
UPDATE
THEIR
IMMUNE
SYSTEM
BOVINE
RESPIRATORY
DISEASE IS A
RELENTLESS
HACKER
BOVALTO
Respi3
Respi4
Boehringer
Ingelheim

The immune system: always under attack

HUSBANDRY RISK FACTORS PLAY A KEY ROLE

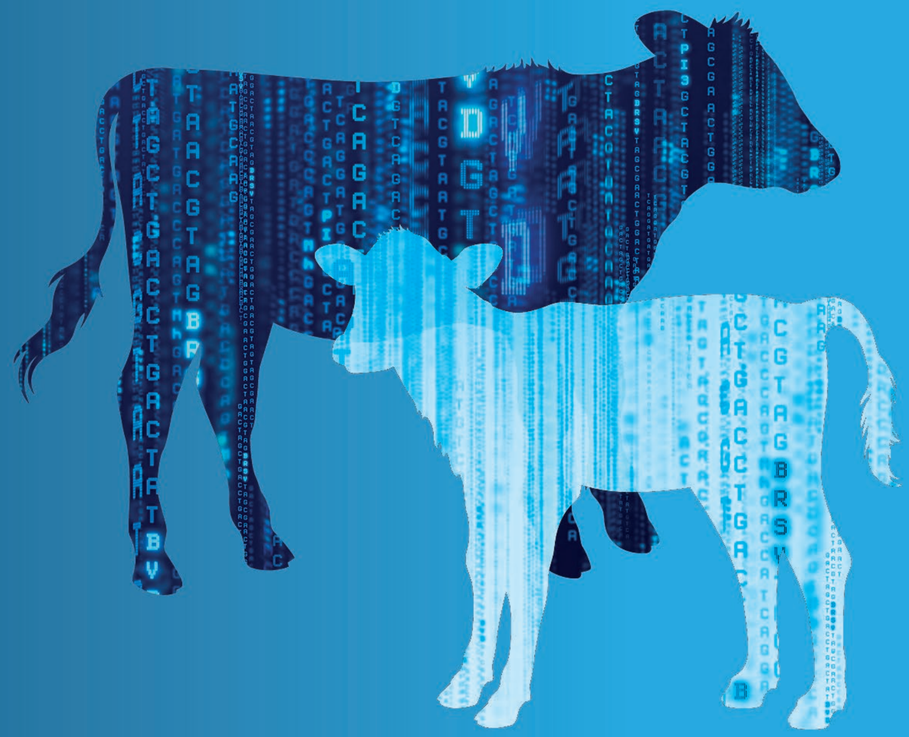
HOUSING[1]

External factors can have a negative impact on microbial load and clearance, such as:

- Humidity
- Temperature
- Air quality (NH_3, dust)
- Air movement and ventilation
- Clean and dry beds

NUTRITION[1]

- Adequate amount
- Quality
- Twice daily feeding
- Adequate fibre
- Good weaning protocol
- First 2 months critical to get it right



COLOSTRUM MANAGEMENT[1,2]

- Quality
- Quantity (10% bodyweight)
- Quickly (6 hours)
- Quietly
- sQueaky clean
- Failure of passive transfer (IgG rate <8–13 g/L) doubles the risk of bronchopneumonia

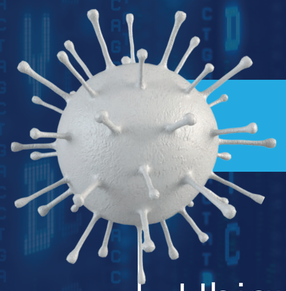
STRESS, TRANSPORT AND GROUPING[1–5]

- Corticosteroid levels are increased under stressful conditions, disrupting the immune system
- Handling animals increases stress
- Mixing of animals, especially of differing age groups
- Routine procedures such as disbudding and castration

Environmental threats are always present, opening the door to relentless pathogen attack

Respiratory pathogens: ultimate hackers of the immune system

THE INITIAL ATTACK – AVOID SECURITY BY SUPPRESSING THE IMMUNE SYSTEM



PI3[6]

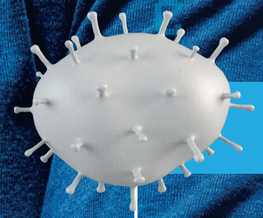
Ubiquitous respirovirus that breaks through mucus barriers & replicates covertly in macrophages. **Destabiliser** enabling secondary bacterial infections.

BVD[7]

Insidious, well-hidden & persistent pestivirus that targets leukocytes. Potent **down-regulator** of the immune system.

Mh[8]

Bacterial **destroyer** waiting for the chance to act. Armed with leukocyte damaging toxin causing fibrinous and necrotising lobar pneumonia.



BRSV[9,10]

Readily mutating pneumovirus leading to transient immunity. **Solo operator** that can inflict inflammation and necrotising bronchiolitis.

The final attack – shut down the system, destroy leukocytes and generate calf pneumonia

PI3: Parainfluenza type 3 virus; BVD: Bovine viral diarrhoea virus; Mh: *Mannheimia haemolytica;* BRSV: Bovine respiratory syncytial virus

Assess and upgrade the calf immune system

1 EVALUATE THE SYSTEM SECURITY – WHAT IS THE LEVEL OF PROTECTION?

EPIDEMIOLOGICAL BACKGROUND OF THE HERD

- Current circulating pathogens
- Regional risks
- Nature of disease seen in calves e.g. BVD

PASSIVELY ACQUIRED IMMUNITY

- Immunisation protocol of dams
- Colostrum management
- Actual calf passive transfer

HUSBANDRY SUPPORT FOR IMMUNITY

- Quality ration in adequate amount
- Air quality
- Housing groups

INDIVIDUAL ANIMAL SUSCEPTIBILITY

- Genetics & breed
- Age
- Weight
- Behaviour & temperament

2 SET UP THE REQUIRED PROTECTION

Use the right antigens in the vaccination programme

3 EXECUTE THE PREVENTION PROGRAMME

Start vaccination at the right age

Administer the correct number of doses

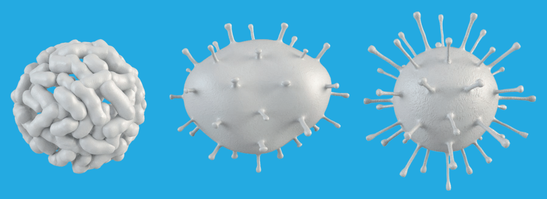
4 VALIDATE THE ACQUIRED LEVEL OF PROTECTION

Confirm that herd immunity improves

Reduce the risk of respiratory disease with a strong protection plan

Upgrade calf immunity with state-of-the-art vaccine-ware

DESIGNED FOR TODAY'S BRD CHALLENGE:



BVD, BRSV, PI3

- Proven by challenge against recent European viral antigens[11]

Mh

- Protection against one of the main[8] bacterial causes of pneumonia in young calves
- Proven by challenge[11]

DOUBLE ADJUVANT MATRIX FOR EFFICIENT STIMULATION OF THE IMMUNE SYSTEM

- Saponin-based adjuvants (Quil-A) able to stimulate comprehensive immunity[12]
- Aluminium hydroxide prolongs antigen presentation to extend and strengthen the immune response[13]

IN 2 DIFFERENT FORMULATIONS:

BOVALTO Respi3

ACTIVELY IMMUNISING CATTLE AGAINST:

- *M. haemolytica** A1
- Respiratory Syncytial Virus
- Parainfluenza 3 Virus

BOVALTO Respi4

ACTIVELY IMMUNISING CATTLE AGAINST:

- *M. haemolytica** A1
- Respiratory Syncytial Virus
- Parainfluenza 3 Virus
- \+ Bovine Viral Diarrhoea Virus

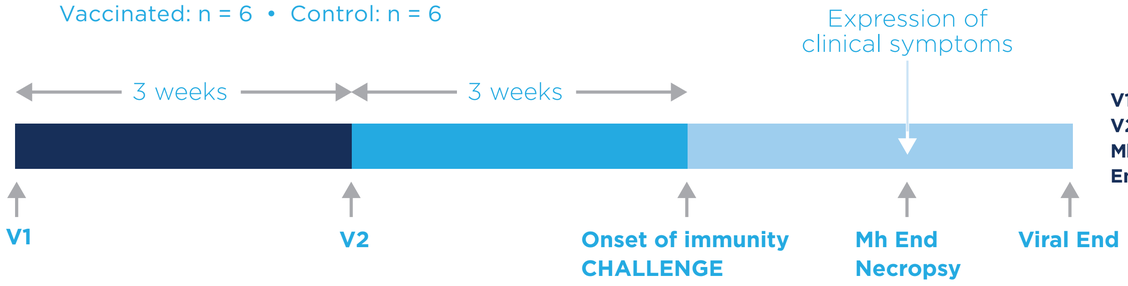
* Formerly known as *Pasteurella haemolytica*

Rapid onset of immunity

3 WEEKS AFTER PRIMARY COURSE[14]

DESIGN: BRSV, PI3, BVD, *Mannheimia haemolytica*

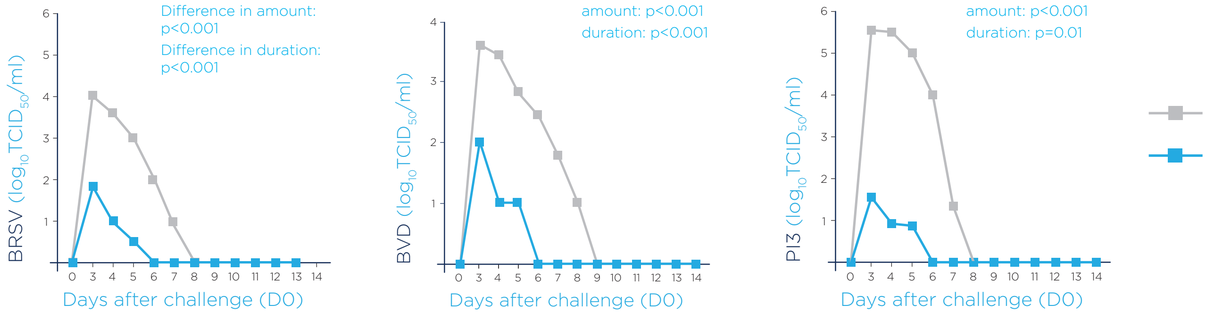
Vaccinated: n = 6 • Control: n = 6



V1 = 1st vaccination
V2 = 2nd vaccination
Mh = *Mannheimia haemolytica*
End = End of challenge (1–2 weeks)

RESULTS

OOI viral challenge



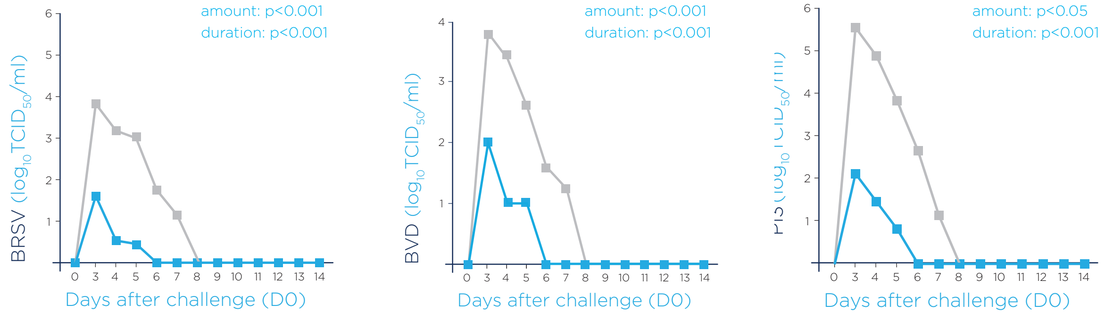
Continuous protection

6 MONTHS' PROTECTION FOR ALL PATHOGENS[11]

DESIGN: BRSV, PI3, BVD, *Mannheimia haemolytica*

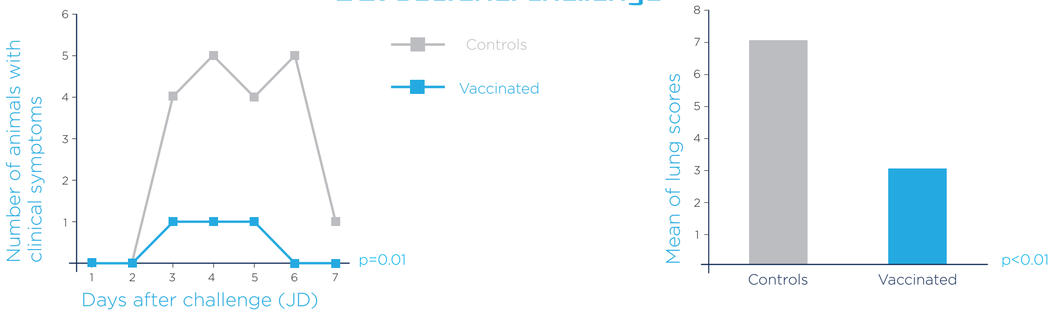
Vaccinated: n = 13 • Control: n = 13

DOI viral challenge

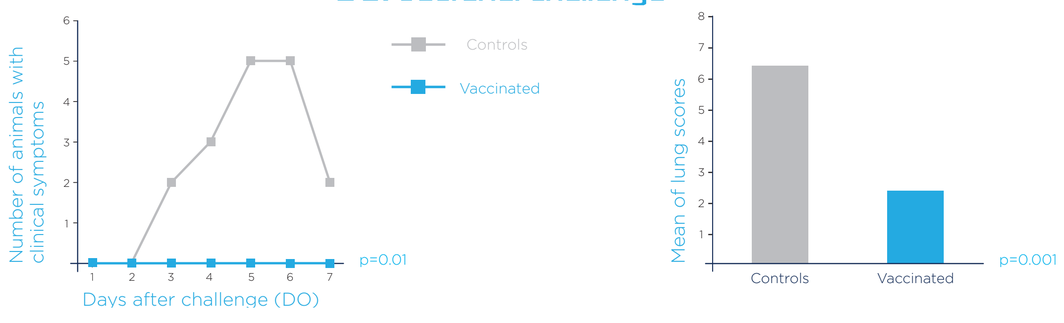


Significant reduction in amount and duration of **viral** excretion at both time points[11,14]

OOI bacterial challenge



DOI bacterial challenge



Significant reduction of clinical signs and lung lesions caused by **Mh** at both time points[11,14]

Challenged with recent strains using recent European viral isolates[11]

Designed to encourage field use, **BOVALTO** hardware delivers with ease and efficiency

A CONVENIENT AND RELIABLE VACCINATION PROGRAM

- Use from 2 weeks of age*[11]
- Rapid onset of immunity 3 weeks post-primary course[14]
- 6 months' continuous protection[11]

- Targets the key respiratory pathogens in a single vial
- Ready-to-use for practical handling
- Small injection volume to reduce discomfort to calves

1st INJECTION
DAY 0

2nd INJECTION
3 WEEKS

ONSET OF IMMUNITY
3 WEEKS AFTER 2nd INJECTION

DURATION OF IMMUNITY
6 MONTHS AFTER 2nd INJECTION

BOOSTER INJECTION

BOVALTO Respi3 Respi4

*For calves from immune dams or where the immune status of the dam is unknown, the vaccination scheme should be adapted at the discretion of the veterinarian to take into account potential interference of maternally derived antibodies with the response to vaccination.

Build your integrated control plan with BOVALTO to reduce the incidence, severity and impact of respiratory disease

BOEHRINGER INGELHEIM IS COMMITTED TO SUPPORTING YOU IN DISEASE PREVENTION

#CALFMATTERS

Visit calfmatters.co.uk for further information about how Boehringer can support you to protect the health of your clients' youngstock

References:

1. Foucras G *et al.* (2011) Bull GTV 61: 73–80
2. Boulton A *et al.* (2015) Open Journal of Animal Sciences 5: 185-197
3. Grignard L *et al.* (2001) Applied Animal Behaviour Science 71: 263–276
4. Maunsell FP *et al.* (2011) Journal of Animal Science 25(4): 772-783
5. Grupta S *et al.* (2005) Journal of Animal Science 85: 1948–1958
6. Ellis JA *et al.* (2010) Vet Clin Food Anim 26: 575–593
7. Lanyon SR *et al.* (2013) The Veterinary Journal 199: 201–209
8. Rice A *et al.* (2008) Animal Health Research Reviews 8(2): 117–128
9. Meyer G *et al.* (2008) Comp Immunol Microbiol Infect Dis. 31: 191–225
10. Baker JC *et al.* (1997) Vet Clin Food Anim 13(3): 425–454
11. Phillippe-Reversat *et al.* (2017) Acta Vet. BRNO 86: 325-332
12. O'Hagan D *et al.* (2001) Biomolecular Engineering 18: 69–85
13. Awate S *et al.* (2013) Frontiers in Immunology 4(114): 1–4
14. BOVALTO Respi 3 and 4, registration studies. Data on file.

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