

RECOMBINANT TYPE 3 VACCINE TECHNOLOGY



RECOMBITEK® is a registered trademark of Boehringer Ingelheim Animal Health USA Inc. PUREVAX® is a registered trademark of the Boehringer Ingelheim Group. ©2021 Boehringer Ingelheim Animal Health USA Inc., Duluth, GA. All rights reserved. US-PET-0782-2020-A.



VACCINE TECHNOLOGY

TRADITIONAL VACCINE TECHNOLOGY

- Vaccines were originally developed on an empirical basis, relying mostly on attenuation of pathogens (e.g., modified live viral vaccines) or inactivation of pathogens (e.g., killed vaccines).¹
- Many current vaccines owe their success to their ability to target pathogens that have low antigenic variability and for which protection depends on antibody-mediated immunity.¹
- On the other hand, important cell-mediated immunity against intracellular pathogens is more difficult to obtain using inactivated pathogens as vaccines.¹
- Live attenuated pathogen vaccines can elicit cell-mediated immunity, but may pose potential risks that cannot be overlooked. Although not often, these vaccines can be virulent in susceptible hosts or experience reversal of attenuation.¹

WHY RECOMBINANT VACCINE TECHNOLOGY?

- Advances in immunology, molecular biology, biochemistry, and genomics have provided additional perspectives to the vaccinology field.¹
- The use of recombinant proteins allows the targeting of immune responses focused against a few protective antigens.¹
- Therefore vaccines can be developed that **contain only the necessary immunogenic protein(s) rather than the entire virus or bacteria.**

WHAT IS RECOMBINANT TYPE 3 VACCINE TECHNOLOGY?

- Recombinant Type 3 vaccine technology is based on the ability to isolate and splice (i.e., recombine) gene-sized fragments of RNA or DNA from one organism, for incorporation into a vector virus.

- A vector virus is a live virus that carries its own natural genes, plus the foreign immunity gene(s) of one or more different virus(es).
- The vector virus used in RECOMBITEK[®] and PUREVAX[®] Type 3 Recombinant vaccines is a **canarypox virus.**
- Canarypox-vectored recombinant vaccines contain only a portion of the genetic material of a pathogen, not the complete organism. Therefore, it is not possible for the recombined canarypox virus to produce disease from the pathogen in the vaccinated animal.

WHY CANARYPOX VIRUS?

- Canarypox viruses have specific cytoplasmic requirements for replication, which are not met by mammalian cytoplasm, therefore replication cannot occur in mammalian cells.²
- Canarypox virus is genetically stable, and its large genome allows the insertion of single or multiple segments of DNA from the disease-causing organism.²

THE BENEFITS OF A CANARYPOX-VECTORED VACCINE

- Simulates natural exposure and produces both humoral and cell-mediated immunity^{2,3}
- No risk of reversion to virulence (as the vaccine only contains one or two gene-sized pieces of DNA from the pathogenic organism)
- Canarypox-vectored pet vaccines (including both RECOMBITEK and PUREVAX brands) are adjuvant-free
- Only uses the necessary proteins needed for protection, rather than the entire pathogenic virus

¹ Nascimento IP, Leite LCC. Recombinant vaccines and the development of new vaccine strategies. *Brazilian Journal of Medical and Biological Research*. 2012;45:1102-1111. ISSN 1414-431X Review.

² Poulet H, Minka J, Pardo MC, Juillard V, Nordgren B, Audonnet JC. Development and registration of recombinant veterinary vaccines. The example of the canarypox vector platform. *Vaccine*. 2006;25:5606-5612.

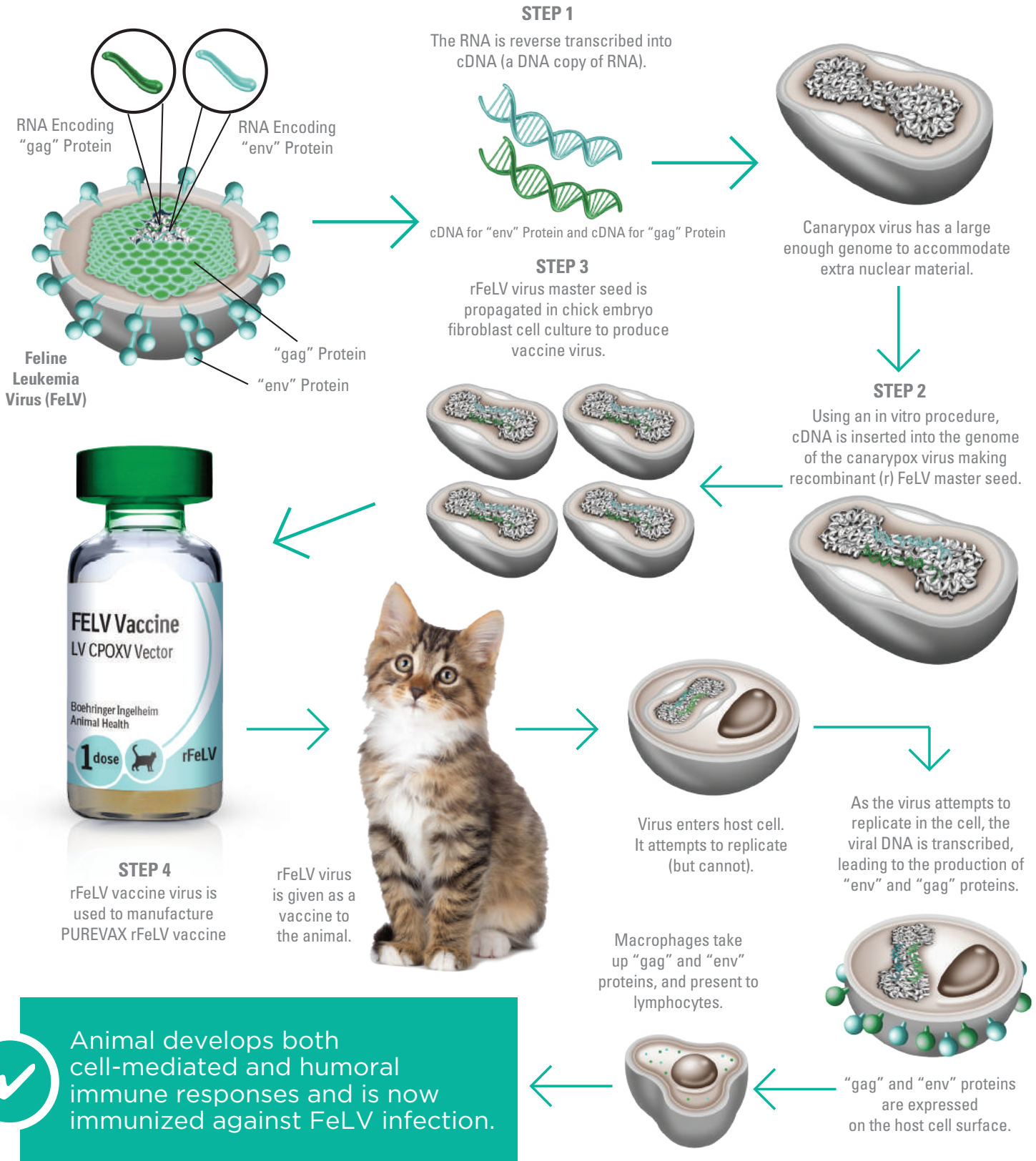
³ Paillot R, Kydd JH, Sindle T et al. Antibody and IFN-gamma responses induced by a recombinant canarypox vaccine and challenge infection with equine influenza virus. *Veterinary Immunology and Immunopathology*. 2006;112:225-233.

RECOMBITEK® Distemper: The Manufacturing Process and Mode of Action



RECOMBITEK® is a registered trademark of Boehringer Ingelheim Animal Health USA Inc.
©2021 Boehringer Ingelheim Animal Health USA Inc., Duluth, GA. All rights reserved. US-PET-0782-2020-B.

PUREVAX® FeLV: The Manufacturing Process and Mode of Action



PUREVAX® is a registered trademark of the Boehringer Ingelheim Group.
©2021 Boehringer Ingelheim Animal Health USA Inc., Duluth, GA. All rights reserved. US-PET-0782-2020-C.

PUREVAX® Rabies: The Manufacturing Process and Mode Of Action



PUREVAX® is a registered trademark of the Boehringer Ingelheim Group.
©2021 Boehringer Ingelheim Animal Health USA Inc., Duluth, GA. All rights reserved. US-PET-0782-2020-D.