**Improvest®**

(Gonadotropin Releasing Factor Analog-Diphtheria Toxoid Conjugate, 0.2 mg/mL)

Sterile Solution for Injection

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: IMPROVEST is a sterile solution containing Gonadotropin Releasing Factor Analog-Diphtheria Toxoid Conjugate. Each mL contains 0.2 mg Gonadotropin Releasing Factor Analog-Diphtheria Toxoid Conjugate, 150 mg of diethylaminoethyl-dextran hydrochloride, 1 mg chlorocresol, sodium hydroxide as needed to adjust pH and water for injection.

INDICATIONS FOR USE: IMROVEST is indicated for the temporary immunological castration (suppression of testicular function) and reduction of boar taint in intact male pigs intended for slaughter. It is for boars intended for market weight injected with IMROVEST as per product labelling and slaughtered 3 to 10 weeks after the second dose.

DOSEAGE AND ADMINISTRATION: IMROVEST should be administered via subcutaneous injection into the post auricular region of the neck. A safety injector should be used, preferably one which has a dual safety system providing both a needle guard and a mechanism to prevent accidental operation of the trigger. Each intact male pig should receive two 2-mL doses of IMROVEST. The first dose should be administered no earlier than 9 weeks of age. The second dose should be administered at least 4 weeks after the first dose. Pigs should be slaughtered no earlier than 10 weeks after the second dose. In case of micing, the animal should be re-dosed immediately.

CONTRAINdications: Do not use IMROVEST in intact male pigs intended for breeding because of the disruption of reproductive function. Not approved for use in female pigs and barrows.

WARNINGS:

WITHDRAWAL PERIODS: No withdrawal period is required when used according to labeling.

Not for Human Use. Keep Out of Reach of Children.

USER SAFETY WARNINGS: Warning for person administering IMROVEST: Accidental self injection could affect reproductive physiology of both men and women and may adversely affect pregnancy. Pregnant women should not administer this product. Women of childbearing age should exercise extreme caution when handling this product. Special care should be taken to avoid accidental self injection and needle stick injury when administering the product. Protective clothing including, but not limited to, safety glasses and gloves should be worn. Use a safety injector, preferably one which has a dual safety system providing both a needle guard and a mechanism to prevent accidental operation of the trigger. In case of eye contact, rinse immediately with copious amounts of water. In case of skin contact, wash immediately with soap and water. The product should be stored safely out of the reach of children. As a reminder, it is the prescribing veterinarian’s responsibility to inform drug administrators of the user safety warnings associated with IMROVEST.

Advice to the user in the event of accidental self injection: In the event of accidental self injection, wash the injury thoroughly with clean running water. Seek prompt medical attention and take the package leaflet with you. Do not administer the product, and/or any other product with a similar action, in the future.

Advice to the physician: Accidental self injection could affect reproductive physiology of both men and women and may adversely affect pregnancy. If self injection with IMROVEST is suspected, reproductive physiology should be monitored by assay of testosterone or estrogen levels (as appropriate). The risk of a physiological effect is greater after a second or subsequent accidental injection than after a first injection. The patient should be advised not to administer IMROVEST, and/or any other product with a similar action, in the future.

For customer service, to report suspected adverse reactions or to obtain a copy of the Material Safety Data Sheet (MSDS) call 1-888-963-8471.

PRECAUTIONS: Subcutaneous injection in intact male pigs can cause a transient local injection site reaction that may result in skin loss at slaughter.

ADVERSE REACTIONS:

Preapproval Experience: The field study observations from field effectiveness studies were consistent with the observations made during the target animal safety studies of transient inflammation at the injection sites. IMROVEST did not cause unusual clinical signs or an unexpected frequency or severity of injection site reactions. Adverse events, as reported, were not uniquely attributable to IMROVEST.

Postapproval Experience: (December 2013) The following adverse events are based on voluntary, post approval reporting. Not all adverse events are reported to FDA/VM. It is not always possible to reliably estimate the adverse event frequency, or establish a causal relationship to product exposure using these data.

In some cases anaphylactoid / anaphylactic-type reactions have been observed within a few minutes after the first administration of IMROVEST with duration up to 30 minutes. Clinical signs may include dyspnea, cyanosis, ataxia, emesis or hypersalivation. Most animals recovered. In some cases, death has been reported as an outcome.

TARGET ANIMAL SAFETY:

Margin of Safety: The safety of two doses of IMROVEST was evaluated in intact male swine. Thirty 9-week old intact boars received two subcutaneous doses of IMROVEST in the same location 14 days apart. The boars received one of three treatments: Saline Control (12-mL), IMROVEST at the intended dose (2-mL, 1X), or IMROVEST at 6 times the intended dose (12-mL, 6X). Boars were clinically monitored daily. In addition, observation and measurement of injection sites, body weight, quantitative feed consumption, hematology, and clinical chemistry analyses were also obtained. A complete postmortem examination was conducted on each boar 14 days after the second injection. IMROVEST, administered subcutaneously at the label dose (2-mL) resulted in mild transient injection site reactions at the 1X dose and caused clinical signs of systemic inflammation at 6X the intended dose. The signs of inflammation included depression, stiffness, panting and a rise lasting up to five days, reduction in feed intake, and lowered body weights. Multiple swollen joints and associated lameness, which may be signs of systemic inflammation, were observed in one 6X boar. Evaluation of blood work revealed increased white blood cell counts (eosinophilia and neutrophilia); slight increases in total serum protein (above normal reference range in 50% of the 6X boars) and globulin (above the normal reference range in 40% of the 6X boars); and slight decreases in serum albumin in 6X boars. Injection sites for the 6X boars showed clinically detectable firmness persisting in all animals for 14 days after the second injection. Pain and sensitivity at the injection site persisted for up to five days, and erythema and heat were more prominent in the 6X boars than in the 1X boars. Mild to moderate chronic inflammation and discoloration in the subcutaneous tissues at the injection site were observed. In all IMROVEST treated boars, atrophy of testes, prostate, and bursaourethral glands were observed as expected consequences associated with the intended effect of the drug. At the label 2-mL dose, IMROVEST may cause transient injection site inflammation.

Injection Site Safety: Injection site safety was evaluated following the injection of IMROVEST into healthy 17-week old boars. The treated boars received two 2-mL doses of IMROVEST into the same injection site location 28 days apart, while the control boars received saline. Daily monitoring included clinical evaluation and observation and measurement of injection sites. Two days after the second injection, postmortem observations of injection sites were conducted. All clinical signs of observable injection site swelling were resolved within 24 hours, and pain on palpation resolved by 48 hours post-injection. Firmness persisted for up to 11 days after the first injection in 10% of boars. Gross injection site alterations consisted of subcutaneous edema with tan or red discoloration. Two 2-mL injections of IMROVEST, administered 28 days apart in the same location resulted in transient injection site reactions following each injection and resulted in discoloration of tissue at the injection site which was observable approximately 48 hours after the second injection.

Field Safety: During the conduct of the nine location field effectiveness study, IMROVEST did not cause unusual clinical signs or an unexpected frequency or severity of injection site reactions. The field safety observations from this study were consistent with the observations made during the target animal safety studies of transient inflammation at the injection sites. Adverse events, as reported, were not uniquely attributed to IMROVEST.

EFFECTIVENESS: IMROVEST is an injectable sterile solution containing an incomplete analog of natural gonadotropin releasing factor (GnRF) conjugated to diphtheria toxoid in an adjuvanted formulation. Immunization with a two dose regimen of IMROVEST, with a four week interval between doses, stimulates the pig's immune system to produce antibodies which can neutralize its own GnRF. Pigs given an initial dose of IMROVEST are immunologically primed but do not produce sufficient antibodies to have any physiological effect. Following receipt of the second dose, the pig’s immune system responds with a strong antibody response. These antibodies bind to and neutralize circulating GnRF in the bloodstream. Neutralization of GnRF blocks the hypothalamic-pituitary-gonadal endocrine axis, thereby suppressing testicular function, including both sex hormone production and reproductive capability, thereby providing temporary immunological castration in these injected boars.

Evidence of temporary immunological castration was provided in a series of studies showing that within 12 weeks after the second injection of IMROVEST, anti-GnRF antibody levels increase significantly. With this rise in anti-GnRF antibodies, the levels of gonadal sex hormones were substantially reduced, the size of the testes, and spermatogenesis suppressed, as was the expression of typical male behaviors (aggression and sexual, e.g., mounting). Full immunological castration was demonstrated to last from 3 to 10 weeks after the second dose.

IMROVEST injected boars will start to return to full reproductive function at a variable period after this time, as evidenced by increasing male sex hormone testosterone and intact male behavior. IMROVEST should not be used in boars intended for breeding purposes.

Evidence to assess the acceptability of pork from IMROVEST treated pigs was provided through a series of consumer taste panels using consumers deemed sensitive to the taste of “tainted” meat. The presence of boar taint was evaluated on the basis of pork aroma and flavor and not by chemical analysis. Four consumer taste panel studies were conducted to demonstrate the difference of pork generated from IMROVEST treated boars and intact boars. A surgically castrated male group was not included in these studies. In these four studies, 767 sensitive consumers evaluated cooked pork loin samples from IMROVEST treated and intact boars. These pigs were raised to market weight, injected with IMROVEST as per product labelling and slaughtered 3 to 10 weeks after receipt of the second IMROVEST injection. The consumers found the aroma and flavor of pork from the IMROVEST injected pigs to be more acceptable than from the intact boars in all four studies.

STORAGE INFORMATION: Store under refrigeration at 2°-8°C (36°-46°F). Once brenched, product may be stored under refrigeration for 28 days. Store bottles in carton until used. Protect from light. Protect from freezing.

HOW SUPPLIED: IMROVEST is available in the following package sizes:

- 20 mL bottle
- 100 mL bottle
- 250 mL bottle
- 500 mL bottle

NADA # 141-322, Approved by FDA

Distributed by: Zoetis Inc.
Kalamazoo, MI 49007

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