

Flu Avert® I.N. Vaccine

# The Science of Exceptional

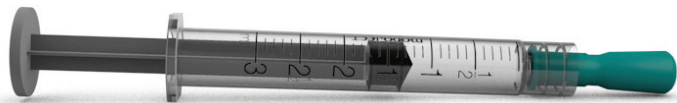
*Flu Avert I.N. is a one-of-a-kind, modified-live, intranasal equine influenza (EIV) vaccine that stimulates a broad immune response – similar to natural EIV infection – at the site of infection.<sup>1</sup>*



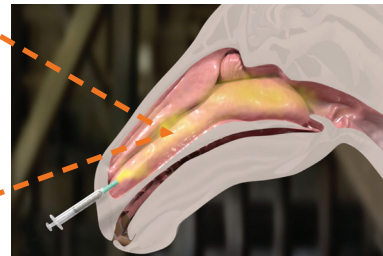
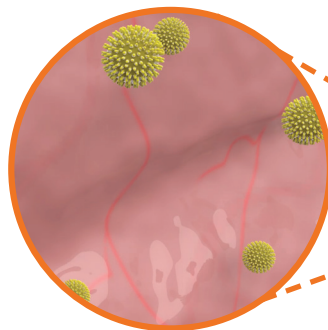
## **Flu Avert I.N. applicator makes vaccination easier for the horse and veterinarian<sup>1</sup>**

- Proprietary new applicator uniquely delivers enhanced coverage of the vaccine throughout the nasal cavity in a less invasive manner<sup>1</sup>
- Atomizes the vaccine, delivering it in a much smaller particle size than with other applicators. This allows the vaccine to reach further into the nasal cavity and cover a broader area of the nasal and pharyngeal mucosa<sup>1</sup>
- Administered just inside the ventral nares of the horse, the applicator delivers a fine mist that is well-tolerated by most horses
- Attaches to a luer-lock syringe; just 1-inch long and ¼-inch wide

## **The new FluAvert I.N. applicator atomizes the vaccine, enhancing distribution and contact with nasal and pharyngeal mucosa.**



Flu Avert I.N. antigen particles make contact with the lymphoid tissue in the upper respiratory tract, simulating a natural type infection **that triggers both innate and adaptive immune responses.**



Flu Avert I.N.'s unique intranasal administration of a cold-adapted modified-live virus (MLV) influenza strain (not a killed vaccine)

**As a modified-live (MLV), intranasal, replicating vaccine, Flu Avert I.N. is less subject to the consequences of antigenic drift than inactivated vaccines, and continues to provide exceptional protection against clinically relevant influenza strains infecting horses in the U.S.<sup>3,4,5</sup>**

## **Innate Immune Response**

Fast-acting, non-specific immune response that occurs at the site of infection.

- Mucosal cells sense antigen and release cytokines and interferons with strong antiviral activity
- Mucosal dendritic cells capture viral particles
- Capable of releasing cytokines and interferons, dendritic cells are an important part of the innate defense mechanism that provides non-specific mucosal immunity

## **Adaptive Immune Response**

Antigen-specific, acquired immunity. Occurs after initial exposure to a specific pathogen. The two types of adaptive immune response are humoral immunity (antibodies) and cell-mediated immunity.

- Dendritic cells present viral particles to T-cells, including antigen-specific cytotoxic T-lymphocytes that kill infected cells
  - This is an example of the cell-mediated immune response generated by Flu Avert I.N.
- Dendritic cells also present viral particles to B-cells that become activated to manufacture equine influenza-specific antibodies, in the form of IgG and IgA
  - These antibodies neutralize viral particles in a wild-type infection, preventing them from infecting host cells
  - This is an example of the humoral immunity provided by Flu Avert I.N.

# One Powerful Dose of Immunity

## Flu Avert® I.N. delivers one-of-a-kind, broad-spectrum protection

### ONLY Flu Avert I.N.:

- Stimulates similar innate immune responses in equine airway epithelium as seen after infection with wild type influenza virus.<sup>2</sup>
- Provides excellent EIV protection by stimulating local and systemic immunity.
- Escalates mucosal immunity that is antigen (EIV) and non-antigen-specific and which could improve the horse's defense against entry of other common respiratory pathogens, in addition to influenza.



### Just ONE dose required

- No muscle soreness or injection-site reaction
- Immunity at the site of infection
- No adjuvant



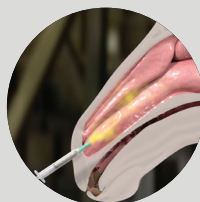
### Proven safe and effective

- Even in horses immunosuppressed by long distant transport or exercise<sup>6</sup>
- Unprecedented efficacy proven in numerous challenge studies<sup>2, 5, 7, 8</sup>



### Intranasal route of administration

- For primary immunization
- For booster immunization following any other EIV vaccine



### Rapid onset of immunity

- Five to seven days in naïve animals<sup>9</sup>
- Intranasal vaccine, which is recommended for use during EIV outbreaks<sup>9</sup>

*“The difficulty of administration has been removed from the discussion, and no one can argue with the data behind Flu Avert and its efficacy. The fine mist makes it much less dramatic for the horse, and it’s incredibly easy to administer – even for me as a 5-foot-4 veterinarian.”*

*– Erica Lacher, D.V.M., Newberry, Fla.*

*“I have never had a horse come down with influenza that was vaccinated with Flu Avert; nor have I seen any reactions following its use. And now, with the ease of administration afforded by the new applicator, I strongly prefer the intranasal influenza vaccine administration.”*

*– Robert Ball, D.V.M., San Antonio, Texas*

<sup>1</sup>Data on file, Merck Animal Health.

<sup>2</sup>HL Pecoraro, D. Koch, G Soboll, Hussey, L Bentsen, GA Landolt. Comparison of innate immune responses in equine respiratory epithelial cells to modified-live equine influenza vaccine and related wild-type influenza virus. Proceedings ACVIM Annual Forum 2014.

<sup>3</sup>Chambers TM, Holland RE, et. al. A new modified live equine influenza virus vaccine: phenotypic stability, restricted spread and efficacy against heterologous virus challenge. Equine Vet J. 2001;33(7):630-636.

<sup>4</sup>Van de Zande S. Efficacy of Flu Avert IN, a modified live influenza vaccine for horses used in different vaccination schedules against A/Equi-2/South Africa 04/03 Challenge. Efficacy of Flu Avert / Prequenza,

<sup>5</sup>Merck Animal Health and University of California, Davis (Nicola Pusterla). Infectious Upper Respiratory Disease Surveillance Program. Ongoing Research 2008 – present.

<sup>6</sup>Lunn DP, Steve Hussey S, et al. Safety, efficacy, and immunogenicity of a modified-live equine influenza virus vaccine in ponies after induction of exercise-induced immunosuppression. JAVMA 2001;218(6):900-906.

<sup>7</sup>Townsend HGG, Penner SJ, et al. Efficacy of a cold-adapted, intranasal, equine influenza vaccine: challenge trials. Equine Vet J. 2001;33(7):637-643.

<sup>8</sup>Townsend HGG. Onset of protection against live-virus equine influenza challenge following vaccination of naïve horses with a modified-live vaccine. Unpublished data.

<sup>9</sup>AAEP vaccination guidelines: [www.aaep.org](http://www.aaep.org)

**Contact your Merck Animal Health sales representative or call 1-800-521-5767 for more information.**

## The Science of Healthier Animals

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