

PYRAMID[®] 5

PROTECTION AGAINST BRSV WITH MATERNAL ANTIBODIES PRESENT¹

- Protection from antibody-rich colostrum fades over time, leaving calves' immune systems unprepared to fight off disease
- Without vaccination, calves will be left vulnerable to bovine respiratory syncytial virus (BRSV), a leading viral contributor to bovine respiratory disease (BRD)
- Some producers rely on intranasal vaccines for this protection, under the impression injectable vaccines are ineffective in the face of maternal antibodies

Goal: Evaluate whether injectable vaccine PYRAMID[®] 5 and its unique METASTIM[®] adjuvant offer protection against BRSV in the presence of maternal antibodies, when given to calves at approximately 30 days of age.

The study: 33 calves were fed colostrum with BRSV antibodies to transfer adequate maternal immunity. At 30 days of age:

- 17 calves were vaccinated with PYRAMID 5
- 16 control calves were sham-vaccinated with sterile diluent

72 days later, each calf was challenged with BRSV intranasally. The group was monitored for 8 days following the disease challenge, then necropsied.

KEY FINDINGS

When challenged with BRSV, calves vaccinated with PYRAMID 5 had:



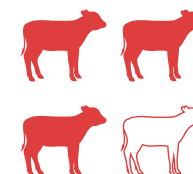
Significantly reduced runny eyes, lung lesions and fever, indicating **lower disease severity**



Less viral shedding over a shorter duration, reducing spread to healthy herd mates



Stronger immune memory response, to help fight off BRSV in the future



Higher mucosal immune response in over half the vaccinated calves, demonstrating **strong local protection from an injectable vaccine**

KEY TAKEAWAY

EVEN IN THE FACE OF MATERNAL ANTIBODIES, CALVES VACCINATED WITH PYRAMID[®] 5 WERE PROTECTED WHEN EXPOSED TO BRSV, AND MAINTAINED ENHANCED IMMUNITY AFTER DISEASE CHALLENGE.

METASTIM[®] ADJUVANT FUELS STRONG IMMUNE RESPONSE

The METASTIM adjuvant, unique to PYRAMID[®] vaccines, is specifically engineered to overcome immunity interference from maternal antibodies. This study, along with others, has shown **PYRAMID 5 provides protection against diseases like BRSV and BVDV Types 1 and 2 in calves as young as 30 days of age — thanks to METASTIM.**¹⁻⁴

PYRAMID[®] 5 GENERATES MUCOSAL IMMUNITY

Intranasal vaccines were thought to be the only vaccination option to produce mucosal immunity. In this study, PYRAMID 5 and its METASTIM adjuvant created both systemic and mucosal immune responses in the face of maternal antibodies.



PYRAMID[®] 5 IS THE FIRST INJECTABLE VACCINE PROVEN TO PRODUCE MUCOSAL IMMUNITY IN CALVES.¹

¹ Kolb EA, Buterbaugh RE, Rinehart CL, et al. Protection against bovine respiratory syncytial virus in calves vaccinated with adjuvanted modified-live vaccine administered in the face of maternal antibody. *Vaccine* 2020;38(2):298–308. Available at: <https://doi.org/10.1016/j.vaccine.2019.10.015>. Accessed April 30, 2025.

² Zimmerman AD, Buterbaugh RE, Schnackel JA, Chase CCL. Efficacy of a modified-live virus vaccine administered to calves with maternal antibodies and challenged seven months later with a virulent bovine viral diarrhea Type 2 virus. *Bov Pract* 2009;43(1):35–43.

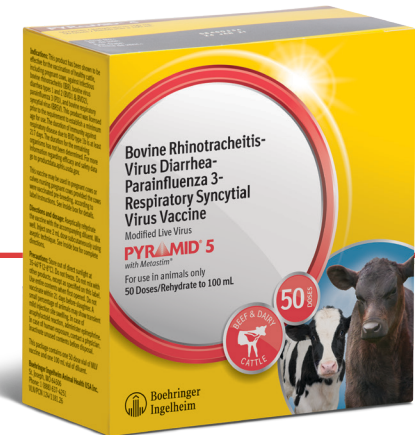
³ Zimmerman AD, Boots RE, Valli JL, Chase CCL. Evaluation of protection against virulent bovine viral diarrhea virus Type 2 in calves that had maternal antibodies and were vaccinated with a modified-live vaccine. *JAVMA* 2006;228(11):1757–1761.

⁴ Perkins-Oines S, Dias N, Krafur G, et al. The effect of neonatal vaccination for bovine respiratory disease in the face of a dual challenge with bovine viral diarrhea virus and Mannheimia haemolytica. *Vaccine* 2023;41(19):3080–3091.

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