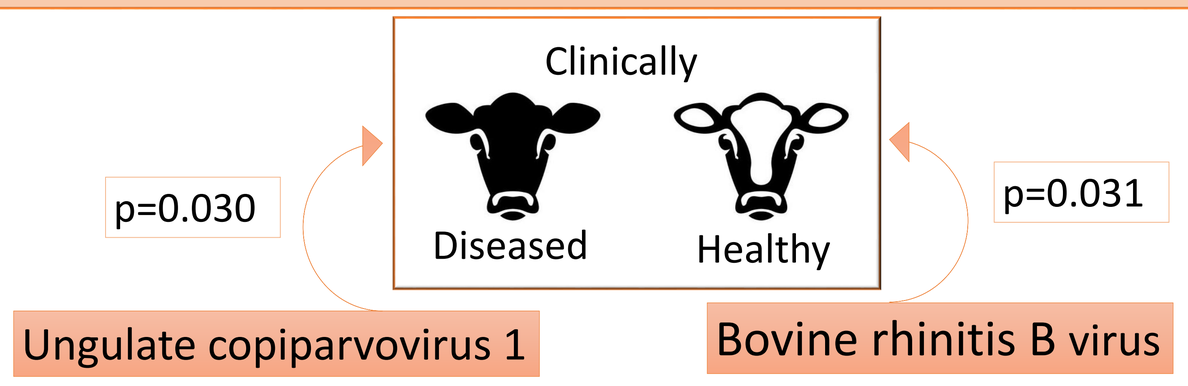
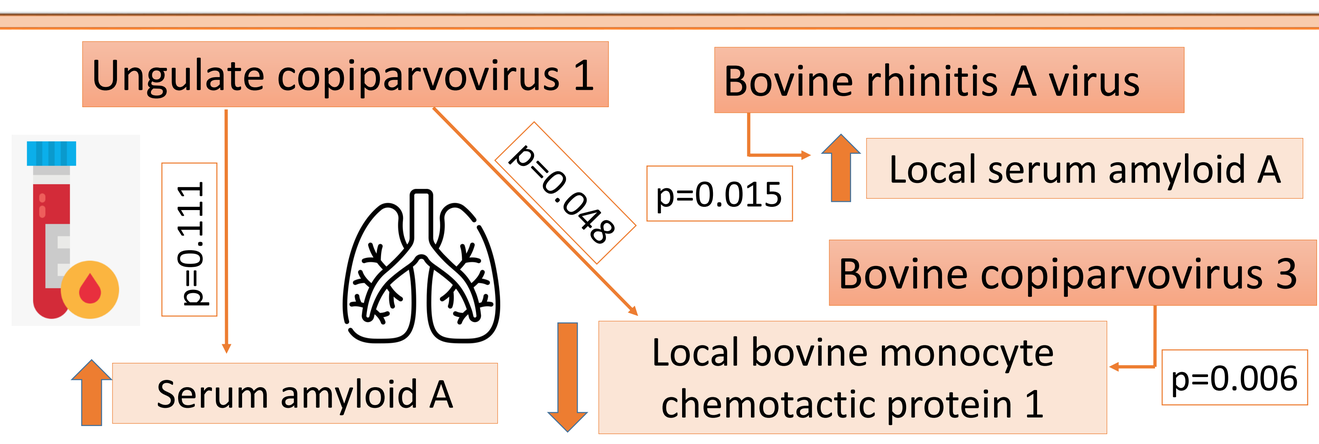



**Fig. 1.** Prevalence of selected viral species identified in individual BAL-samples of clinically healthy and diseases calves (n=201 calves from 20 herds)




## CONCLUSIONS

- Viruses typically associated with BRD were not at all identified, whereas novel viruses were detected.
- **Ungulate copiparvovirus 1** was associated with clinical respiratory disease signs and triggered systemic inflammatory response.
- **Bovine rhinitis B virus** was more prevalent in healthy calves without causing inflammation.

**ACKNOWLEDGEMENTS**

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