

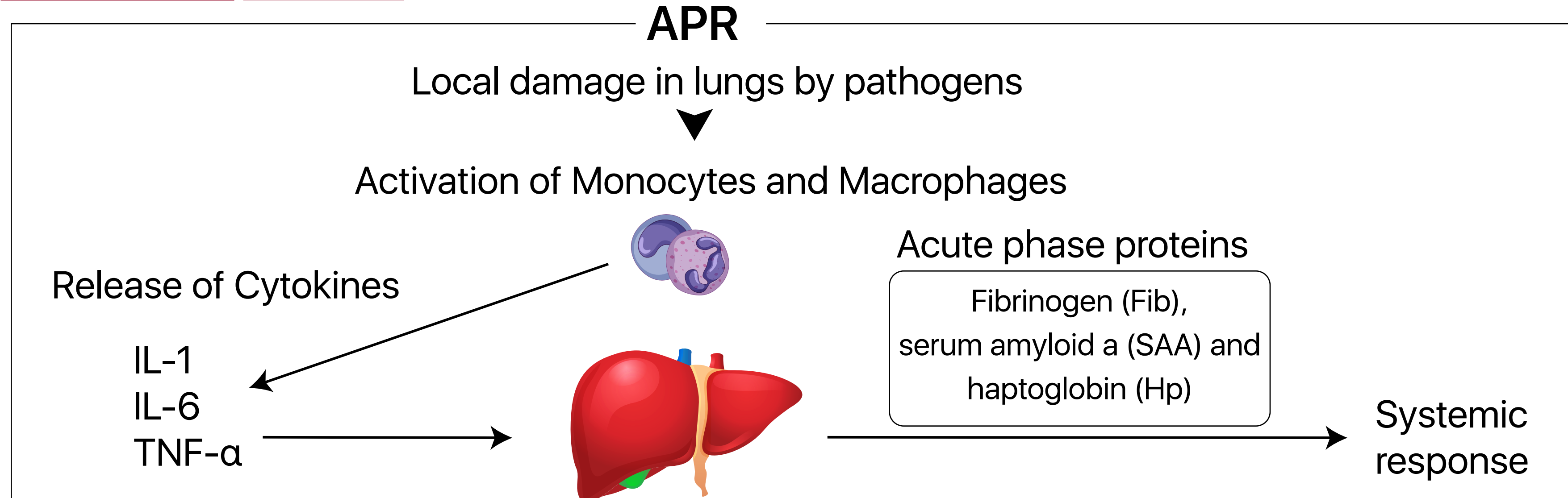
# Systemic acute phase response (APR) to lower respiratory tract bacterial pathogens



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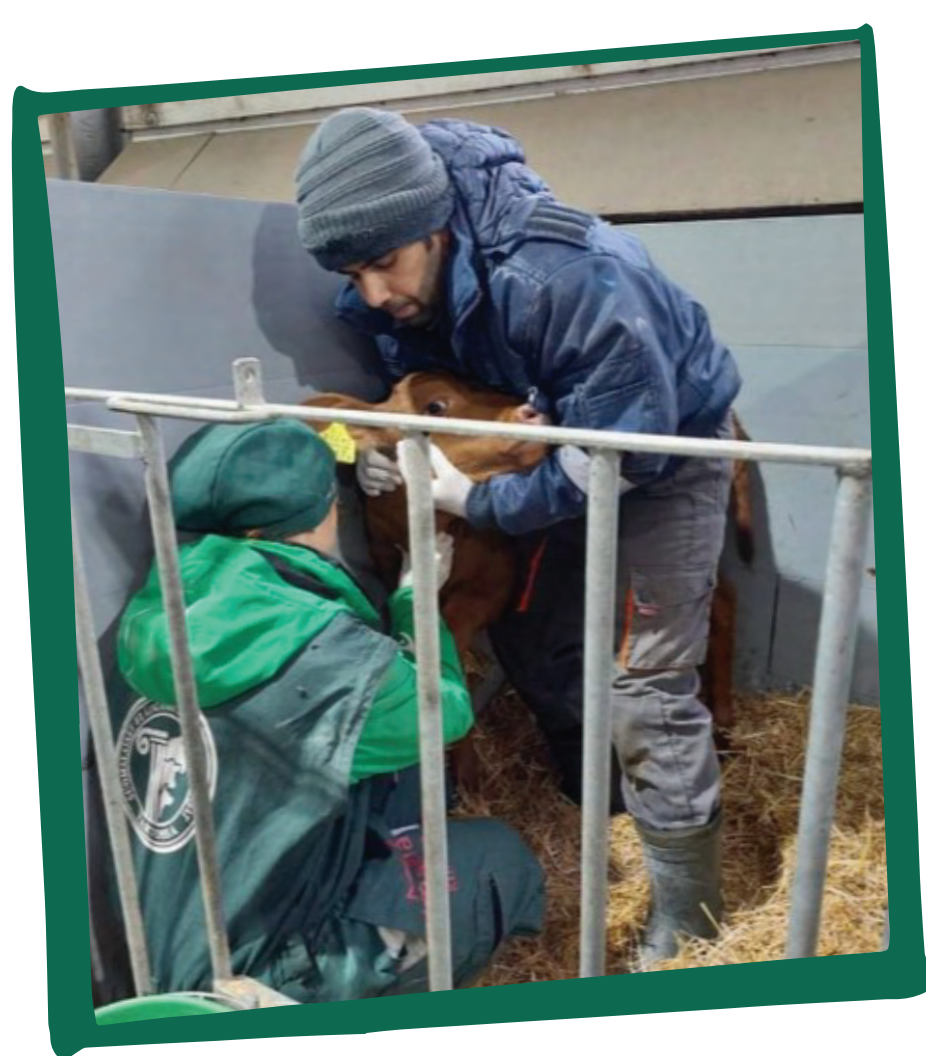
## Objective



Bovine Respiratory Disease (BRD) is one of the leading causes of morbidity, mortality and antimicrobial consumption in dairy calves

Aim of this study was to analyze the systemic acute phase response to lower respiratory tract bacterial pathogens and identify the acute phase proteins (APP's) markers that best characterizes the BRD infection and clinical disease signs

## Herds & Samples



Eleven dairy herds were studied all over Estonia  
 The mean age of calves was 27 days (range 2-71)

Blood and tracheo-bronchial lavage (TBL) samples were taken from 5 calves suffering from respiratory distress and 5 apparently healthy calves/herd, for a total of 110 calves

Sample analysis - Identification of bacteria by culturing and Hp by haemoglobin-binding assay, SAA by ELISA kit and Fib by heat precipitation technique



## Results

Table 1. Descriptive analysis of serum concentrations of investigated APP's in 110 calves

	SAA (mg/l)	Hp (mg/l)	Fib (g/l)
Median (min-max)	213.0 (9.0-511.2)	184 (30 - 1482)	5.28 (3.01 - 12.50)
1st quartile (25%)	118.6	132	4.65
3rd quartile (75%)	304.9	319	6.17

Table 2. Linear mixed model with herd random effect analyzing the association between lower respiratory tract bacterial pathogens, clinical signs of calves and plasma fibrinogen content (g/l)

Variables	n	Coefficient log (g/l)	SEM	P-value	Wald test p-value
Age (days)	110	-0.006	0.002	<0.001	
<i>P. multocida</i> - No	71	0			
Yes	39	0.096	0.045	0.035	
<i>H. somni</i> - No	108	0			
Yes	2	0.346	0.151	0.022	
Rectal temp. - <39.0	57	0			<0.001
39.0-39.49	12	0.006	0.07	0.932	
≥39.5	41	0.179	0.044	<0.001	
Coughing - No	93				
Yes	17	0.142	0.067	0.036	
Intercept		1.724	0.051	<0.001	

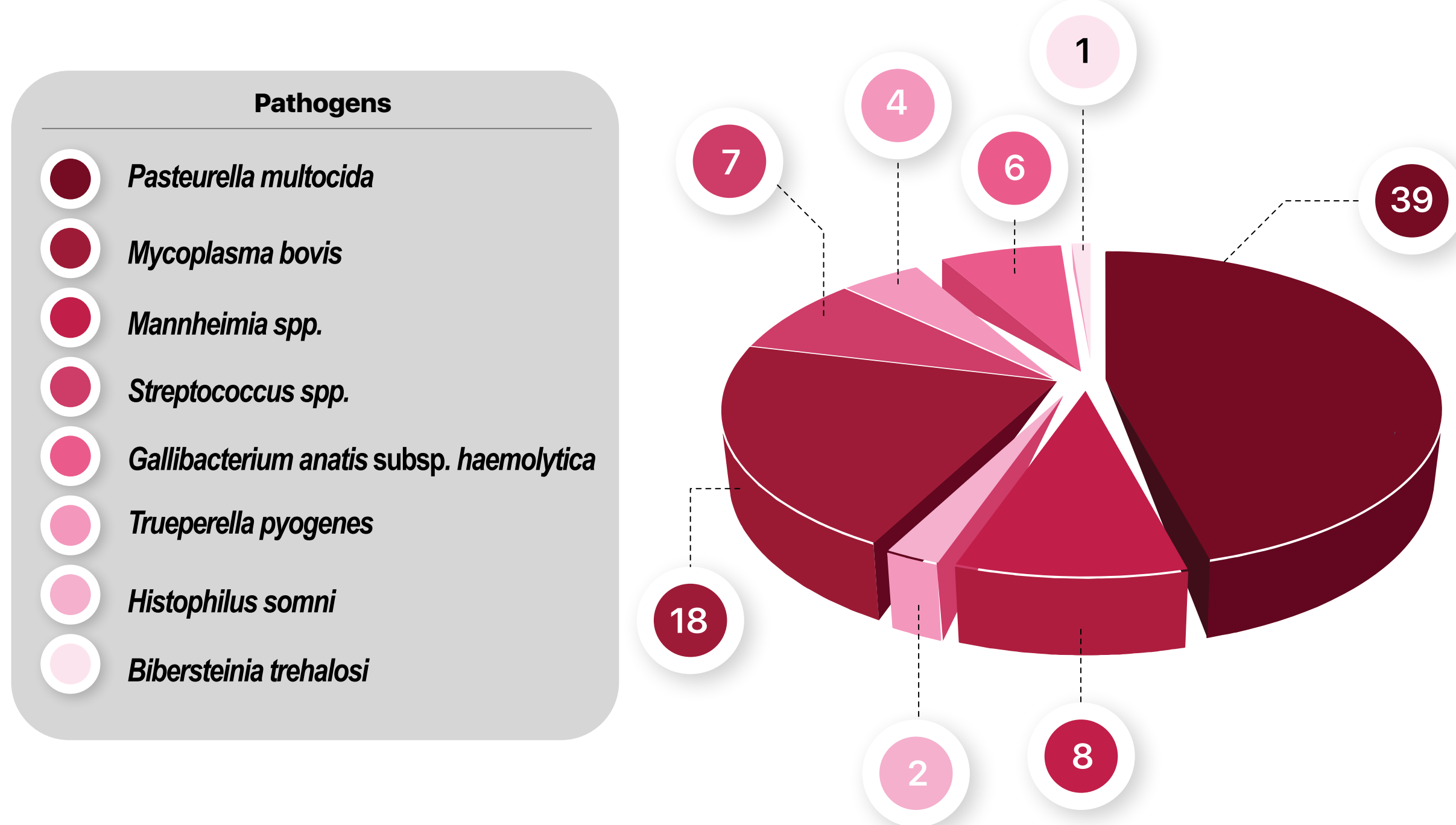


Figure: Bacterial pathogens isolated from TBL samples of 110 dairy calves

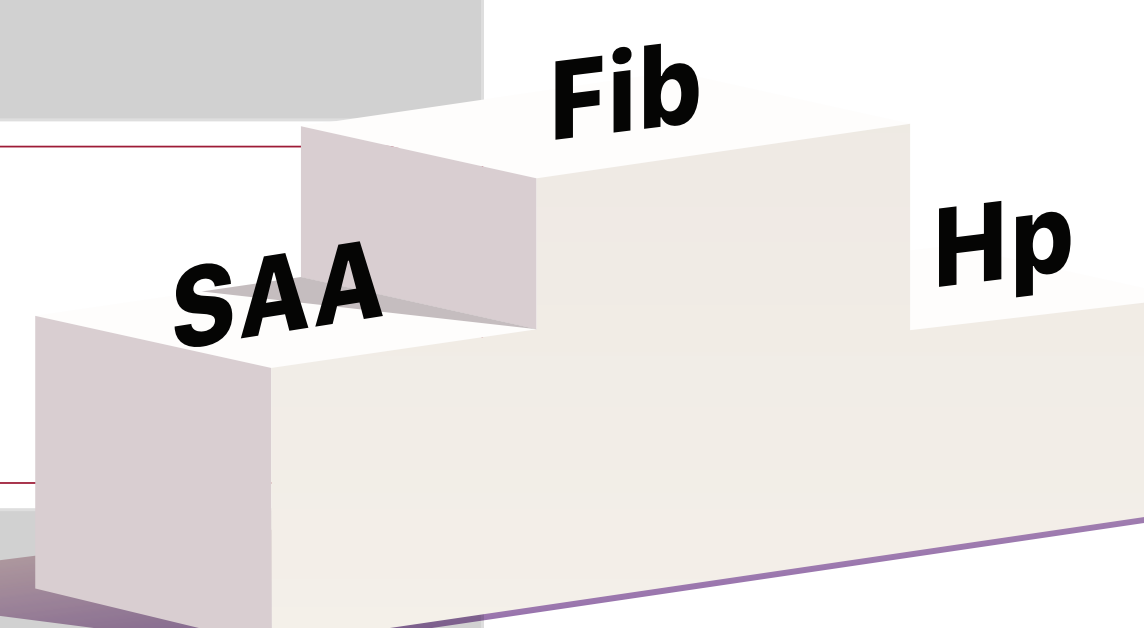
Calf rectal temperature ≥39.5°C was associated with elevated serum SAA concentration

Neither isolated bacteria nor clinical BRD signs were associated with serum Hp concentration

## Research Findings



- In our study we found *P. multocida* and *H. somni* as significant contributors to BRD
- Surprisingly, BRD pathogens *Mannheimia* spp. and *Mycoplasma bovis* did not induce systemic inflammatory response
- Plasma fibrinogen content together with BRD clinical signs is a sensitive marker for detecting bacterial infection in lower airways



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