

Everything starts with protecting them.

Life forward



Everything starts with protecting them.

Canine and feline vaccines from Boehringer Ingelheim



RECOMBITEK



IMRAB



PUREVAX



Content

3	RECOMBITEK® Canine Vaccines	
	RECOMBITEK Distemper	5
	RECOMBITEK Canine Parvo	8
	RECOMBITEK Lyme	10
	RECOMBITEK 4 Lepto	18
	RECOMBITEK Oral Bordetella	22
	RECOMBITEK KC2	26
28	Canine Vaccine Satisfaction Guarantee	28
29	Canine Vaccines Product List	29
30	IMRAB® Rabies Vaccines	30
32	PUREVAX® Feline Vaccines	32
	PUREVAX Recombinant FeLV	35
	PUREVAX Feline Rabies	40
43	Feline Vaccine Satisfaction Guarantee	43
47	Feline Vaccines Product List	47
48	References	48

Breakthroughs that help prevent outbreaks



Boehringer Ingelheim is a research-driven company that is committed to developing advanced prevention and innovative therapies that help protect, improve and extend patient lives.



RECOMBITEK® offers innovative canine vaccines that use advanced technology to help protect dogs and puppies from a range of dangerous and deadly diseases. **RECOMBITEK** vaccines are safe and effective, providing proven protection to dogs, as well as puppies, and much-needed peace of mind to pet owners as well as veterinarians.



IMRAB® is a market-leading US rabies vaccine.¹ **IMRAB** provides robust immunity against one of nature's deadliest killers. **IMRAB 3** is the only rabies vaccine approved for six species (dogs, cats, cattle, horses, sheep, and ferrets), and **IMRAB** vaccines have provided trusted rabies prevention with over 35 years of proven safety.^{2,3}

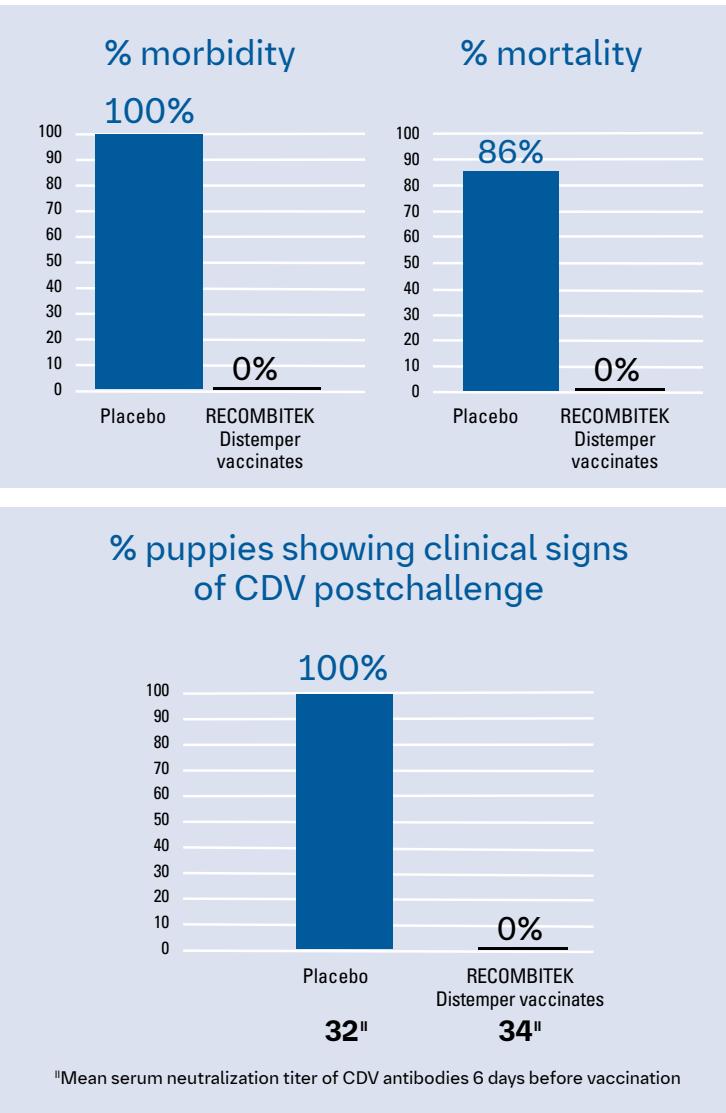


PUREVAX® is the only complete line of nonadjuvanted feline vaccines. The advanced science in **PUREVAX** vaccines gives cats and kittens protection from dangerous and deadly diseases, while giving veterinarians and cat owners the peace of mind of knowing their cats are receiving nonadjuvanted, highly purified protection.



RECOMBITEK® Distemper: the **only** recombinant canine distemper vaccine

Made using recombinant canarypox-vectored vaccine technology, RECOMBITEK canine distemper provides the following benefits:



Proven efficacy⁴

In a placebo-controlled laboratory study, puppies between 7 and 10 weeks of age were vaccinated twice (21 days apart) with canarypox-vectored RECOMBITEK canine distemper vaccine along with MLV components of CAV, CCV, CPiV, and CPV, reconstituted with *Leptospira Canicola* and *L. Icterohaemorrhagiae* bacterins or sterile water. The placebo group received the same MLV components except recombinant distemper. Animals were challenged 21 days after booster vaccination with a virulent canine distemper virus (CDV). All of the vaccinated dogs were protected from morbidity and mortality after being challenged with virulent CDV.

Protection in the presence of MDA⁵

In puppies with maternally derived antibodies (MDA), RECOMBITEK distemper vaccine provided significant protection to a highly virulent CDV challenge.



Proven strength⁶

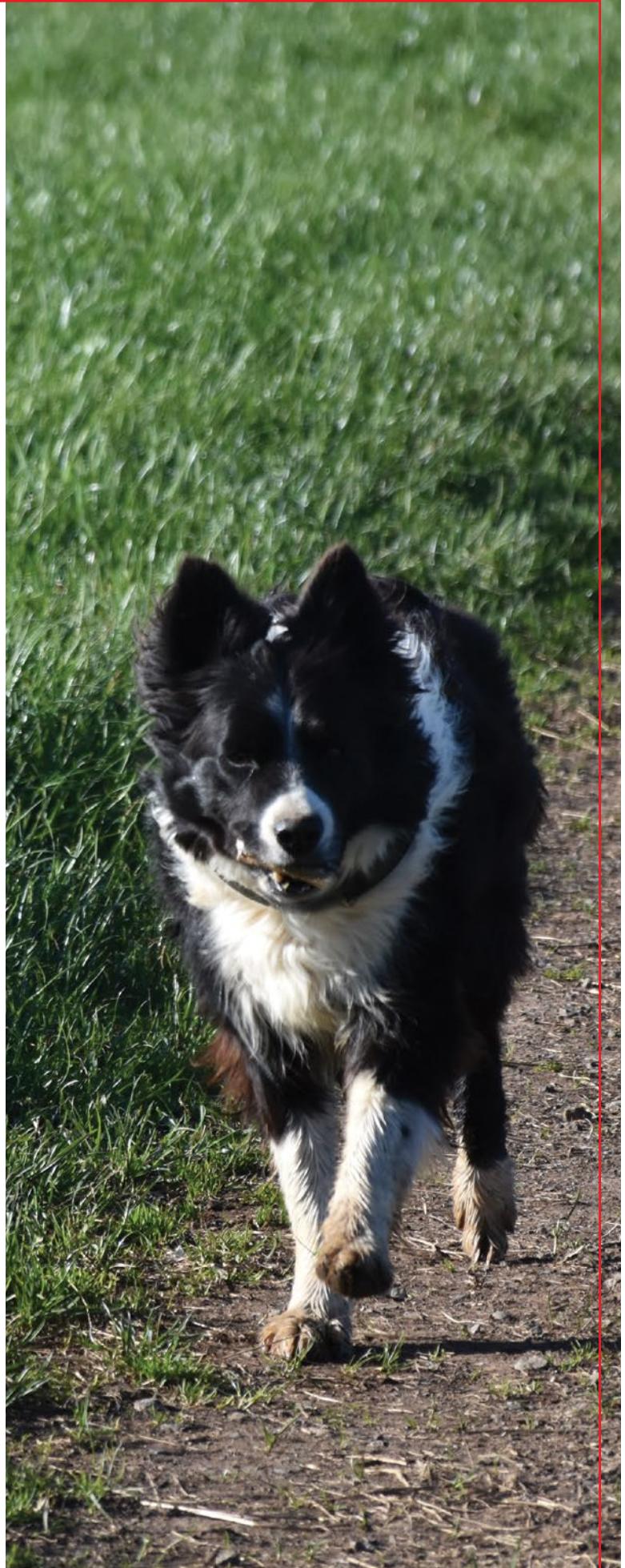
In previously MLV-CDV vaccinated dogs, RECOMBITEK® distemper vaccine significantly increased the antibody titer in significantly more dogs than when vaccinated (booster dose) with MLV-CDV.

90% of the previously MLV-CDV vaccinated dogs, when vaccinated (booster dose) with RECOMBITEK C4 containing recombinant distemper vaccine, demonstrated a significant increase¹ in CDV antibody response.

In contrast, the MLV-CDV products (from any one of the four different manufacturers) stimulated a significant increase¹ in CDV antibody response in only 10% to 35% of the group.

This study demonstrates that RECOMBITEK distemper, the only vaccine for dogs containing recombinant CDV (rCDV), is more likely to significantly boost the CDV antibody response in previously MLV-CDV vaccinated dogs than the MLV-CDV vaccines.

¹ fourfold or higher





Proven rapid onset of immunity

RECOMBITEK® Distemper vaccine shows rapid onset of immunity and provides protection to dogs in high risk environments.

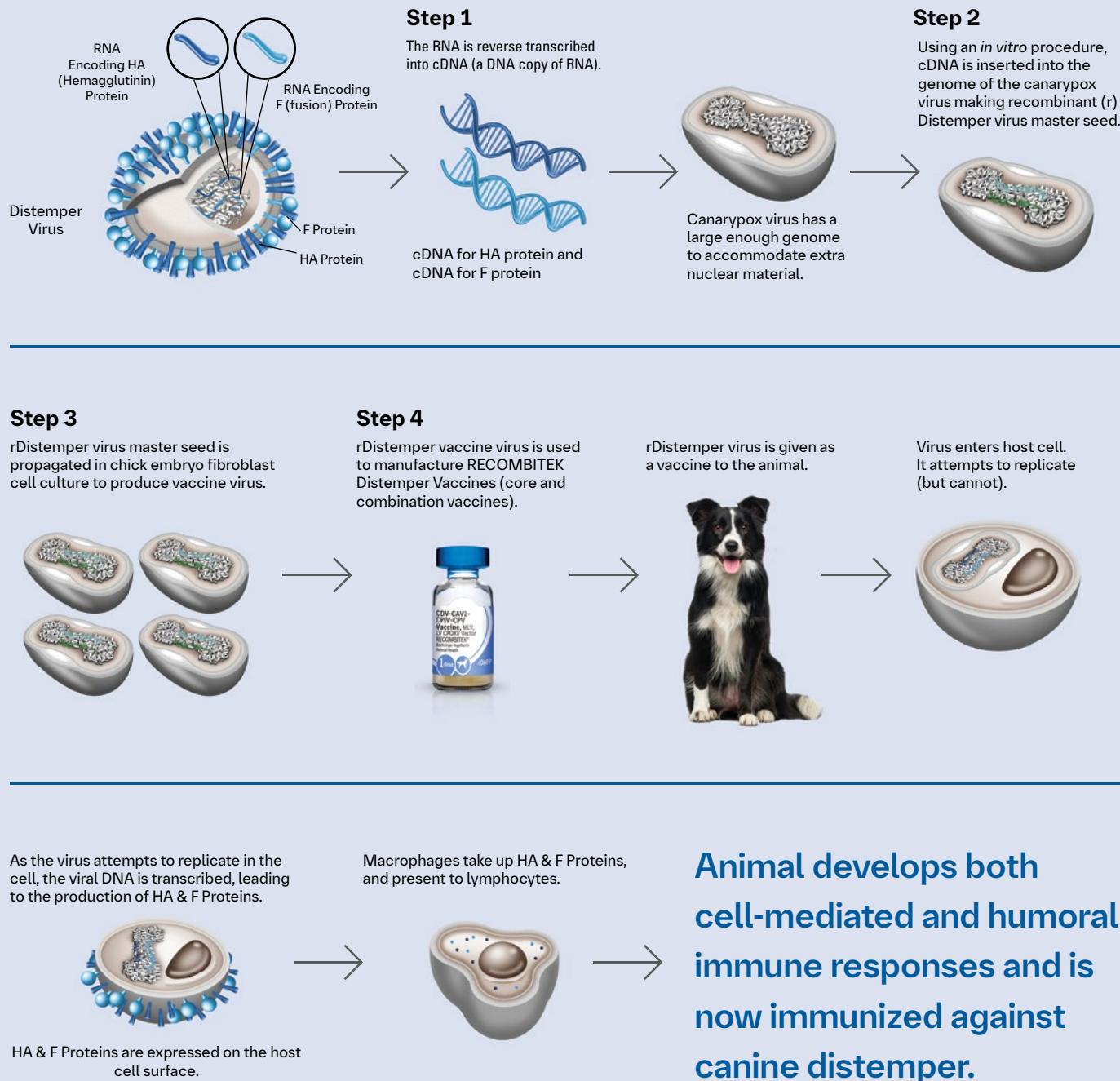
In a study, CDV-antibody negative puppies vaccinated with RECOMBITEK Distemper four hours before exposure to CDV-infected dogs in a shelterlike setting showed no signs of distemper infection for four weeks.⁷

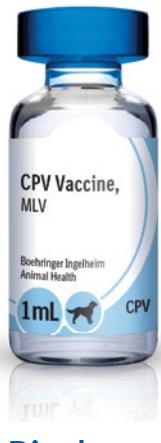
RECOMBITEK Distemper's canarypox-vectorized technology provides rapid protection, with proven strengths you can trust:

- Outstanding efficacy: 100% of RECOMBITEK Distemper-vaccinated dogs were protected from morbidity and mortality^{4,5}
- Rapid stimulation of both humoral and cell-mediated immune responses⁸
- No risk of shedding or reversion to virulence
- Proven safe for puppies as young as 6 weeks of age⁹
- Proven efficacy in the presence of maternal antibodies⁵
- Does not demonstrate possible immunosuppression seen with MLV-CDV combination vaccines.^{10,11}
- Demonstrated duration of immunity (serologic) of at least 36 months.¹²



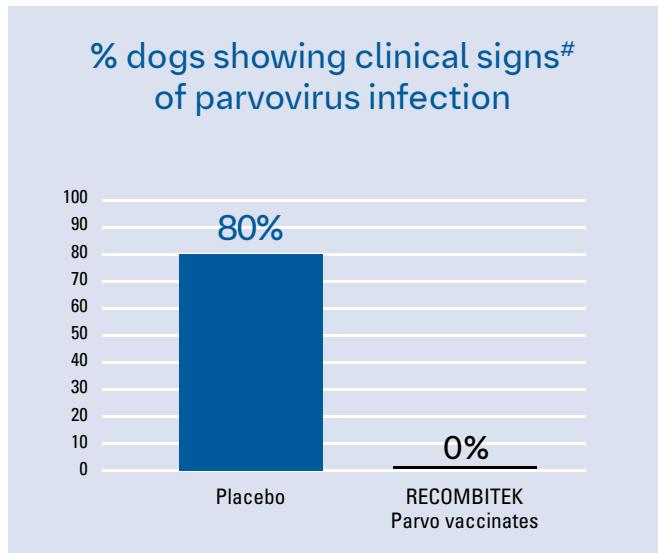
RECOMBITEK® Distemper: the manufacturing process and mode of action





RECOMBITEK® Canine Parvo means broad protection

Bivalent challenge¹³



Broad protection¹⁴



[#] Clinical signs are general malaise, dehydration, vomiting, and diarrhea.

In a laboratory study, puppies were vaccinated at 8, 10, and 12 weeks with RECOMBITEK Parvo vaccine or placebo, and challenged oronasally at 14 weeks of age with virulent CPV-2a and CPV-2b. Nine days after challenge, vaccinated puppies were bright and alert, and none of them developed leukopenia. In contrast, 80% of unvaccinated puppies developed clinical signs of Parvovirus infection, 40% developed leukopenia, and 30% died. Results showed 100% of vaccinated puppies were protected against bivalent CPV-2a and CPV-2b after challenge in this study.

After 14 days following a single dose of the RECOMBITEK Parvo vaccine, dogs were challenged oronasally with CPV-2c. All vaccinated dogs seroconverted after single dose. Clinical signs were observed, and white blood cell counts and serology were performed up to day 28 following vaccination.

No clinical signs were observed in vaccinees, whereas 100% of the controls had one or more clinical signs of Parvovirus infection. Additionally, there was significant alleviation of leukopenia in vaccinees compared to controls.

On Day 9 post challenge, 100% of the vaccinees were bright, alert and responsive, and none had developed leukopenia compared with 40% of controls.¹³

Demonstrated duration of immunity (serologic) of at least 36 months¹⁵

A blind randomized study was conducted on two study groups:

Study group 1: included 51 beagle dogs housed in a CPV-2 disease-free environment.

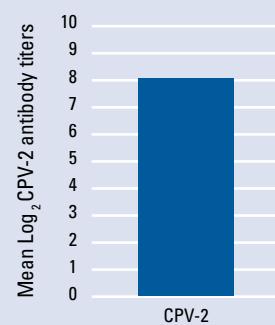
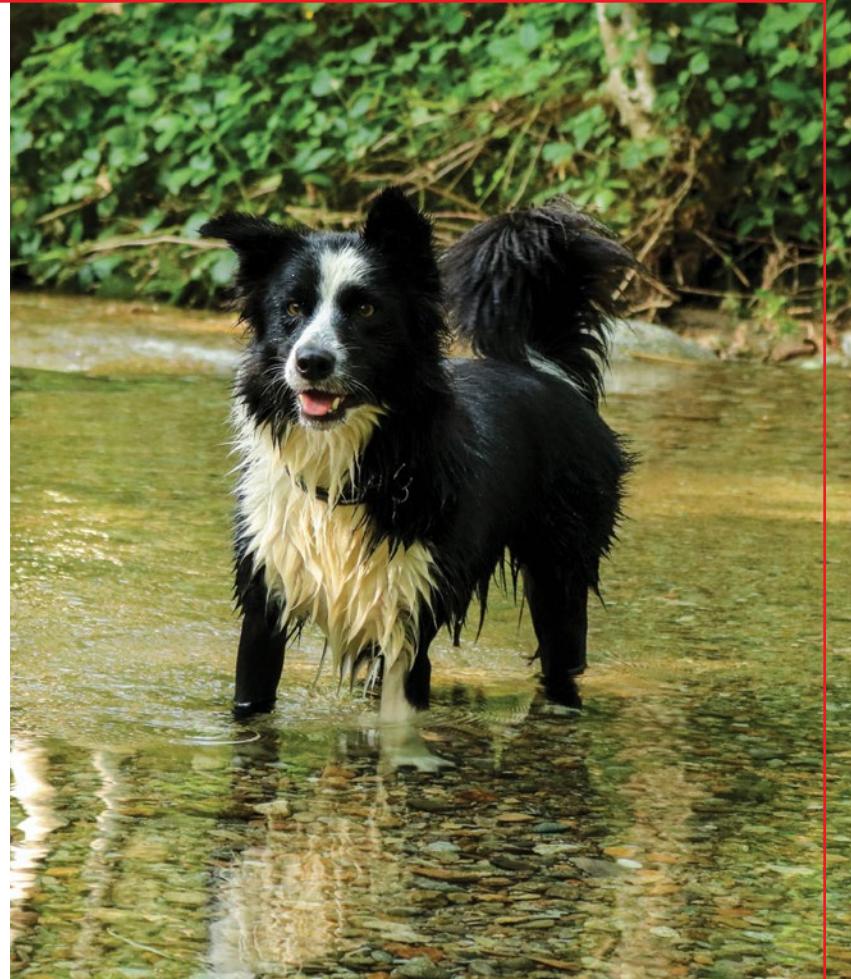
Study group 2: included 327 client-owned dogs of various breeds seen for routine care at veterinary clinics throughout the United States; all dogs had previously been vaccinated with RECOMBITEK® C4.

The duration of antibody titers, which correlates with protective immunity, was found to be at least 36 months following vaccination with RECOMBITEK C4.

This demonstrates that RECOMBITEK combination vaccines can confidently be given every 3 years with assurance of protection against CPV-2 in immunocompetent dogs.

RECOMBITEK Parvo provides broad protection and a 36-month duration of immunity:

- In placebo-controlled studies, 100% of vaccinated puppies were protected against CPV-2a, 2b, and 2c challenges
- 36-month duration of serological antibody titers
- Safe for puppies as young as 6 weeks of age¹⁶
- High-titer, low-passage profile
- Proven effective in the presence of maternal antibodies¹³

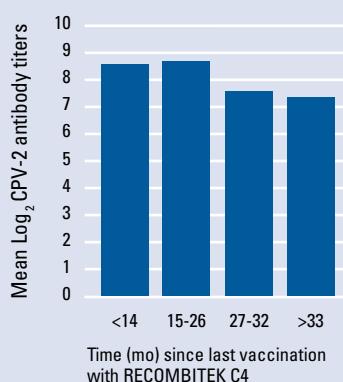


All dogs in study 1 developed and maintained antibodies against CPV-2 at levels considered protective

Mean log₂ CPV-2 antibody titers in 51 beagle dogs that received RECOMBITEK C4. Serum samples were collected more than 33 months after the last vaccination with RECOMBITEK and more than 36 months after the primary vaccination series.

Essentially all dogs in study 2 developed antibody titers to CPV-2 that were considered protective

Mean log₂ CPV-2 antibody titers in 327 client-owned dogs that received RECOMBITEK C4 or C6.



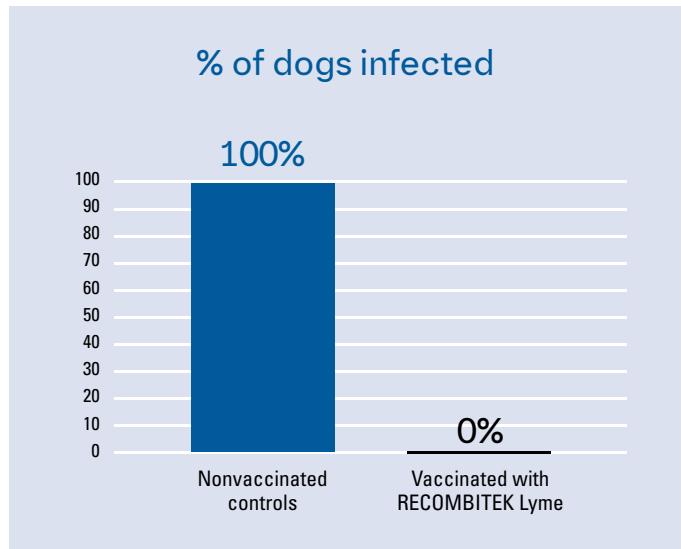
Time (mo) since last vaccination with RECOMBITEK C4



RECOMBITEK® Lyme means pure

All the protection dogs need, and none of the antigens they don't

Demonstrated efficacy¹⁷



None of the vaccinated dogs were infected

In this study involving severe natural tick challenge, RECOMBITEK Lyme vaccine blocked infection with *Borrelia burgdorferi* before transmission from a tick could occur.

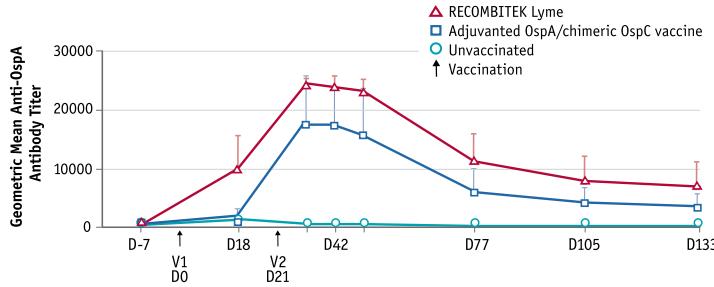
- 0% of the vaccinated dogs became infected.
- 100% of unvaccinated control dogs became infected.
- Infection was determined by isolation of *B. burgdorferi* after challenge.
- Results were confirmed by polymerase chain reaction (PCR), serology, protein biochemistry, and tick xenodiagnosis.

Nonadjuvanted, lipidated outer surface protein A (OspA) antigen that generates a robust high-avidity humoral response¹⁸

A randomized, blinded, placebo-controlled study in dogs examined the immunogenicity of a nonadjuvanted monovalent recombinant OspA vaccine (RECOMBITEK Lyme) and an adjuvanted OspA/chimeric OspC vaccine.

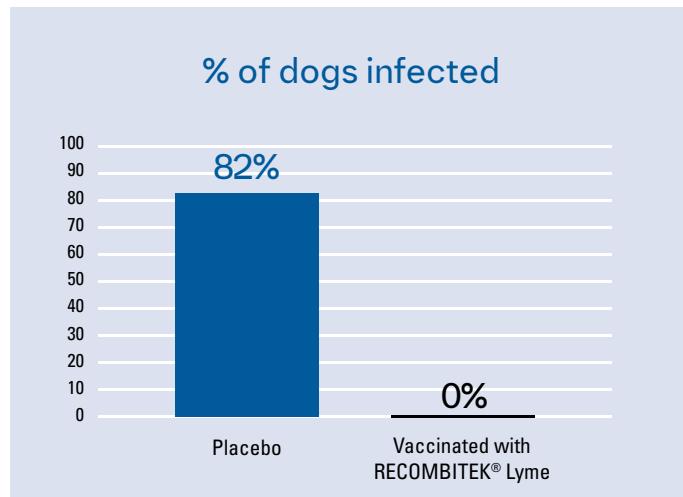
Results showed that RECOMBITEK Lyme elicited an earlier onset of anti-OspA antibody response with a significantly higher antibody titer (significant on Day 18 and persistently higher but non-significant on other days) than the adjuvanted OspA/chimeric OspC vaccine.

Compared to the adjuvanted OspA/chimeric OspC fusion vaccine, RECOMBITEK Lyme generated a more homogenous and high-avidity anti-OspA response, along with greater concurrent increase in serum borreliacidal activity.



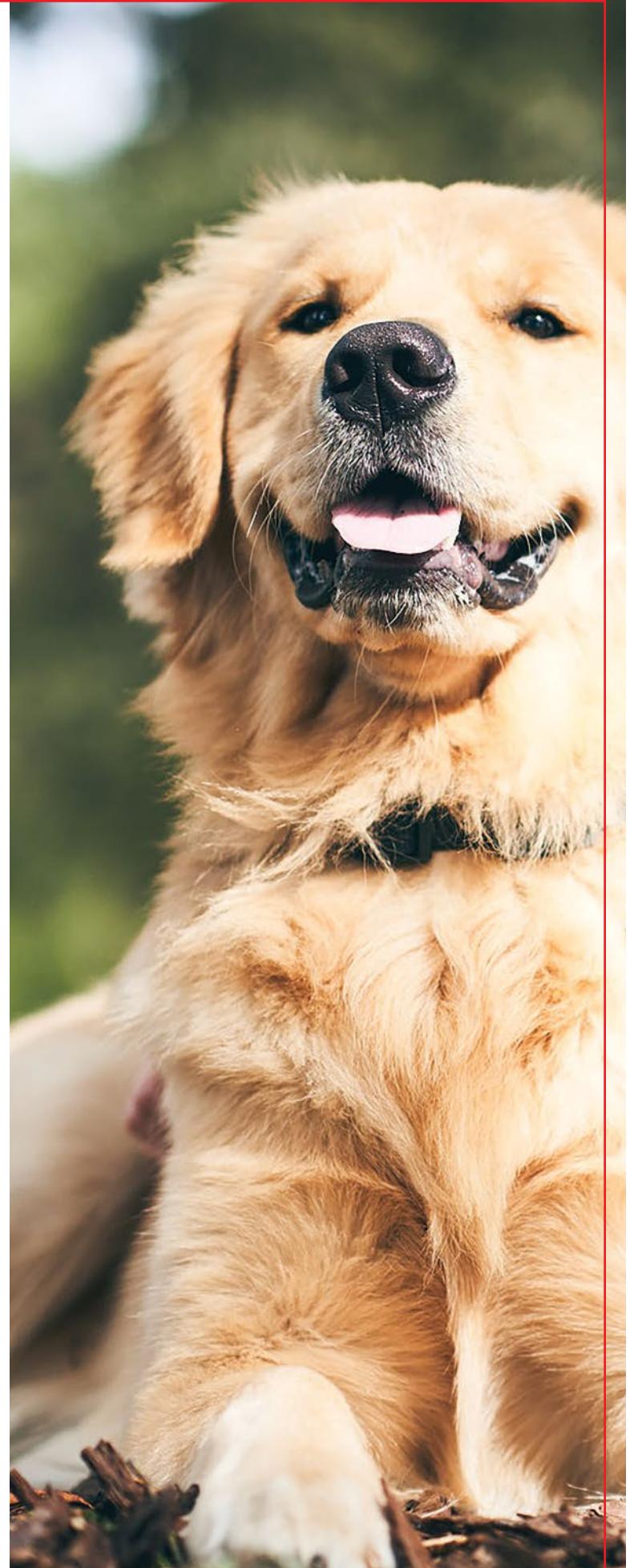
Proven one-year duration of immunity¹⁹

Outstanding efficacy in a live-tick challenge
12 months post-vaccination



With a live-tick challenge 366 days after vaccination, RECOMBITEK Lyme demonstrated one-year duration of immunity.

- None of the vaccinated dogs tested positive for infection with *Borrelia burgdorferi* at any assessed time - demonstrating robust efficacy.
- 82% of the control dogs tested positive for infection with *Borrelia burgdorferi* 3 months post-challenge.
- None of the vaccinated dogs exhibited clinical signs of Lyme disease after challenge, whereas 18% of controls showed clinical signs.





Help protect your patients from infectious disease with safe and effective recombinant vaccines.

Why choose recombinant technology?

Traditional killed vaccines use inactivated whole pathogenic organisms to stimulate an immune response. These whole-cell bacterin canine Lyme vaccines can contain more than 100 *Borrelia burgdorferi* lipoproteins, inducing host inflammatory responses that may lead to pathologic changes associated with infection.^{20,21}

Additionally, adjuvants (in the whole-cell bacterin or recombinant OspA/chimeric OspC fusion vaccine) lead to a heightened immune response and thus might cause sensitization contributing to undesired hypersensitivity reactions.^{22,23}

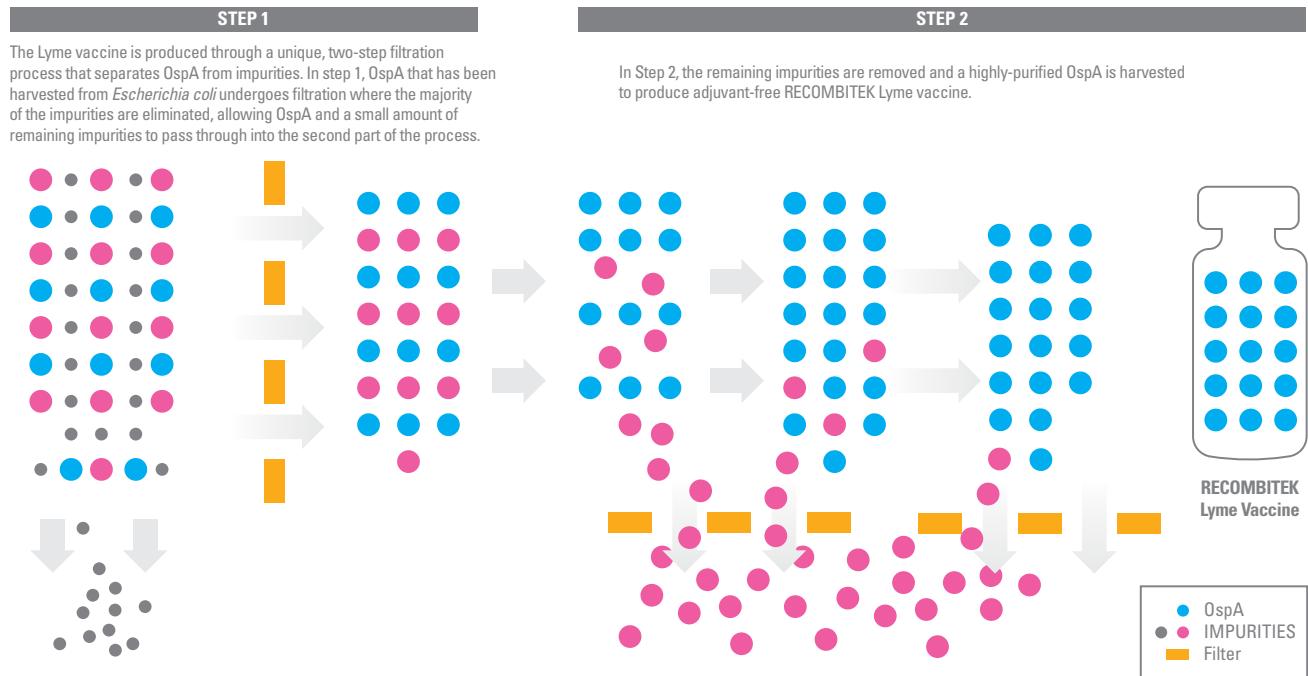
In contrast, subunit recombinant vaccines are highly purified and use only the antigens necessary to elicit the desired response.

RECOMBITEK® Lyme is the only nonadjuvanted canine Lyme disease vaccine.¹⁸



Unique purification process

Purifying OspA for the RECOMBITEK® Lyme Vaccine. Unique Filtration Technology (UFT) produces a highly-purified vaccine*



*Conceptual schematic representation of the UFT process. Not to scale for both size and purification.

Pure targeted lyme protection

RECOMBITEK Lyme is *THE ONLY* canine Lyme disease vaccine that is nonadjuvanted and contains lipidated OspA that forms large (418 kDa, 18nm) complexes.¹⁸

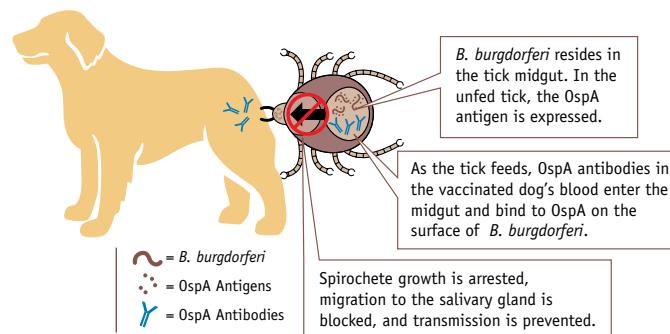
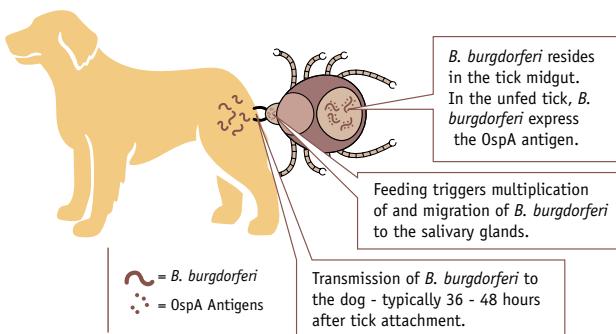
- Lipidation of OspA protein is a critical determinant of immunogenicity.²⁴ Lipidated nonadjuvanted monovalent OspA (RECOMBITEK Lyme) vaccine elicited an earlier onset of immunity with a significantly higher antibody response and a greater concurrent increase in serum borreliacidal activity than the nonlipidated adjuvanted OspA/chimeric OspC vaccine.¹⁸
- RECOMBITEK Lyme offers effective protection that blocks *Borrelia burgdorferi* while it's still in the tick.¹⁷





Unvaccinated

Received RECOMBITEK® Lyme vaccine

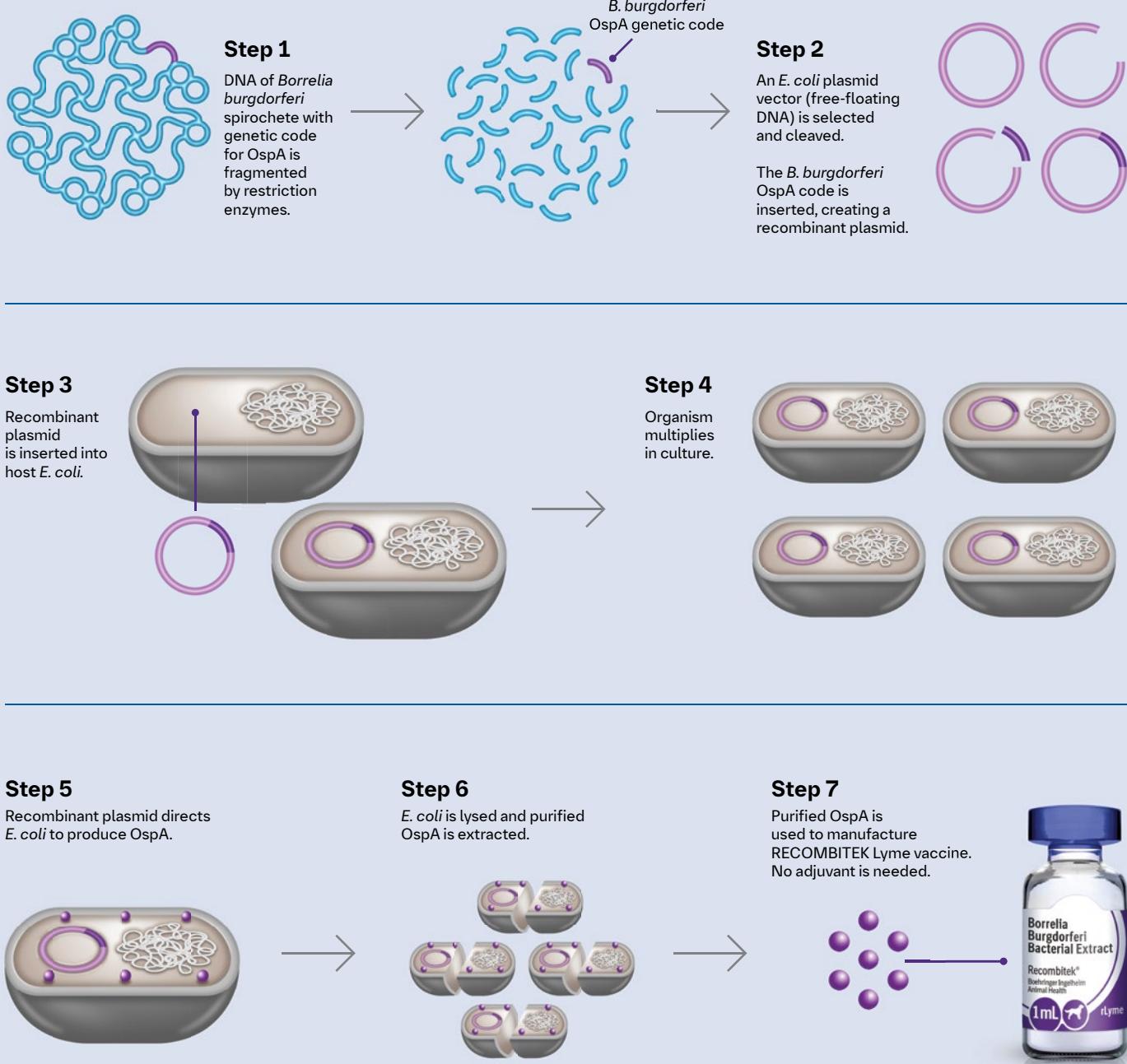


How the RECOMBITEK Lyme vaccine works

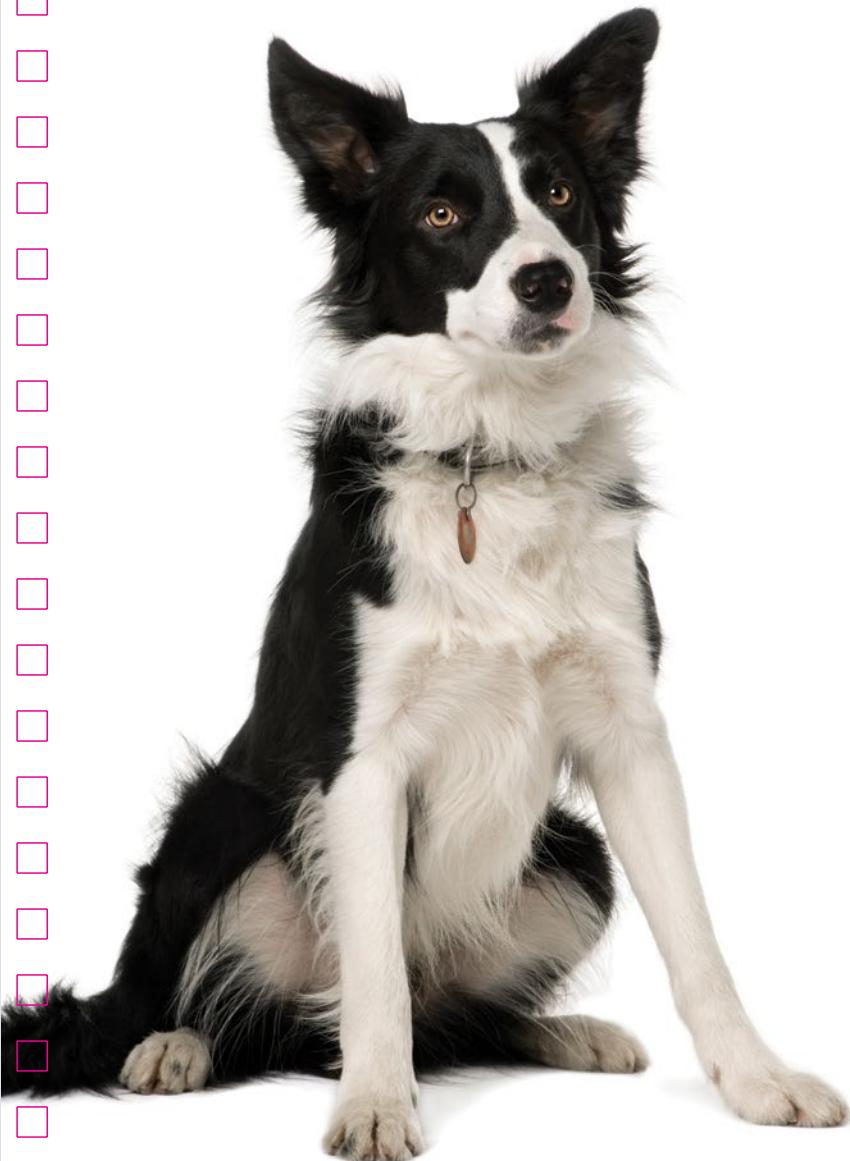
Borrelia burgdorferi residing in the mid-gut of an infected tick express outer surface protein A (OspA). When the infected tick feeds on an unvaccinated dog (in the figure above left), *Borrelia burgdorferi* migrates to the mouthparts of the tick and is transmitted to the dog, a process that typically takes at least 36-48 hours.²⁵ In contrast, when an infected tick feeds on a vaccinated dog (right figure in diagram above), the OspA-specific antibodies in the dog are ingested by the tick as part of the blood meal. Those antibodies encounter and arrest growth as well as prevent transmission of the *Borrelia burgdorferi* to the salivary glands of the tick, helping prevent infection of the vaccinated dog.²⁶



RECOMBITEK® Lyme: the manufacturing process



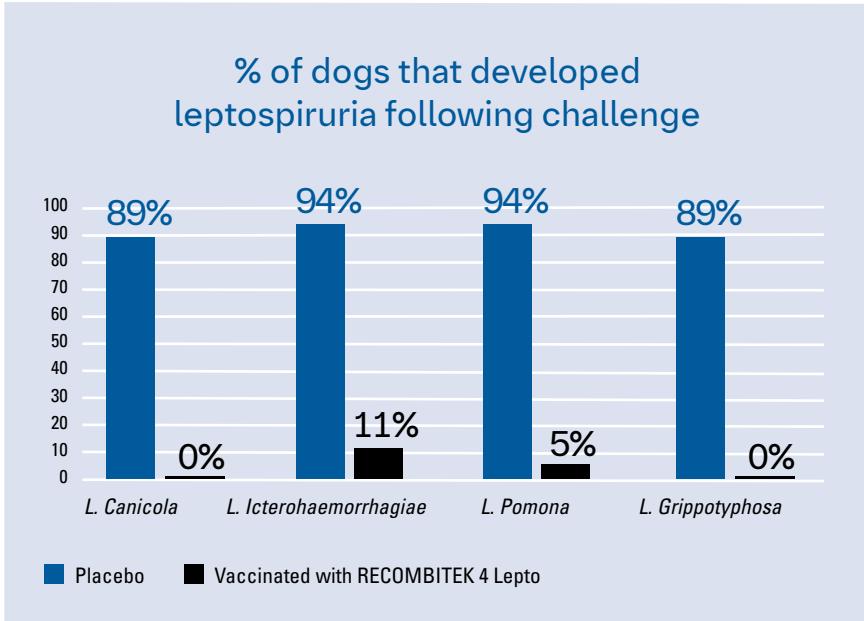
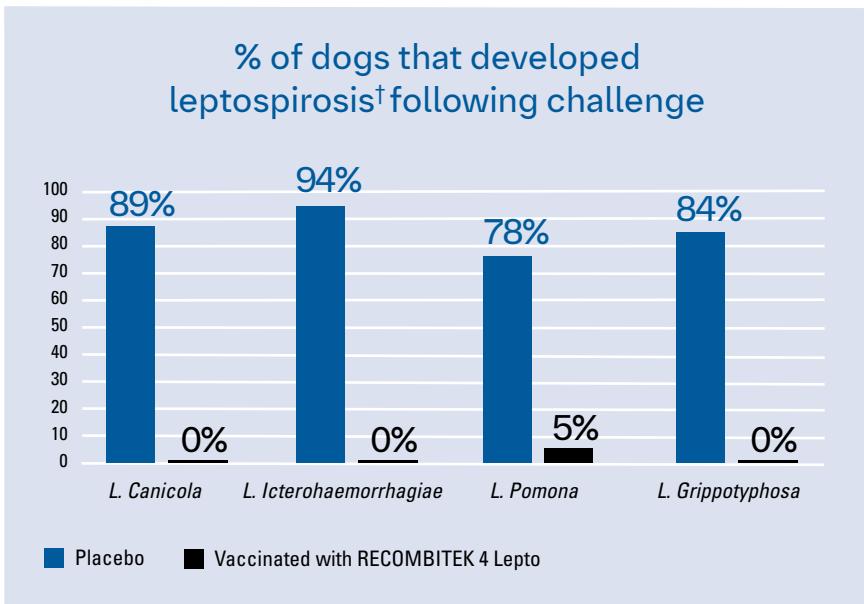
Our unique manufacturing process ensures potent, pure protection for the dogs you care for. RECOMBITEK® Lyme is the only adjuvant-free canine Lyme disease vaccine.¹⁸





RECOMBITEK® 4 Lepto means comprehensive

Pure four-way protection for dogs against common pathogenic serovars of *Leptospira* spp.^{27,28}



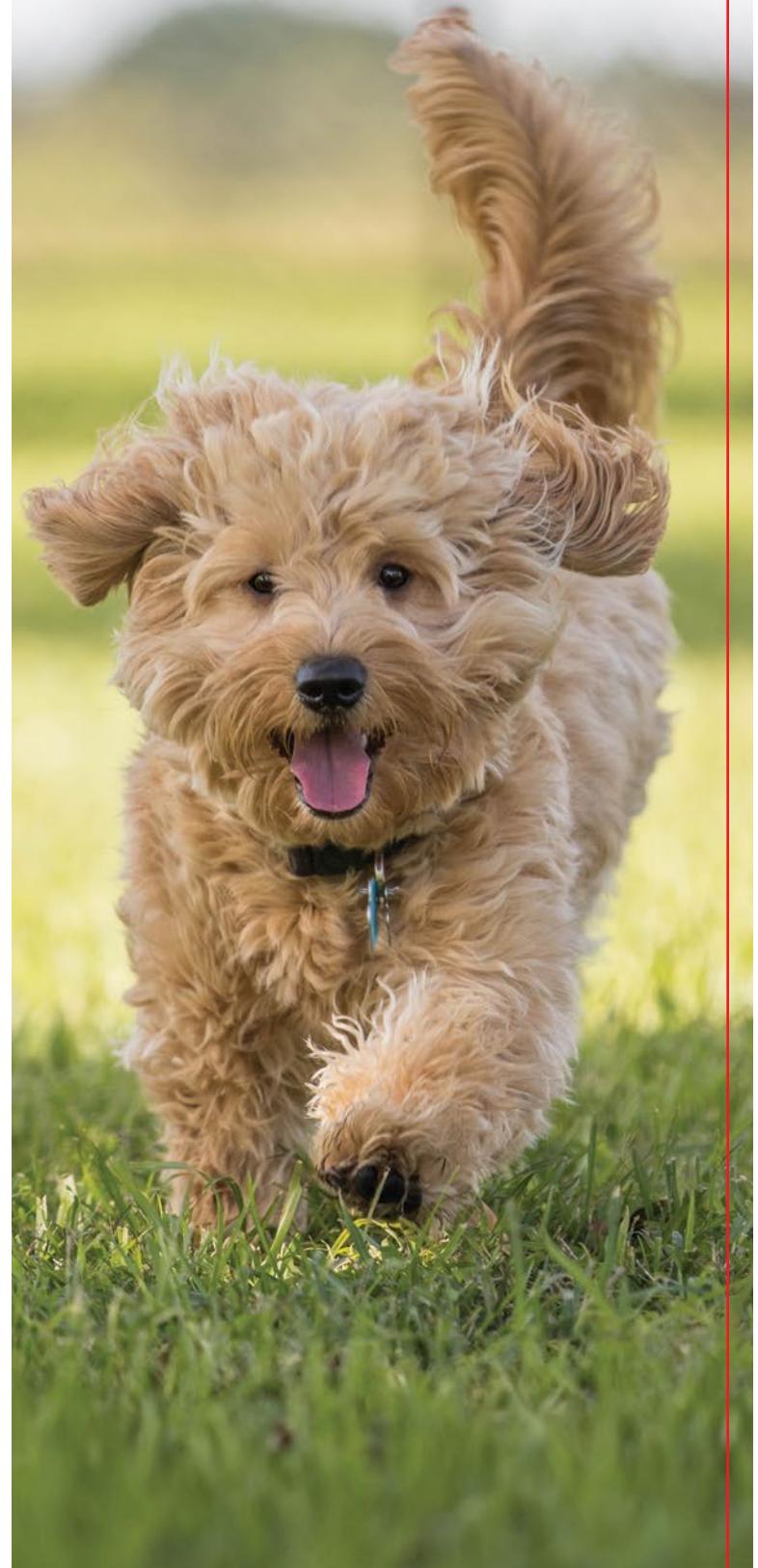
In a blinded, randomized, placebo-controlled, and commingled (placebo and vaccines) laboratory study, 46- to 88-day-old puppies (median age 61 days at first vaccination) were vaccinated with either RECOMBITEK 4 Lepto and RECOMBITEK C4/CV (rDAPPc) or placebo vaccine (a monovalent or bivalent modified live viral vaccine devoid of the *Leptospira* components) twice subcutaneously, with a 21-day interval between vaccinations. Dogs were challenged with a dog-virulent respective challenge serovar preparation (heterologous strains), 2 to 7 weeks after the second vaccination.

RECOMBITEK® 4 Lepto vaccine provided significant protection against both leptospirosis[†] and urinary shedding of the bacterium (leptospiruria) for all four serovars compared to controls.

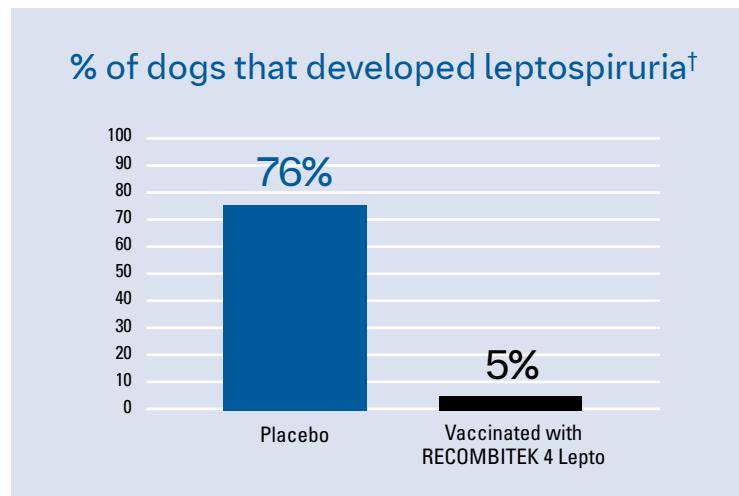
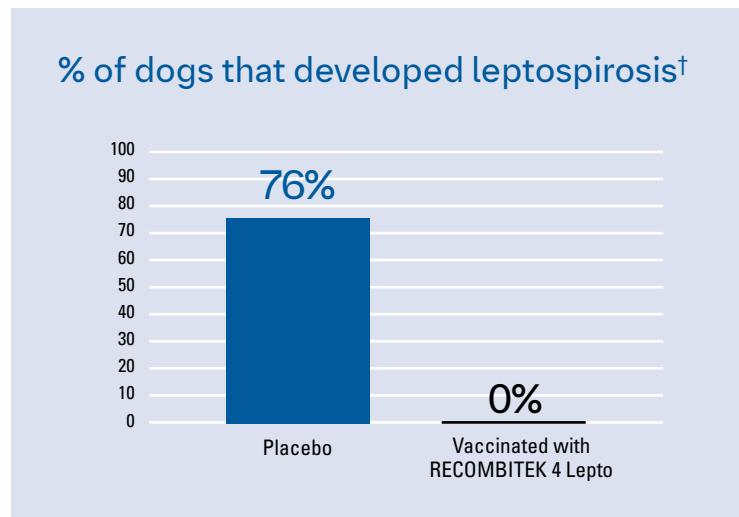
- Despite most vaccines being commingled with control dogs actively shedding spirochetes in their urine, 100% of vaccines were protected from leptospirosis[†] for serovars *Canicola*, *Icterohaemorrhagiae*, and *Grippotyphosa* and 95% of the vaccines were protected from leptospirosis[†] for serovar *Pomona*.
- Leptospiruria was prevented in 100% of the serovar *Canicola* and *Grippotyphosa* vaccines. Leptospiruria was prevented in 89% and 95% of the vaccines for serovars *Icterohaemorrhagiae* and *Pomona* respectively.



[†] Leptospirosis was defined as having at least one positive urine sample for leptospiruria and a positive renal histopathology score; or, in the absence of renal pathology, multiple positive urine samples for leptospiruria – these criteria for Leptospirosis definition were evaluated and approved by the USDA prior to study onset.



15-month duration of immunity (DOI) for serovar *Grippotyphosa*²⁹



In a blinded, randomized, placebo-controlled laboratory study, 47- to 73-day-old puppies (median age – 65 days) were vaccinated with either RECOMBITEK® 4 Lepto and RECOMBITEK C4/CV (rDAPPc) (vaccinates) or RECOMBITEK C4/CV (Placebo), twice at 21-day intervals. Four hundred and seventy days after the second vaccination, dogs were challenged with a dog-virulent *Leptospira kirschneri* serovar *Grippotyphosa*.

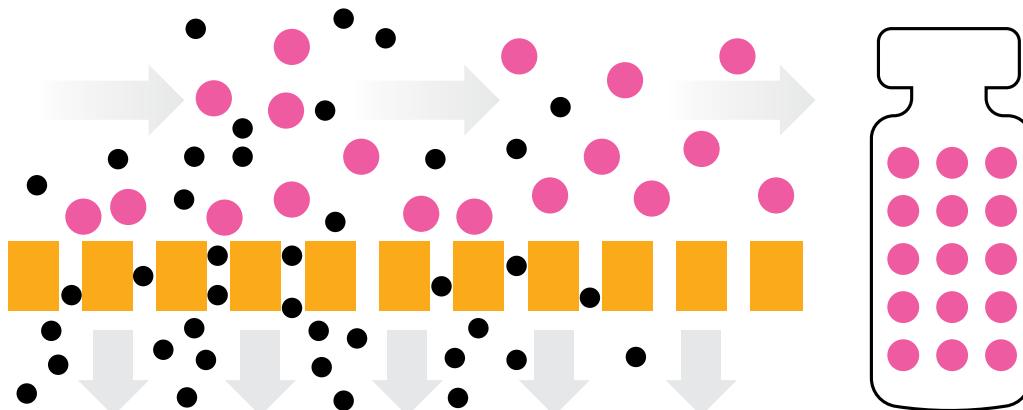
RECOMBITEK 4 Lepto vaccine provided significant protection compared to placebo for leptospirosis[†] following *L. kirschneri* serovar *Grippotyphosa* challenge 15 months after the primary series of vaccinations.

- All vaccinated dogs were protected from leptospirosis[†] despite most vaccinees being commingled with control dogs actively shedding spirochetes in their urine.
- 76.2% of the placebo-treated dogs developed leptospirosis.[†]

RECOMBITEK 4 Lepto vaccine provided significant protection compared to placebo against leptospiruria following *L. kirschneri* serovar *Grippotyphosa* challenge 15 months after primary series of vaccinations.

- Leptospiruria was prevented in 95% of the vaccinees despite being commingled with control dogs actively shedding spirochetes in their urine.
- 76.2% of the placebo-treated dogs developed leptospiruria.

The science of purification



- Soluble proteins
- Leptospira bacteria
- Membrane

The size of the pores, filter material and trans-membrane pressure determines what passes through and what is retained as product.*

*Conceptual schematic representation of the UFT process. Not to scale for both size and purification.

**RECOMBITEK® 4
Lepto Vaccine**

RECOMBITEK 4 Lepto is purified using a unique filtration technology (UFT), removing undesirable soluble proteins which flow out through the membrane as shown above. What remains are the valuable Leptospira serovars, which are the foundation of our pure, four-way protective Leptospirosis vaccine.

Demonstrated effectiveness against Leptospirosis[†] and Leptospiuria:

- Effective against leptospirosis and leptospiuria (urinary bacterial shedding) caused by:
 - *Leptospira Canicola*
 - *L. Grippotyphosa*
 - *L. Icterohaemorrhagiae*
 - *L. Pomona*
- THE ONLY vaccine with published 15-month duration of immunity against *L. Grippotyphosa*²⁹
- Available with DAP/DAPP combinations

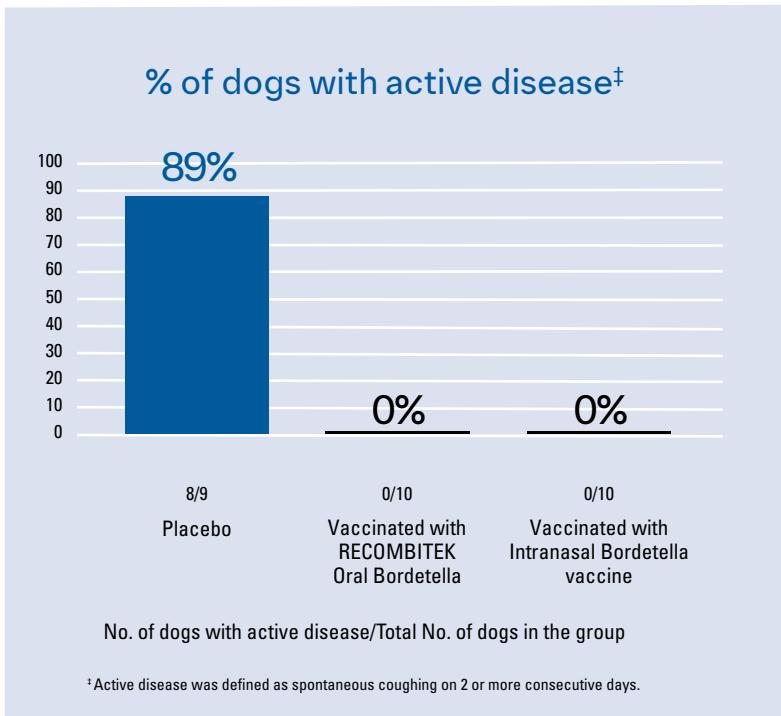


[†] Leptospirosis was defined as having at least one positive urine sample for leptospiuria and a positive renal histopathology score; or, in the absence of renal pathology, multiple positive urine samples for leptospiuria – these criteria for Leptospirosis definition were evaluated and approved by the USDA prior to study onset.



RECOMBITEK® Oral Bordetella means convenient

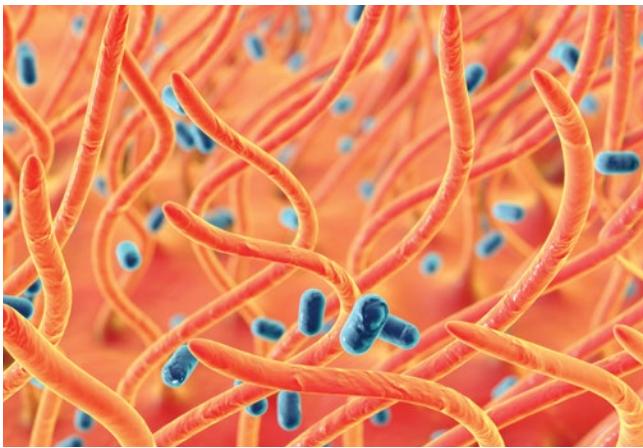
Bordetella bronchiseptica vaccine with proven onset of immunity at 7 days post-vaccination and a duration of immunity for 13 months.^{30,31}



Rapid Onset of immunity at 7 days post vaccination³⁰

In a randomized, blinded, placebo-controlled study, puppies were challenged via aerosolization with a mixture of two strains of virulent *Bordetella bronchiseptica* seven days after vaccination with RECOMBITEK Oral Bordetella vaccine or an intranasal Bordetella vaccine, or placebo. About 90% of puppies in the placebo group developed spontaneous cough following challenge, while 100% of dogs in both vaccine groups were protected.

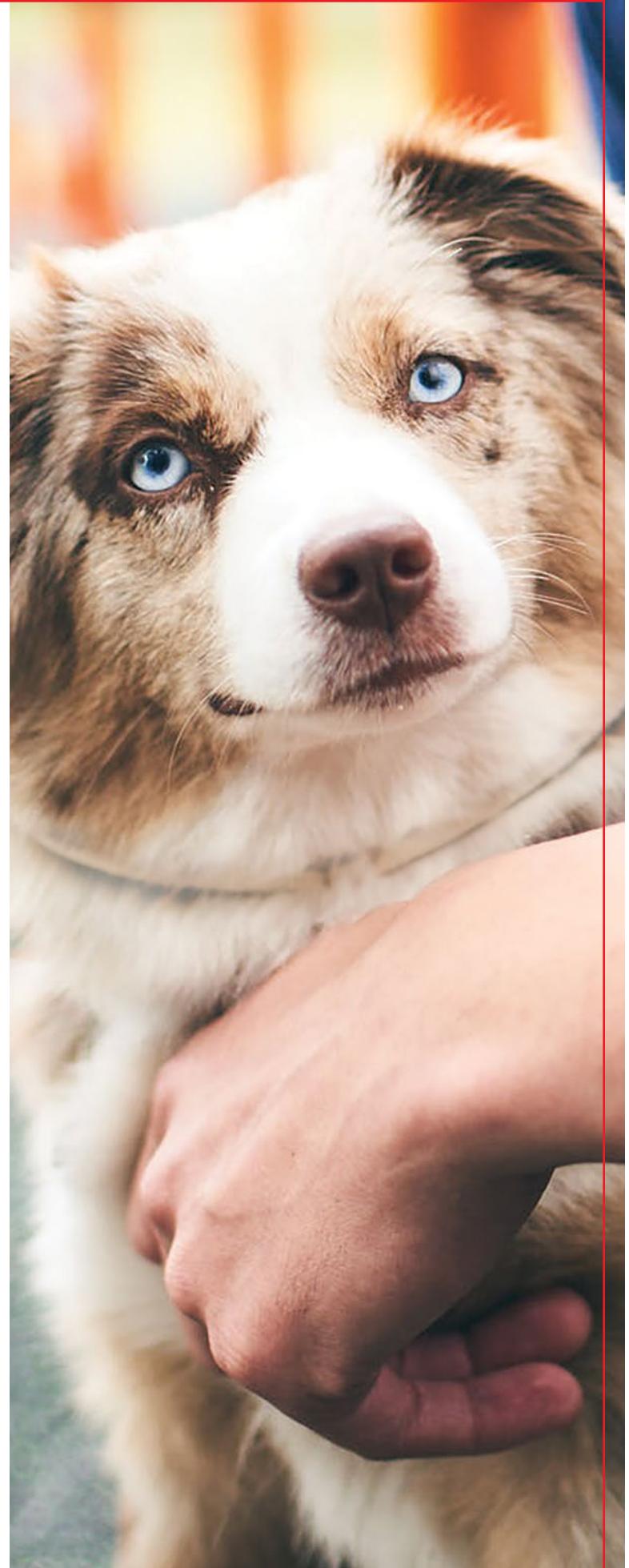




RECOMBITEK® Oral Bordetella contains live, avirulent *Bordetella bronchiseptica* and initiates “mucosal immunity.”

Why is Mucosal Immunity important?

- *Bordetella bronchiseptica* infects and colonizes the respiratory tract, using the mucosal tissues as a point of entry.
 - Localized protection involving mucosal immunity is a key step in helping prevent the disease.
 - Mucosal immunity is known to stimulate both humoral and cell-mediated responses in both the systemic and mucosal compartments and generates long-lasting memory responses.³²
 - Mucosal vaccines are also known to act rapidly.³³
 - Furthermore, mucosal vaccines generate both IgA and IgG antibodies.³²
 - IgA blocks mucosal penetration of *Bordetella bronchiseptica* by immune exclusion.
 - IgG targets *Bordetella* organisms that penetrate the mucosal surface by immune elimination.
 - Additionally, mucosal vaccination is not subject to maternally derived antibody (MDA) interference.³⁴
- In summary, mucosal immunity is comprehensive, rapid, provides two modes of action (MOA), and has no interference from MDA.



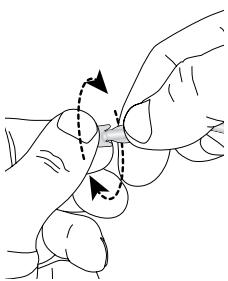
Protection in 4 simple steps

1



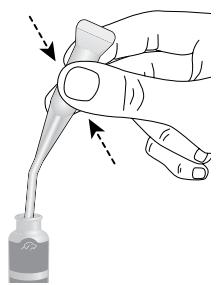
Note markings on the top of the plastic cap. Push up the plastic cap at the triangle marking. Twist cap **counter-clockwise** to tear off aluminum seal. Remove stopper.

2



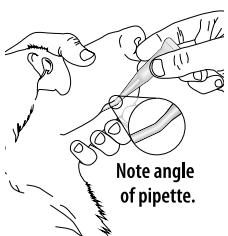
Twist pipette tip to open.

3



Expel the contents of the water pipette into the vaccine vial. Draw rehydrated vaccine back into pipette.

4



Place tip of pipette in dog's buccal cavity and expel the dose (1.0 mL) of rehydrated vaccine.

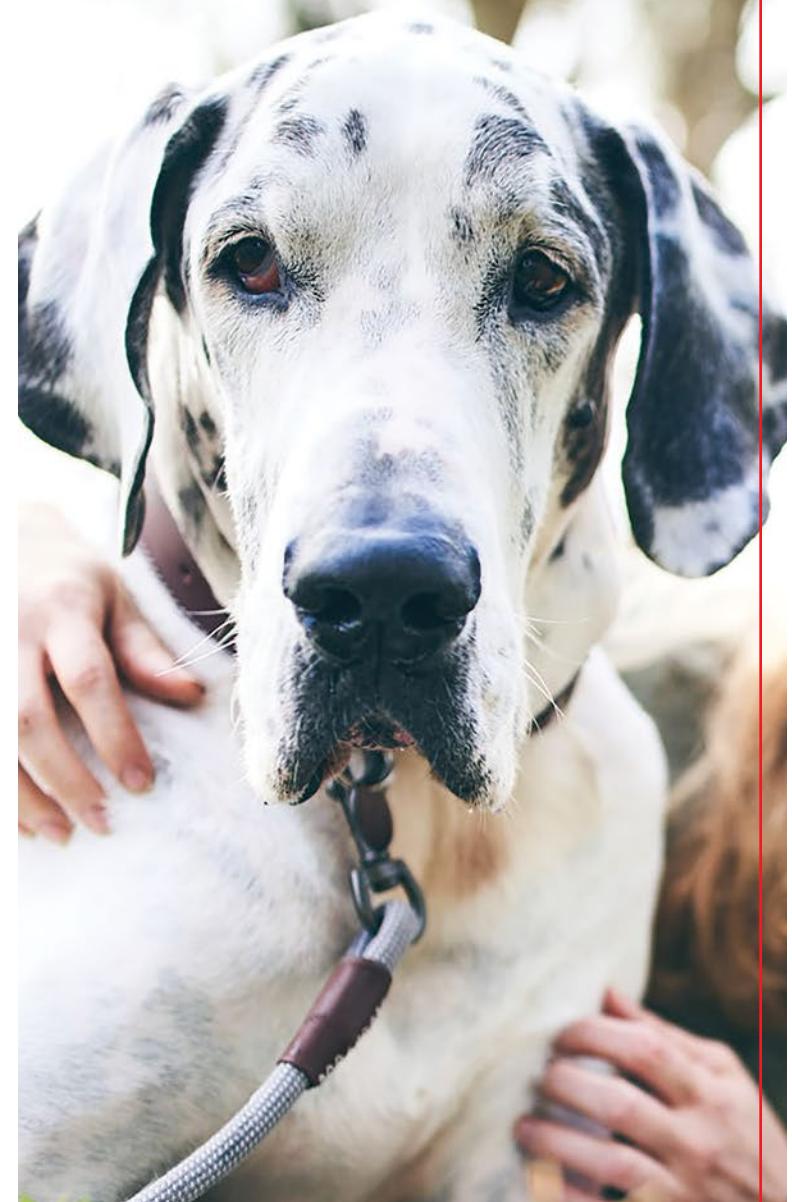
Long-term protection with 13-month duration of immunity³¹

In a randomized, blinded, placebo-controlled study, 13 months after vaccination with a single dose of RECOMBITEK® Oral Bordetella vaccine or Placebo, dogs were challenged via aerosolization with a mixture of two strains of virulent *B. bronchiseptica*. Over 76% of puppies in the placebo group developed spontaneous cough following challenge, while 100% of dogs in the vaccine group were protected. RECOMBITEK Oral Bordetella significantly lowered the prevalence of disease^{††} with 100% preventable fraction 13 months post vaccination. Additionally, a single dose of RECOMBITEK Oral Bordetella vaccine significantly lowered both number of days of cough and duration of cough and demonstrated a significant reduction in both nasal and tracheal shedding of *B. bronchiseptica* at 14 days post-challenge.

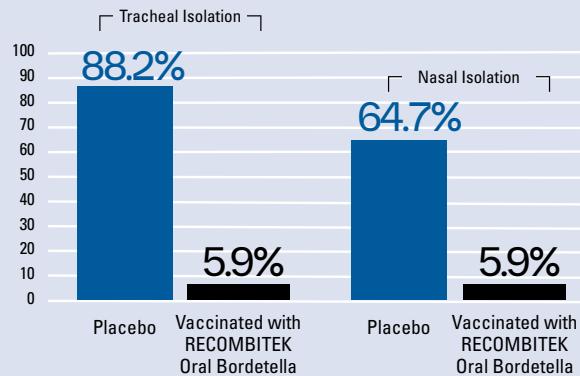


Multiple advantages of RECOMBITEK® Oral Bordetella³⁵

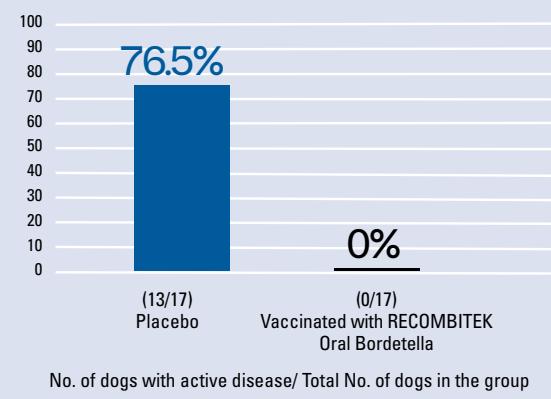
- **User friendly:** Ergonomically designed, curved pipette for comfortable oral administration
- **Pre-filled with diluent:** No need to shake or swirl when reconstituting
- **Single dose:** Vaccination stimulates protective levels of IgA and IgG after a single dose, so there's no need for a booster 2 to 4 weeks later
- **Convenient:** Needle-free oral delivery
 - Oral administration offers low-stress vaccination
 - No unpleasant sneezing or wrestling with patients as with intranasal delivery
 - An easy experience for everyone in the room including staff, dogs, and dog owners
 - Needle-free administration helps prevent risk of accidental subcutaneous injection



% of Dogs with positive isolation at 14 days postchallenge



% of Dogs with active disease^{††}



^{††} Active disease was defined as spontaneous coughing on 2 or more consecutive days.



RECOMBITEK® KC2 means dual protection



RECOMBITEK® KC2 targets *Bordetella bronchiseptica* and canine parainfluenza virus, two important respiratory pathogens associated with canine infectious respiratory disease complex (CIRDC).

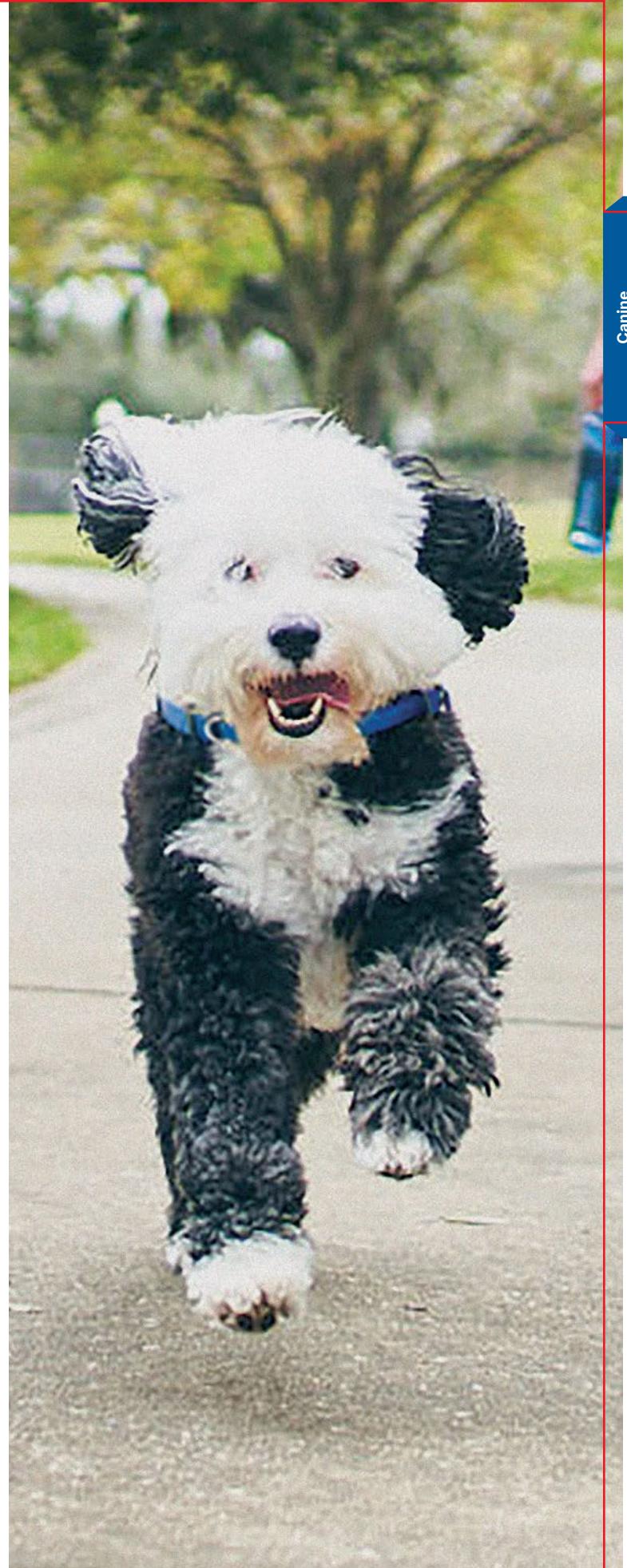
RECOMBITEK KC2 is designed to be administered intranasally for rapid protection.

Demonstrated Efficacy

- Effective against two organisms that are widespread, common etiologic agents of CIRDC^{36,37}
- Intranasal vaccination initiates a comprehensive immune response, including mucosal immunity, which targets pathogens at the point of entry^{32,33}
- Can be incorporated for use in your protocol for at-risk dogs in alignment with the current American Animal Hospital Association (AAHA) vaccination guidelines³⁸
- Half-mL vaccine option is designed for patient comfort and ease of administration[§]
- Safe for use in puppies as young as 3 weeks of age³⁷

Both intranasal and oral vaccination for *B. bronchiseptica* have been proven efficacious.^{35,37}

[§] Rehydrate to desired dose volume with accompanying sterile diluent. For 0.5 mL dose, reconstitute with 0.5 mL diluent. For 1 mL dose, reconstitute with 1 mL diluent.



Canine Vaccine Satisfaction Guarantee^{††}

Our commitment starts with science and technology to help you protect your patients and continues with support for you and your clients. To this end, we will provide support in the event of a suspected adverse event (AE) or perceived lack of efficacy (LOE) associated with our vaccines.

Lyme Disease:

In the event that a dog is found to be Lyme disease positive after being properly vaccinated with RECOMBITEK® Lyme vaccine, Boehringer Ingelheim Animal Health USA Inc. will support testing with either the Cornell Canine Lyme Multiplex Assay or the IDEXX Quantitative C6 Antibody Test (please contact VeTS to set up support for testing preemptively). If a positive diagnosis is confirmed, Boehringer Ingelheim Animal Health USA Inc. will support urinalysis testing and treatment with appropriate antibiotics, such as amoxicillin or doxycycline. More in-depth support will be considered for testing and treatment of definitively diagnosed complications of Lyme disease on a case-by-case basis.

Leptospirosis:

If a dog is found to be positive for leptospirosis after being fully vaccinated with RECOMBITEK 4 Lepto vaccine for the corresponding serovar (receiving a full course of initial vaccines plus annual boosters as required) Boehringer Ingelheim Animal Health USA Inc. will support diagnosis and treatment up to a maximum of \$5,000. Dogs that did not complete a full course of vaccines, or test inconclusive, will qualify for support (amount to be determined on a case-by-case basis) depending on the vaccination history of the dog.

To learn more about RECOMBITEK vaccines and how they can benefit your patients, contact your Sales Representative or call Customer Care: 1-888-637-4251 or visit BI-CONNECT.com.

**Ask your Representative about our Satisfaction Guarantee for vaccines or
call our VeTS team: 1-888-637-4251 (OPT. 1).**

^{††} For further details and full terms & conditions please refer to the Boehringer Ingelheim Animal Health USA Pet Vaccines Customer Satisfaction Guarantee detailer.

Bordetella bronchiseptica:

Boehringer Ingelheim Animal Health USA Inc. will cover reasonable diagnostic and treatment costs associated with Canine Infectious Respiratory Disease Complex caused by *Bordetella bronchiseptica* up to \$5,000 for a pet properly vaccinated with a Boehringer Ingelheim Animal Health USA Inc. *B. bronchiseptica* vaccine as long as exposure has not occurred within 1 week or more than 13 months following vaccination. Cases involving 6 or more dogs will be handled on a case-by-case basis.

Canine Combinations:

Boehringer Ingelheim Animal Health USA Inc. has multiple types of support for the antigens in our core and Lepto combo vaccines (C3, C4, C7, C8). In the event of a suspected LOE or AE, please contact our Veterinary Technical Solutions (VeTS) group and they will assist you in determining the appropriate support. In the event a patient properly vaccinated with these vaccines experiences a lack of efficacy for distemper, adenovirus, parainfluenza or parvovirus, Boehringer Ingelheim Animal Health USA Inc. will support diagnosis and treatment for up to 3 years after vaccination.





RECOMBITEK® Canine Vaccines

Vaccines	Vials	Lyophilized Antigens	Antigen/Diluent
RECOMBITEK C3 (rDAP) 25 x 1 dose/tray		Distemper – canarypox-vectored recombinant Adenovirus – MLV, type 2 Parvovirus – MLV, low-passage, high-titer	Sterile Water
RECOMBITEK C4 (rDAPP) 25 x 1 dose/tray		Distemper – canarypox-vectored recombinant Adenovirus – MLV, type 2 Parainfluenza – MLV Parvovirus – MLV, low-passage, high-titer	Sterile Water
RECOMBITEK C4/CV (rDAPPC) 25 x 1 dose/tray		Distemper – canarypox-vectored recombinant Adenovirus – MLV, type 2 Parainfluenza – MLV Parvovirus – MLV, low-passage, high-titer Coronavirus – MLV	Sterile Water
RECOMBITEK C7 (rDAP-LCGIP) 25 x 1 dose/tray		Distemper – canarypox-vectored recombinant Adenovirus – MLV, type 2 Parvovirus – MLV, low-passage, high-titer	Leptospira – killed, <i>L. Canicola</i> , <i>L. Grippotyphosa</i> , <i>L. Icterohaemorrhagiae</i> and <i>L. Pomona</i>
RECOMBITEK C8 (rDAPP-LCGIP) 25 x 1 dose/tray		Distemper – canarypox-vectored recombinant Adenovirus – MLV, type 2 Parainfluenza – MLV Parvovirus – MLV, low-passage, high-titer	Leptospira – killed, <i>L. Canicola</i> , <i>L. Grippotyphosa</i> , <i>L. Icterohaemorrhagiae</i> and <i>L. Pomona</i>
RECOMBITEK 4 Lepto (LCGIP) 50 x 1 dose/tray		None	Leptospira – killed, <i>L. Canicola</i> , <i>L. Grippotyphosa</i> , <i>L. Icterohaemorrhagiae</i> and <i>L. Pomona</i>
RECOMBITEK Lyme (rLyme) 50 x 1 dose/tray 20 x 1 dose/tray		None	Lyme – recombinant, OspA from <i>Borrelia burgdorferi</i>
RECOMBITEK Canine Parvo (CPV) 50 x 1 dose/tray		None	Parvovirus – MLV, low-passage, high-titer
RECOMBITEK KC2 25 x 1 dose/tray		<i>Bordetella bronchiseptica</i> - avirulent live culture Canine parainfluenza - MLV	Sterile Water
RECOMBITEK Oral Bordetella 25 x 1 dose/tray		<i>Bordetella bronchiseptica</i> - avirulent live culture	Sterile Water

MLV - Modified Live Virus





IMRAB® means leader

A market-leading US rabies vaccine¹



When it comes to preventing rabies, there's no room for compromise. That's why veterinarians worldwide trust IMRAB vaccines — a proven leader in rabies prevention.

- Produced from a virus derived from Louis Pasteur's original strain²
- Available in thimerosal-free formulations (TF)
- Trusted rabies prevention with over 35 years of safety

Multi-Species Protection

IMRAB 3 is the only vaccine that provides proven rabies protection for six animal species including dogs, cats, horses, cattle, sheep and ferrets.^{**39}

- Three-year duration of immunity for dogs, cats and sheep^{**39}
- For information on rabies laws and vaccination in the US, visit rabiesaware.org or scan this QR code:

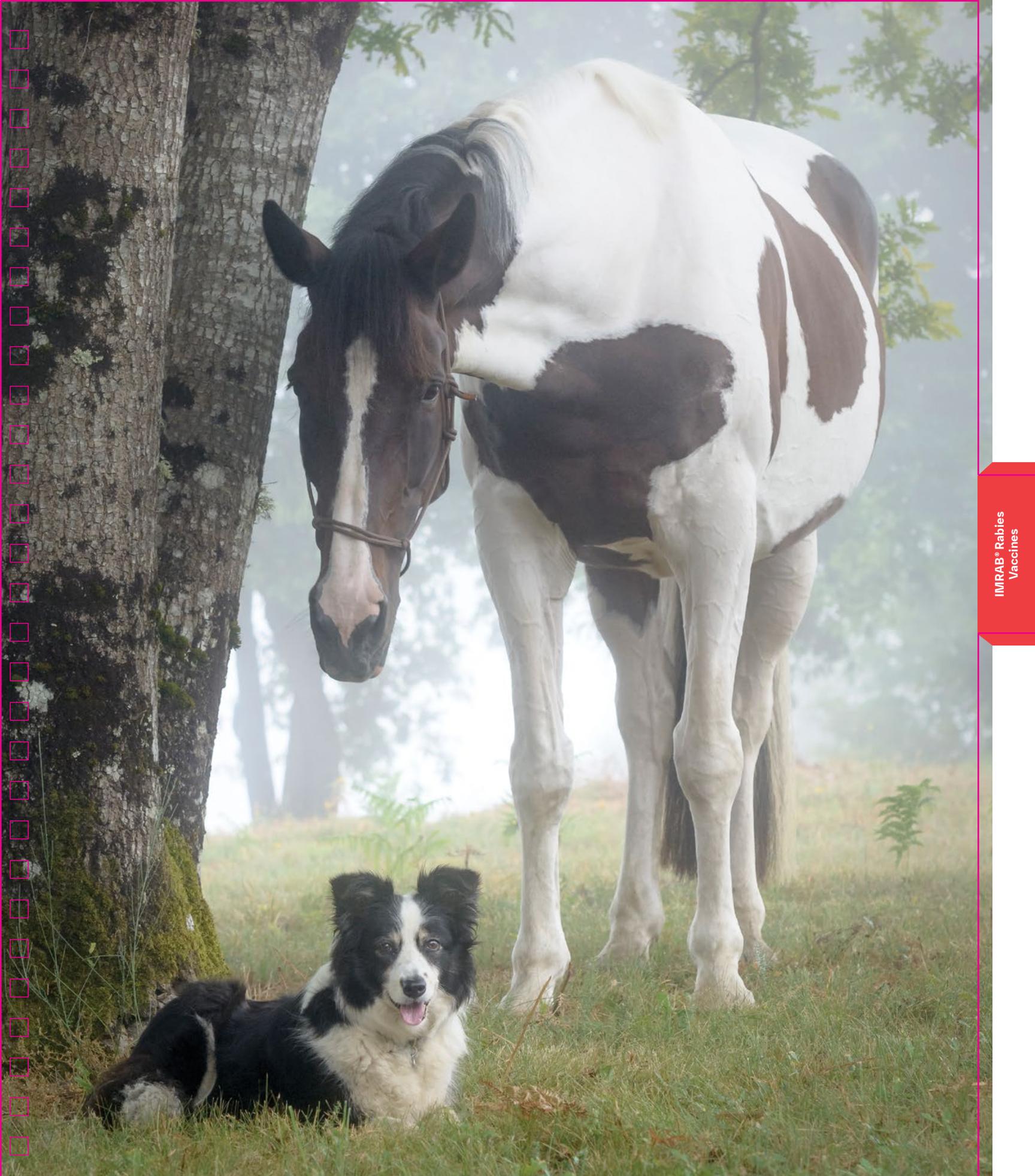
 **Rabies aware**



IMRAB® Rabies Vaccines

Vaccines	Vials	Lyophilized Antigens	Species approved and DOI	Antigen/Diluent
IMRAB 3 5 x 10 dose/box		None	Dogs, Cats, and Sheep (3 Year) Cattle, Horses, and Ferrets (1 Year)	Rabies virus - Killed
IMRAB 3 TF 50 x 1 dose/tray		None	Dogs and Cats (3 Year) Ferrets (1 Year)	Rabies virus - Killed, Thimerosal free
IMRAB 1 5 x 10 dose/box		None	Dogs and Cats (1 Year)	Rabies virus - Killed
IMRAB 1 TF 50 x 1 dose/tray		None	Dogs and Cats (1 Year)	Rabies virus - Killed, Thimerosal free

** IMRAB 3





PUREVAX® Feline Vaccines

Safe, effective and pure vaccines
without adjuvants

PUREVAX vaccines provide the only complete line of half-mL nonadjuvanted feline vaccines

- All PUREVAX feline vaccines utilize either modified live (ML) or recombinant canarypox-vectored technology, which stimulate both humoral and cell-mediated immune responses.^{22,40}
- PUREVAX Feline 3 and Feline 4 are available as standalone vaccines, and are the only vaccines available in combination with rabies (PUREVAX Feline 3/1 YR Rabies and PUREVAX Feline 4/1 YR Rabies).
- PUREVAX Feline 3 and Feline 4 are the only vaccines that provide proven protection from feline rhinotracheitis, panleukopenia, calicivirus, and chlamydia for healthy cats as early as 6 weeks of age.^{41,42}
- PUREVAX brand offers the only recombinant Feline Rabies (1- and 3-year duration of immunity products) and Feline Leukemia Virus (FeLV) vaccines.
- PUREVAX brand offers the first and only half-mL Feline Rabies vaccine.

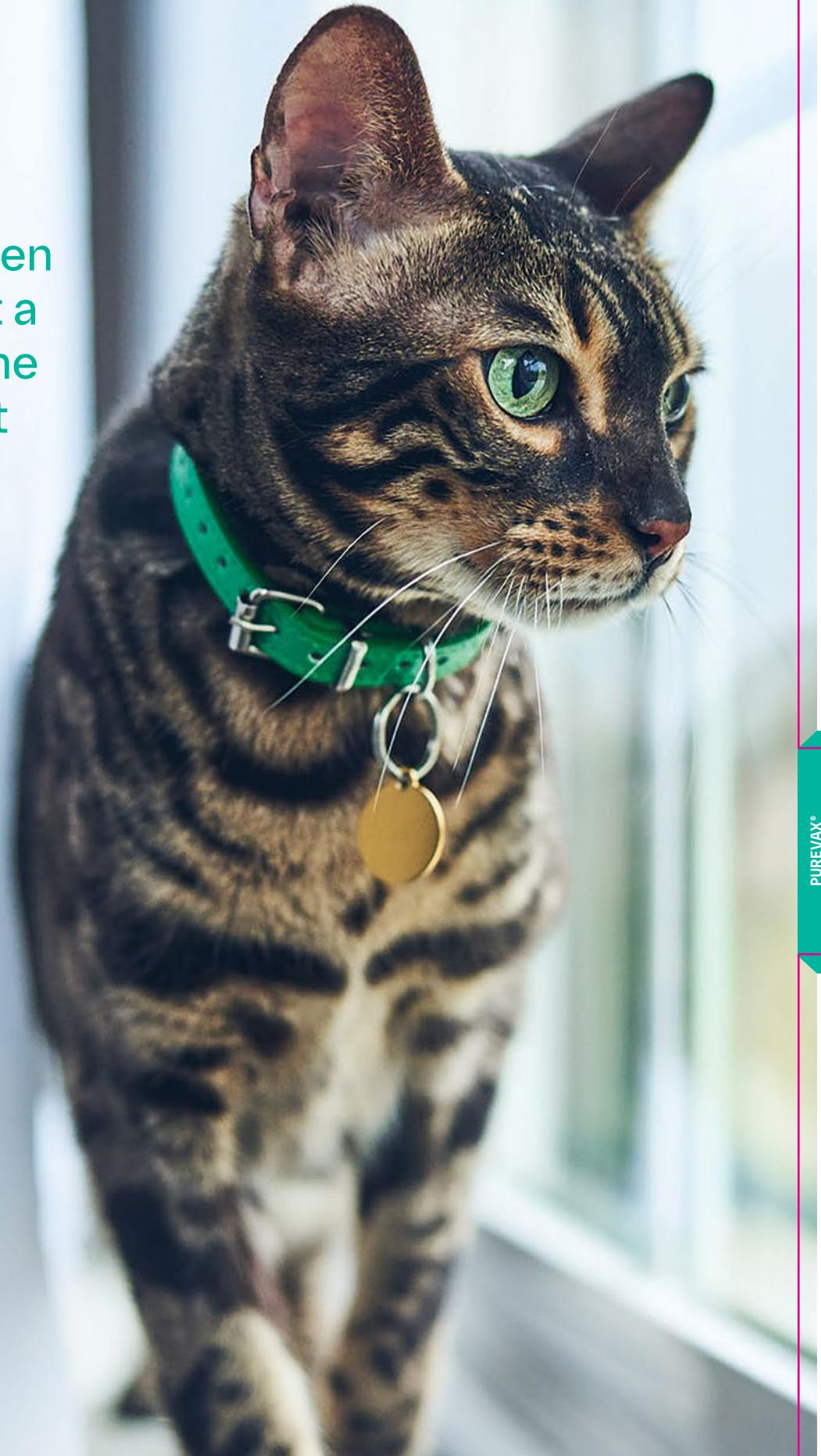


Adjuvants can present potential risks to feline patients.^{22, 23, 43}

- Injection-site reaction
- Injection-site granuloma
- Chronic inflammation

- Recombinant canarypox-vectored vaccines contain only a portion of the genetic material of a pathogen, not the complete pathogenic organism. Therefore there is no potential for reversion to virulence.
- With half-mL doses, PUREVAX brand continues to meet the evolving needs of veterinarians and their patients and may help further enhance compliance with vaccination site recommendations from feline vaccination guidelines.

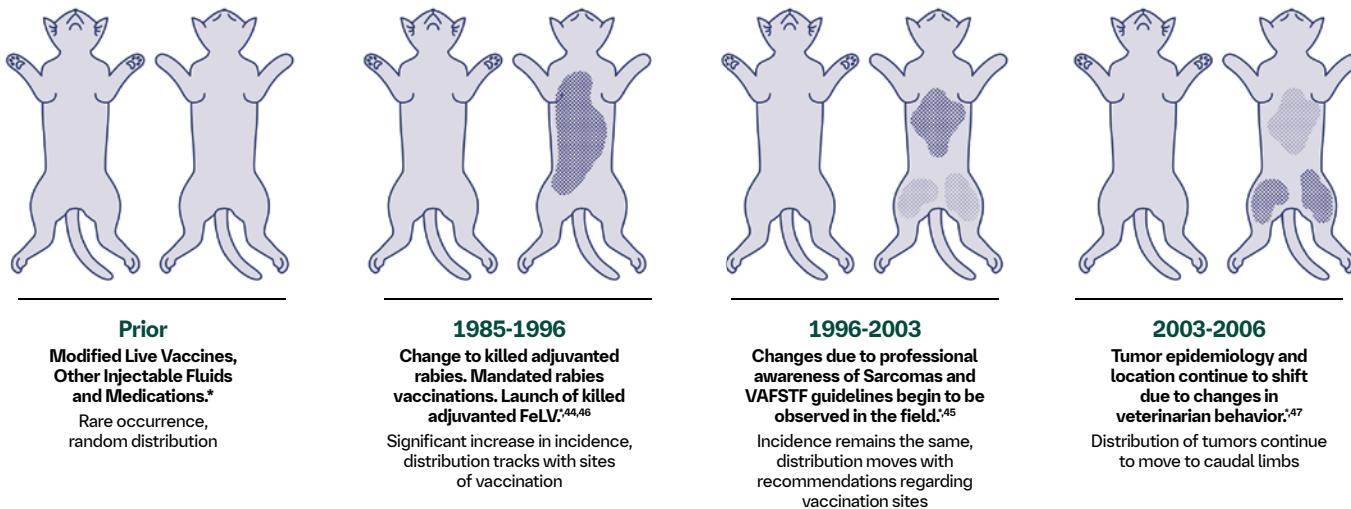
PUREVAX® feline vaccines have been designed to elicit a protective immune response without the addition of adjuvants.



Feline fibrosarcomas and vaccine adjuvant: A look at the data

Prior to the use of killed, adjuvanted vaccines, cats developed sarcomas, generally in conjunction with trauma. The hypothesis that killed, adjuvanted vaccines contribute to sarcoma formation developed from an observed increased incidence of sarcomas following the introduction of the killed rabies and FeLV vaccines in the mid-80s. These sarcomas developed in areas where vaccines were normally administered.⁴⁴ It's important to note the specific changes in incidence and location of tumors in cats that map coincidentally with the introduction of the killed, adjuvanted rabies vaccines in the mid-80s, as well as the shift in the location of tumors seen following the publication of the Vaccine-Associated Feline Sarcoma Task Force (VASTF) guidelines.^{44,45,46} The diagram below illustrates the changes in location and relative incidence of tumor formation seen in different periods of time coincident with the changes in vaccine site and introduction of killed adjuvanted rabies. As in most cancer epidemiology, direct causal linkage is complicated by a low overall incidence rate of sarcoma formation, the

potentially long lag time between vaccination and tumor formation, and the often mixed vaccination history of most cats. Several studies have been published since then that support the contribution of adjuvants to inflammation, granuloma formation, and injection site reactions.^{22,23,43} A study looking at 181 cats with soft tissue sarcomas concluded that "results consistently showed that case cats were less likely to have received recombinant vaccines than inactivated ones" though no vaccines should be considered to be risk free.⁴⁸ Of special interest is a study from Switzerland showing the statistically significant decrease in feline fibrosarcomas from 2009-2014 after a nonadjuvanted feline leukemia virus vaccine was introduced in 2007.⁴⁹ More recently, a European study published in 2023 showed cats vaccinated with adjuvanted vaccines had more frequent, intense, and long-lasting injection site reactions than cats that received nonadjuvanted vaccines.⁵⁰ Further support to administer nonadjuvanted vaccines is provided by the Advisory Board on Cat Diseases (ABCD) that states "non-adjuvanted, modified-live, or recombinant vaccines should be selected in preference to adjuvanted vaccines." and by the World Small Animal Veterinary Association (WSAVA) vaccination guidelines that state "Nonadjuvanted vaccines should be administered to cats wherever possible."^{51,52}



* Areas of tumor formations shown are approximations based on published literature.



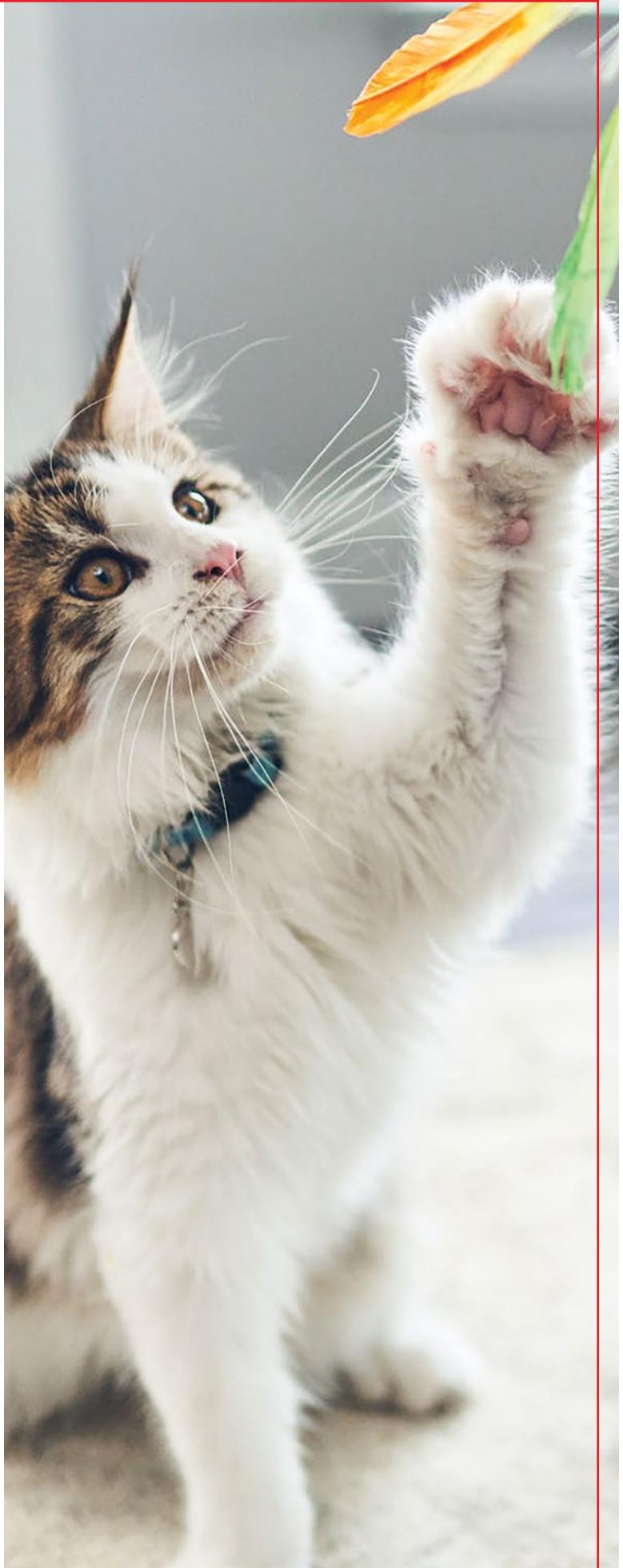
PUREVAX® Recombinant FeLV

Unique technology makes
the difference

- The first and only recombinant canarypox-vectored nonadjuvanted Feline Leukemia Virus (FeLV) vaccine.
- Available in half-mL presentation.

FeLV:

- Oronasal contact with saliva or urine from infected cats represents the most common mode of transmission, but transmission *in utero* or through nursing is also common.
- Often only “outdoor” cats are deemed at-risk for FeLV.
- However, are “indoor” cats truly indoors?
 - In a study, 41% of lost cats were identified by their owners as strictly indoors and not typically allowed outside.⁵³
 - In multi-cat households, some are indoor-only, while others may be indoor/outdoor.⁵⁴



Assessing the Efficacy of FeLV Vaccines:

Various vaccines have been granted licensure by the USDA for providing effective protection against feline leukemia virus, and include adjuvanted, inactivated, whole virus preparations, and a nonadjuvanted canarypox-vectored vaccine.⁵⁵⁻⁵⁹

Vaccine efficacy is demonstrated by comparing protection following a virulent challenge to a group of vaccinated cats and a group of unvaccinated control cats. FeLV vaccine efficacy is usually demonstrated in cats vaccinated twice 2 to 4 weeks apart, with the initial vaccine typically being administered at 8-9 weeks of age.⁵⁵⁻⁵⁹

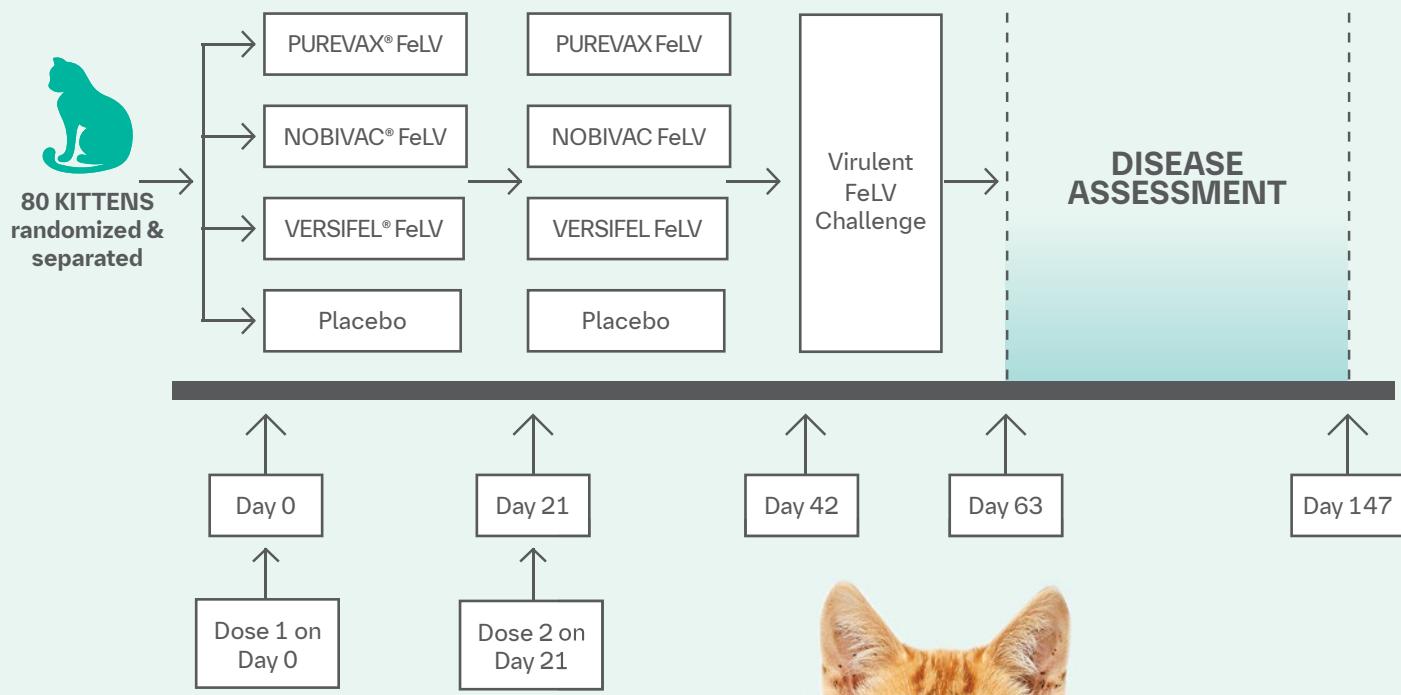
Veterinary immunologists and vaccinologists strive to create challenge models that capture the variation that occurs in natural infection under field conditions. Numerous studies have shown that persistent infection can be achieved in unvaccinated immunocompetent cats via oronasal challenge using a virulent FeLV challenge strain or by contact challenge, without concurrent immunosuppressive treatment.⁶⁰⁻⁶⁴



The task force of experts convened by the AAHA and AAFP recommends FeLV vaccination as core for all kittens and young adult cats younger than 1 year of age.

2020 AAHA/AAFP Feline Vaccination Guidelines⁵⁴

PUREVAX® FeLV: Adjuvant-free protection



“Nonadjuvanted vaccines should be administered to cats wherever possible.”

2016 WSAVA Guidelines for the Vaccination of Dogs and Cats⁵²

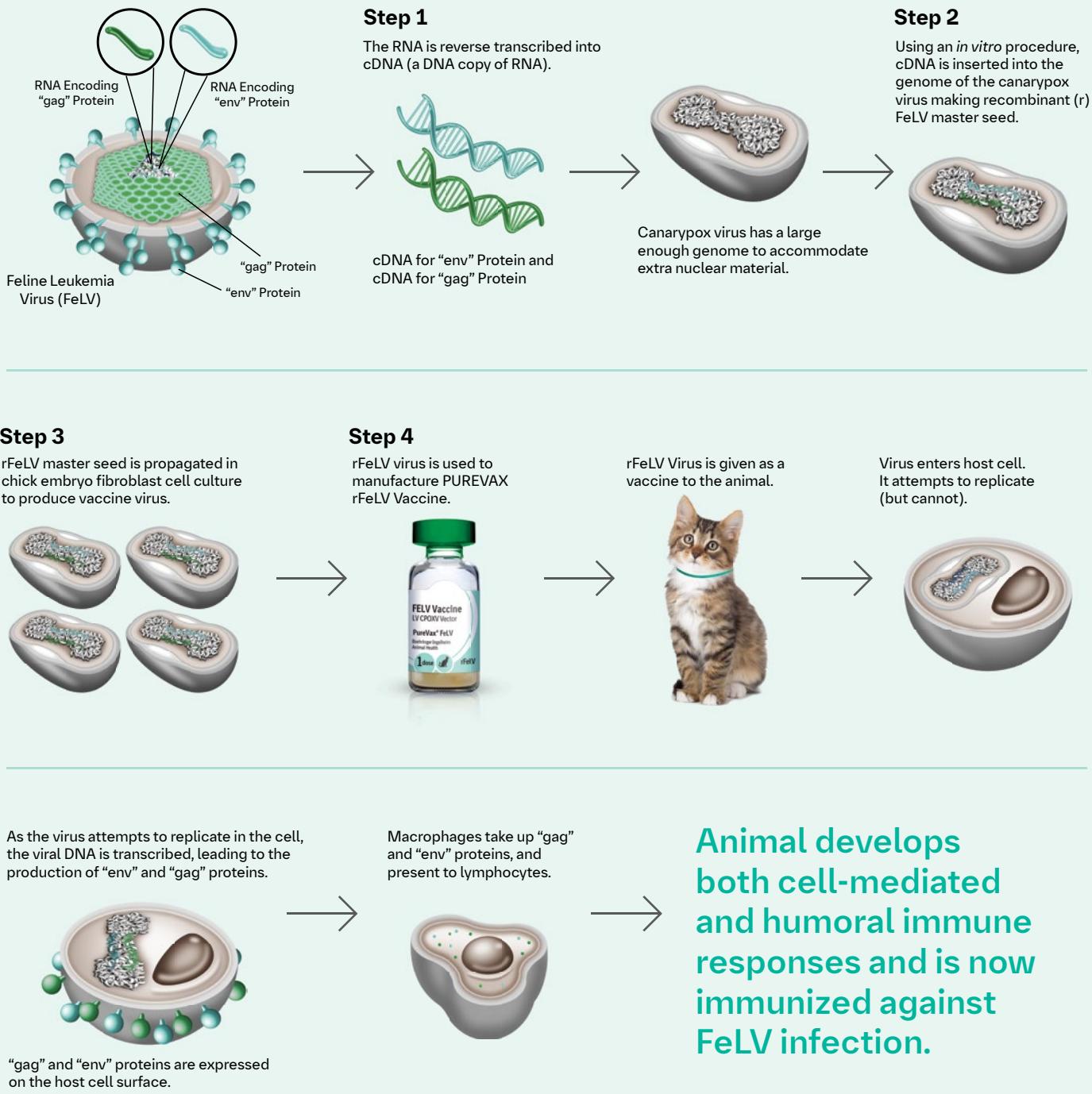


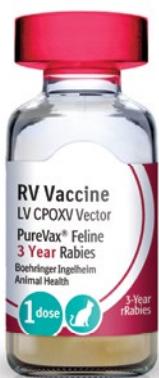
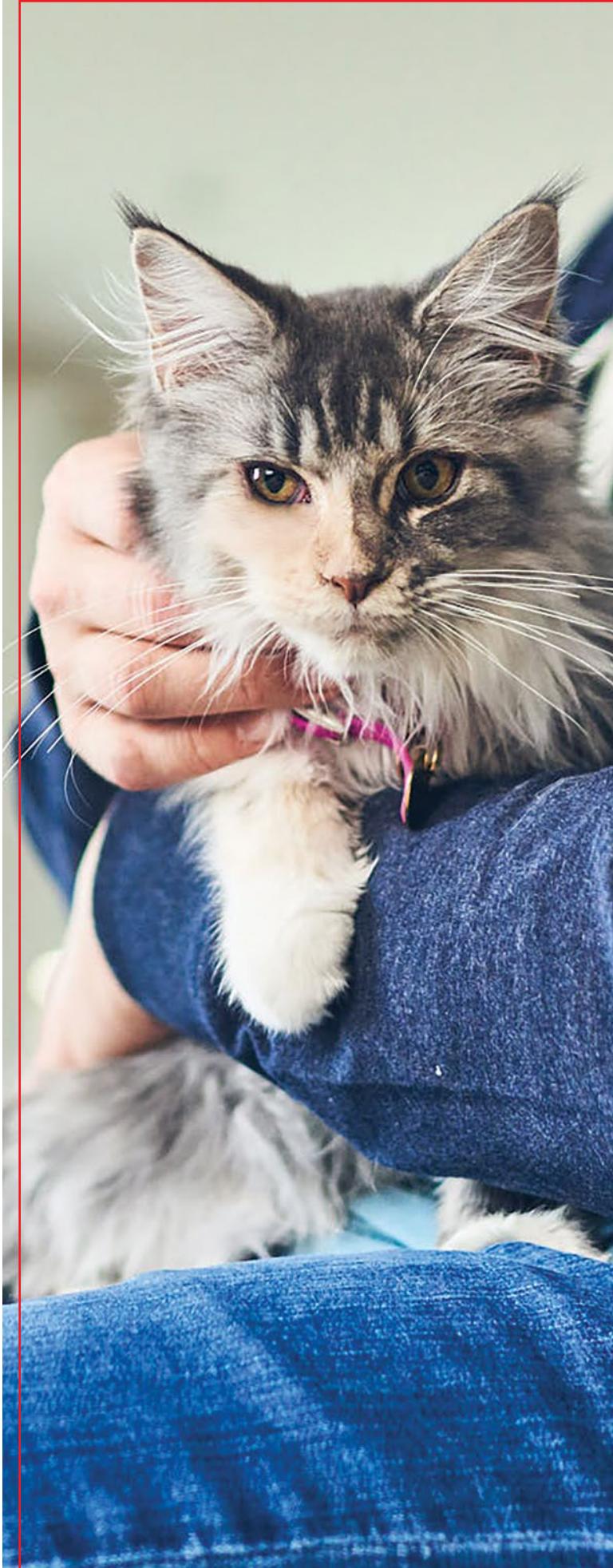


**PUREVAX® FeLV provides
efficacy equivalent to killed,
adjuvanted FeLV vaccines⁶⁰**

- 80 kittens aged 9-10 weeks of age were randomly assigned to 4 treatment groups, and received two 1 mL subcutaneous injections of the following vaccines, or placebo at a 21-day interval: PUREVAX FeLV, NOBIVAC® FeLV, VERSIFEL® FeLV, or placebo.
- Three weeks after the second vaccination, all cats were challenged with FeLV heterologous challenge material via the oronasal route on two consecutive days.
- Blood was collected prior to the first vaccination, prior to challenge, and weekly from 3 to 15 consecutive weeks postchallenge. Serum samples were tested for FeLV antigen to detect free, soluble p27 protein. In addition, proviral FeLV DNA loads in circulating peripheral blood mononuclear cells (PBMCs) were determined on terminal blood samples at 15-17 weeks postchallenge.
- Based on weekly serological assessments from Days 63 to 147, the recombinant nonadjuvanted PUREVAX FeLV vaccine provided a degree of protection from persistent antigenemia and integration of proviral DNA equivalent to that for the two killed, adjuvanted FeLV vaccines.

PUREVAX® FeLV: The manufacturing process and mode of action





PUREVAX® Feline Rabies

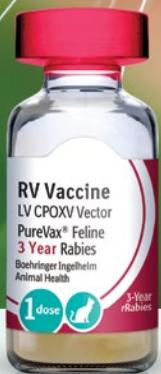
Unique technology makes
the difference

- The first and only recombinant canarypox-vectored nonadjuvanted feline rabies vaccine.
- The first and only half-mL feline rabies vaccine.
- PUREVAX feline rabies vaccines are available in both 1-year and 3-year duration of immunity preparations.
- PUREVAX Feline Rabies 1-year is available in combination with PUREVAX Feline 3 or PUREVAX Feline 4.
- While the number of cases of rabies diagnosed in dogs has declined from over 1,600 per year in 1958 to 66 in 2019, the number of cases of cats has remained relatively unchanged over that same period, and in 2019, was 245.⁶⁵
- According to a survey in 2017, only 31% of cats were vaccinated compared with 48% of dogs.⁶⁶

The primary goal of
vaccinating cats against
rabies is to help protect
them against disease.
In some states, vaccination
is mandatory.



Every year in the US,
there are more cats
diagnosed with rabies
than dogs.



Even though rabies laws differ considerably between states, there can be serious consequences for an unvaccinated pet.

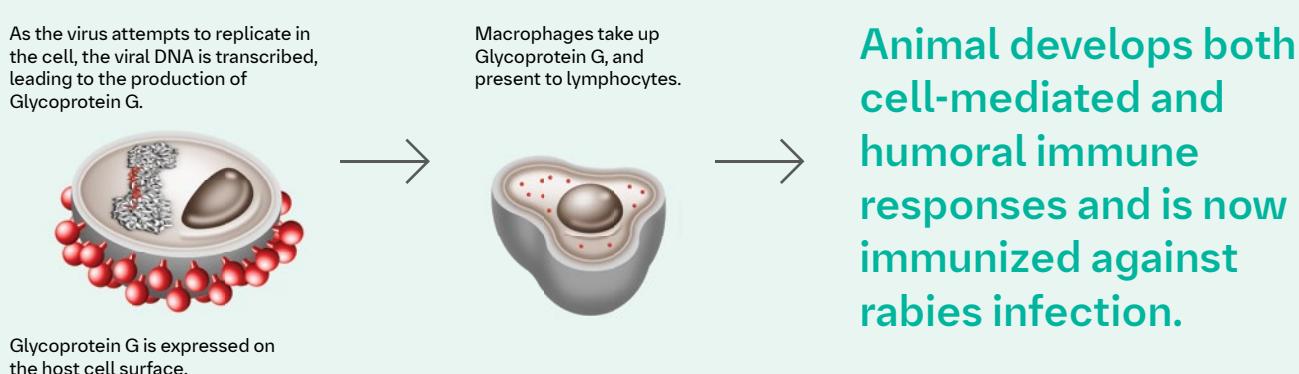
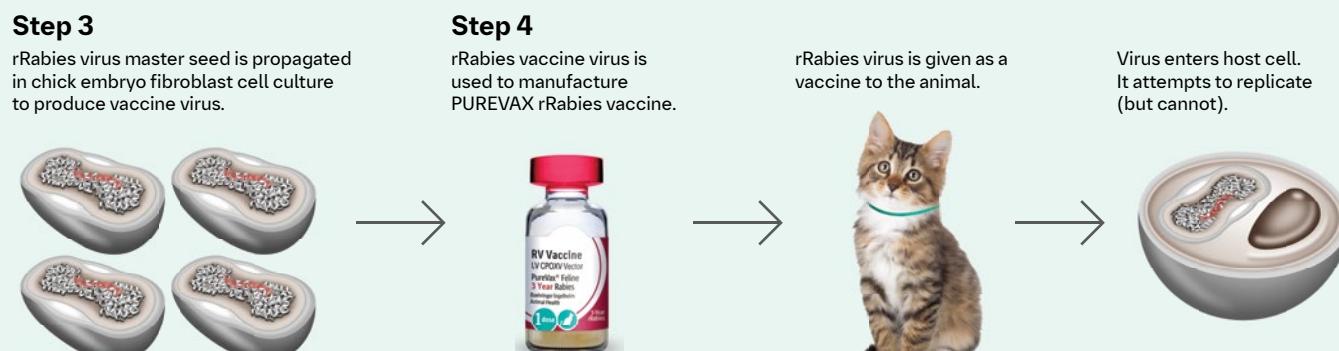
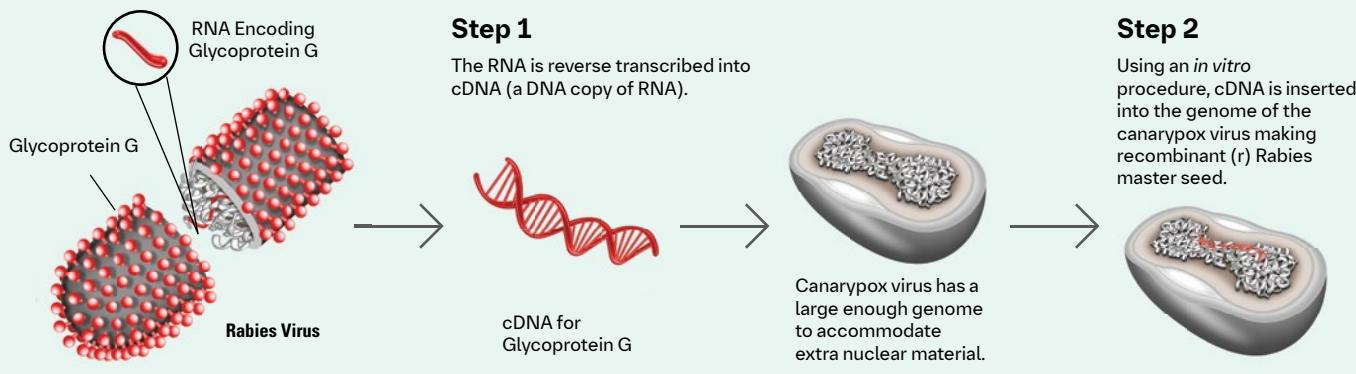
- If the pet is exposed to a rabid or suspected rabid animal (domestic dog or cat, or wildlife)
- If the pet bites another pet
- If the pet bites a human

 **Rabies aware**



For information on rabies laws and vaccination in the US, scan the QR code or visit www.RabiesAware.org

PUREVAX® Rabies: The manufacturing process and mode of action



Feline Vaccine Satisfaction Guarantee[#]

Boehringer Ingelheim Animal Health USA Inc. is committed to supporting the use of nonadjuvanted vaccines in feline patients, throughout their lives. We understand, however, that patients sometimes move, or are otherwise lost to observation, making it impossible to verify their complete vaccination history. Our PUREVAX® Satisfaction Guarantee therefore falls into three tiers:

Diagnosis	In the event that a cat is definitively diagnosed with an injection-site sarcoma:		
Guarantee Tier	Tier 1	Tier 2	Tier 3
Criteria	AND if that feline patient has been exclusively vaccinated with PUREVAX nonadjuvanted feline vaccines over its entire lifetime,	AND if that feline patient has been exclusively vaccinated with PUREVAX nonadjuvanted feline vaccines during the most recent 5 years of their life,	AND if that feline patient's LAST vaccination was with a PUREVAX nonadjuvanted feline vaccine but the patient does not otherwise have a documented history of PUREVAX-only vaccination,
Support	Boehringer Ingelheim Animal Health USA Inc. will support standard and reasonable diagnostic and treatment costs up to \$5,000.	Boehringer Ingelheim Animal Health USA Inc. will support standard and reasonable diagnostic and treatment costs up to \$3,000.	Boehringer Ingelheim Animal Health USA Inc. will support standard and reasonable diagnostic and treatment costs up to \$1,500.



Other adverse events and lack of efficacy

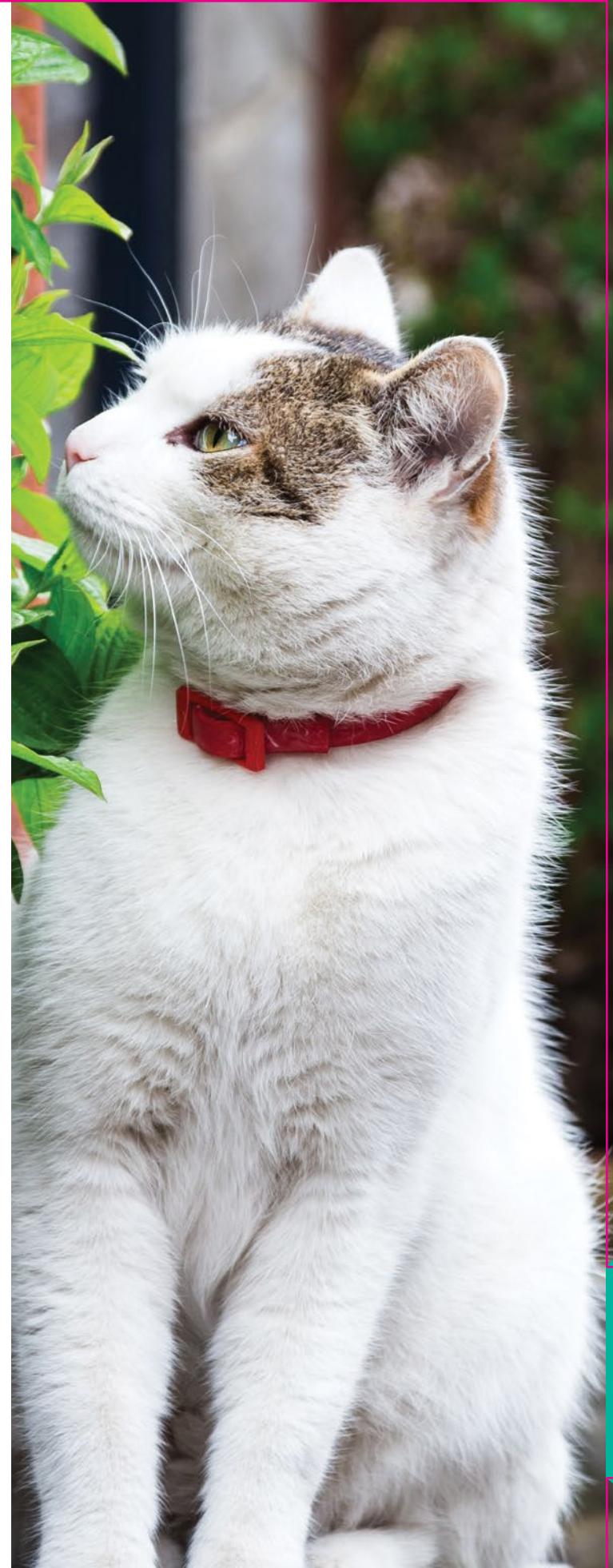
Boehringer Ingelheim Animal Health USA Inc. also provides customer support in the rare event that feline patients experience other types of adverse events or contract the disease for which they are vaccinated. Please contact our Veterinary Technical Solutions team (VeTS) representatives at 1-888-637-4251 (Option 1) for assistance in determining support eligibility in these instances.

To learn more about PUREVAX® vaccines and how they can benefit your patients, contact your Sales Representative or call Customer Care: 1-888-637-4251 or visit BI-CONNECT.com

**Ask your Representative about our Satisfaction Guarantee for PUREVAX vaccines or call our VeTS team:
1-888-637-4251 (Option 1)**



For further details and full terms & conditions please refer to the Boehringer Ingelheim Animal Health USA Pet Vaccines Customer Satisfaction Guarantee detailer.





PUREVAX® Feline Vaccines

Provides the only complete line of half-mL nonadjuvanted feline vaccines.

Vaccines	Vials	Lyophilized Antigens	Antigen/Diluent
PUREVAX 3 (RCP) 25 x 1 dose/tray		Rhinotracheitis - MLV Calicivirus - MLV Panleukopenia - MLV	Sterile Water
PUREVAX 4 (RCCP) 25 x 1 dose/tray		Rhinotracheitis - MLV Calicivirus - MLV Panleukopenia - MLV <i>Chlamydia</i> - MLV	Sterile Water
PUREVAX Recombinant FeLV 25 x 1 dose/tray		FeLV - canarypox-vectorized recombinant	Sterile Water
PUREVAX Feline Rabies 1 YR (rRabies) 25 x 1 dose/tray		Rabies - canarypox-vectorized recombinant	Sterile Water
PUREVAX Feline Rabies 3 YR (rRabies) 10 x 1 dose/tray 25 x 1 dose/tray		Rabies - canarypox-vectorized recombinant	Sterile Water
PUREVAX Feline 3/Rabies 1 YR (RCP + rRabies) 25 x 1 dose/tray		Rhinotracheitis - MLV Calicivirus - MLV Panleukopenia - MLV Rabies - canarypox-vectorized recombinant	Sterile Water
PUREVAX Feline 4/Rabies 1 YR (RCCP + rRabies) 25 x 1 dose/tray		Rhinotracheitis - MLV Calicivirus - MLV Panleukopenia - MLV <i>Chlamydia</i> - MLV Rabies - canarypox-vectorized recombinant	Sterile Water



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