HEARTWORM DISEASE

TICKS & FLEAS

ROUNDWORMS & HOOKWORMS

All this coverage in just one monthly chewable.

The TRIO Zone. It's the heart of protection.

Simparica TRIO®

(sarolaner, moxidectin, and pyrantel chewable tablets)

HEARTWORM DISEASE | TICKS* & FLEAS | ROUNDWORMS† & HOOKWORMS‡

- **Designed for defense**
  - **Prevents heartworm disease**
  - **Protects against 5 species of ticks***
  - **Kills fleas before they can lay eggs**
  - **Treats and controls roundworms† and hookworms‡**
- **One convenient and simple-to-give chew does the job of 2 or 3 products**
- **Demonstrated safe for puppies as young as 8 weeks old, and weighing at least 2.8 lbs.**

IMPORTANT SAFETY INFORMATION: Use with caution in dogs with a history of seizures. Simparica Trio contains sarolaner, a member of the isoxazoline class, which has been associated with neurologic adverse reactions including tremors, ataxia, and seizures in dogs with or without a history of neurologic disorders. The safe use of Simparica Trio has not been evaluated in breeding, pregnant, or lactating dogs. The most frequently reported adverse reactions in clinical trials were vomiting and diarrhea. **See full Prescribing information, attached.**

**Amblyomma americanum*), *Amblyomma maculatum*, *Dermacentor variabilis*, *Ixodes scapularis*, and *Rhipicephalus sanguineus*. †*Toxocara canis* and *Toxascaris leonina*. ‡*Ancylostoma caninum* and *Uncinaria stenocephala*.

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ZOETIS PETCARE

Simparica TRIO™

(sarolaner, moxidectin, and pyrantel chewable tablets)

FOR ORAL USE IN DOGS ONLY

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

DESCRIPTION
SIMPARICA TRIO (sarolaner, moxidectin, and pyrantel chewable tablets) is a flavored, chewable tablet for administration to dogs 8 weeks of age and older. Each tablet is formulated to provide minimum dosages of 0.54 mg/lb (1.2 mg/kg) sarolaner, 0.011 mg/lb (24 µg/kg) moxidectin, and 2.27 mg/lb (5 mg/kg) pyrantel (as pamoate salt).

Sarolaner is a member of the isoxazoline class of parasiticides and the chemical name is 1-(5'-((5S)-5-(3,5-Dichloro-4-fluorophenyl)-5-(trifluoromethyl)-4,5-dihydroisoxazol-3-yl)-3'-H-spiro(azetidine-3,1'-(2) benzofuran)-1-yl)-2-(methylsulfonyl)ethanone. SIMPARICA TRIO contains the S-enantiomer of sarolaner.

Moxidectin is a semi-synthetic methoxime derivative of nemadectin which is a fermentation product of *Streptomyces cyaneogriseus* subspecies *noncyanogenus*. Moxidectin is a pentacyclic 16-membered lactone macrolide. The chemical name for moxidectin is (6R,23E,25S)-5-O-Demethyl-28-deoxy-25-[(1E)-1,3-dimethyl-1-buten-1-yl]-6,28-epoxy-23-(methoxyimino) milbemycin B.

Pyrantel belongs to a family classified chemically as tetrahydropyrimidines and the chemical name is (E)-1,4,5,6-Tetrahydro-1-methyl-2-[2-(2-thienyl) vinyl] pyrimidine 4,4' methylenebis [3-hydroxy-2-naphthoate](1:1). It is a yellow, water-insoluble crystalline salt of the tetrahydropyrimidine base and pamoic acid containing 34.7% base activity.

INDICATIONS
SIMPARICA TRIO is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis* and for the treatment and control of roundworm (immature adult and adult *Toxocara canis* and adult *Toxascaris leonina*) and adult hookworm (*Ancylostoma caninum* and *Uncinaria stenocephala*) infections. SIMPARICA TRIO kills adult fleas (*Ctenocephalides felis*) and is indicated for the treatment and prevention of flea infestations, and the treatment and control of tick infestations with *Amblyomma americanum* (lone star tick), *Amblyomma maculatum* (Gulf Coast tick), *Dermacentor variabilis* (American dog tick), *Ixodes scapularis* (black-legged tick), and *Rhipicephalus sanguineus* (brown dog tick) for one month in dogs and puppies 8 weeks of age and older, and weighing 2.8 pounds or greater.

DOSAGE AND ADMINISTRATION
SIMPARICA TRIO is given orally once a month, at the recommended minimum dose of 0.54 mg/lb (1.2 mg/kg) sarolaner, 0.011 mg/lb (24 µg/kg) moxidectin, and 2.27 mg/lb (5 mg/kg) pyrantel (as pamoate salt).

Dosage Schedule

Body Weight (lbs)	Sarolaner per Tablet (mg)	Moxidectin per Tablet (mg)	Pyrantel per Tablet (mg)	Number of Tablets Administered
2.8 to 5.5	3	0.06	12.5	One
5.6 to 11.0	6	0.12	25	One
11.1 to 22.0	12	0.24	50	One
22.1 to 44.0	24	0.48	100	One
44.1 to 88.0	48	0.96	200	One
88.1 to 132.0	72	1.44	300	One
>132.0	Administer the appropriate combination of tablets			

SIMPARICA TRIO can be offered to the dog with or without food.

Care should be taken to ensure that the dog consumes the complete dose and that part of the dose is not lost or refused. If a dose is missed, give SIMPARICA TRIO immediately and resume monthly dosing.

Heartworm Prevention:
SIMPARICA TRIO should be administered at monthly intervals year-round or at least within one month of the animal's first seasonal exposure to mosquitoes and continuing until at least 1 month after the dog's last seasonal exposure. If a dose is missed, give SIMPARICA TRIO immediately and resume monthly dosing. When replacing a monthly heartworm preventive product, SIMPARICA TRIO should be given within one month of the last dose of the former medication.

Flea Treatment and Prevention:
Treatment with SIMPARICA TRIO may begin at any time of the year. SIMPARICA TRIO should be administered year-round at monthly intervals or started at least one month before fleas become active.

To minimize the likelihood of flea re-infestation, it is important to treat all dogs and cats within a household with a flea control product.

Tick Treatment and Control:
Treatment with SIMPARICA TRIO can begin at any time of the year. SIMPARICA TRIO should be administered year-round at monthly intervals or started at least one month before ticks become active.

Intestinal Nematode Treatment and Control:
For the treatment of roundworm (immature adult and adult *Toxocara canis* and adult *Toxascaris leonina*) and adult hookworm (*Ancylostoma caninum* and *Uncinaria stenocephala*) infections, SIMPARICA TRIO should be administered once as a single dose. Monthly use of SIMPARICA TRIO will control any subsequent infections.

CONTRAINDICATIONS
There are no known contraindications for the use of SIMPARICA TRIO.

WARNINGS
Not for use in humans. Keep this and all drugs out of reach of children.

Keep SIMPARICA TRIO in a secure location out of reach of dogs, cats and other animals to prevent accidental ingestion or overdose.

PRECAUTIONS
Sarolaner, one of the ingredients in SIMPARICA TRIO, is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders.

Prior to administration of SIMPARICA TRIO, dogs should be tested for existing heartworm infections. Infected dogs should be treated with an adulticide to remove adult heartworms. SIMPARICA TRIO is not effective against adult *D. immitis*.

The safe use of SIMPARICA TRIO has not been evaluated in breeding, pregnant, or lactating dogs.

ADVERSE REACTIONS
In a field safety and effectiveness study, SIMPARICA TRIO was administered to dogs for the prevention of heartworm disease. The study included a total of 410 dogs treated once monthly for 11 treatments (272 treated with SIMPARICA TRIO and 138 treated with an active control). Over the 330-day study period, all observations of potential adverse reactions were recorded. The most frequent reactions reported in the SIMPARICA TRIO group are presented in the following table.

Table 1. Dogs with Adverse Reactions

Clinical Sign	SIMPARICA TRIO *n* = 272	Active Control *n* = 138
Vomiting	14.3%	10.9%
Diarrhea	13.2%	8.0%
Lethargy	8.5%	6.5%
Anorexia	5.1%	5.8%
Polyuria	3.7%	3.6%
Hyperactivity	2.2%	0.7%
Polydipsia	2.2%	2.9%

In a second field safety and effectiveness study, SIMPARICA TRIO was administered to 278 dogs with fleas. Adverse reactions in dogs treated with SIMPARICA TRIO included diarrhea.

In a third field safety and effectiveness study, SIMPARICA TRIO was administered to 120 dogs with roundworms. Adverse reactions in dogs treated with SIMPARICA TRIO included diarrhea and vomiting.

For a copy of the Safety Data Sheet or to report adverse reactions, call Zoetis Inc. at 1-888-963-8471. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or www.fda.gov/reportanimalae.

CLINICAL PHARMACOLOGY
Following oral administration of SIMPARICA TRIO in Beagle dogs (13 to 15 months of age at the time of initial dosing), sarolaner and moxidectin were rapidly and well-absorbed. Following a single oral dose of SIMPARICA TRIO (sarolaner dose of 1.2 mg/kg), the sarolaner mean maximum plasma concentration (C_{max}) was 523 ng/mL with a mean time to maximum concentration (T_{max}) of 3.5 hours and an absolute bioavailability of 88%. At a moxidectin dose of 0.024 mg/kg, the moxidectin mean C_{max} was 13.1 ng/mL with a mean T_{max} of 2.4 hours and an absolute bioavailability of 67%.

Following intravenous (IV) dosing of a combination solution of sarolaner and moxidectin, the sarolaner volume of distribution (V_{ss}) was 2.4 L/kg and systemic clearance (CL) was 6.0 mL/kg/hr. For moxidectin the V_{ss} was 7.65 L/kg and CL was 26.6 mL/kg/hr. The terminal half-lives were similar after oral and IV dosing for both sarolaner (12 days) and moxidectin (11 days). The primary route of elimination of both sarolaner and moxidectin is biliary excretion with minimal metabolism.

Following an oral dose of SIMPARICA TRIO containing 5 mg/kg pyrantel (as pamoate salt), pyrantel has measurable plasma concentrations, but they are low and highly variable. Pyrantel pamoate is intended to remain in the gastrointestinal tract allowing for delivery of effective concentrations to gastrointestinal nematodes.

MODE OF ACTION
SIMPARICA TRIO contains three active pharmaceutical ingredients, sarolaner, moxidectin, and pyrantel pamoate.

Sarolaner is an acaricide and insecticide belonging to the isoxazoline group. Sarolaner inhibits the function of the neurotransmitter gamma aminobutyric acid (GABA) receptor and glutamate receptor, and works at the neuromuscular junction in insects. This results in uncontrolled neuromuscular activity leading to death in insects or acarines.

Moxidectin is an endectocide in the macrocyclic lactone class. Moxidectin acts by interfering with the chloride channel-mediated neurotransmission in the parasite. This results in paralysis and death of the parasite.

Pyrantel pamoate is a nematocide belonging to the tetrahydropyrimidine class. Pyrantel acts as a depolarizing, neuromuscular-blocking agent in susceptible parasites, which causes paralysis and death or expulsion of the organism.

EFFECTIVENESS
Heartworm Prevention
In two well-controlled laboratory studies, a single oral dose of SIMPARICA TRIO was 100% effective in preventing the development of adult *D. immitis* in dogs inoculated with infective larvae 30 days before treatment.

In a well-controlled US field study consisting of 246 dogs administered SIMPARICA TRIO and 119 administered an active control, no dogs treated with SIMPARICA TRIO tested positive for heartworm disease. All dogs treated with SIMPARICA TRIO were negative for *D. immitis* antigen and blood microfilariae at study completion on day 330.

Flea Treatment and Prevention
In a well-controlled laboratory study, SIMPARICA TRIO began to kill fleas at 4 hours and demonstrated 100% effectiveness at 8 hours after initial administration. After weekly re-infestations, SIMPARICA TRIO reduced the number of live fleas by ≥97.8% within 12 hours of infestation for 28 days.

In a separate well-controlled laboratory study, SIMPARICA TRIO demonstrated 100% effectiveness against adult fleas within 24 hours following treatment and maintained ≥99.7% effectiveness against weekly re-infestations for 35 days.

In a study to explore flea egg production and viability, SIMPARICA TRIO killed fleas before they could lay eggs for 35 days.

In a well-controlled 60-day US field study conducted in dogs with existing flea infestations of varying severity, the effectiveness of SIMPARICA TRIO against fleas on Day 30 and 60 visits was 99.0% and 99.7%, respectively, compared to baseline. Dogs with signs of flea allergy dermatitis showed improvement in erythema, papules, scaling, alopecia, dermatitis/pyodermatitis and pruritus as a direct result of eliminating fleas.

Tick Treatment and Control
In a well-controlled laboratory study, SIMPARICA TRIO began to kill existing *I. scapularis* within 8 hours, SIMPARICA TRIO reduced the number of live ticks by ≥94.2% within 24 hours of infestation for 28 days.

In well-controlled laboratory studies, SIMPARICA TRIO demonstrated ≥98.9% effectiveness against an existing infestation of *Amblyomma maculatum*, *Ixodes scapularis*, *Rhipicephalus sanguineus*, and *Dermacentor variabilis* 48 hours post-administration and maintained ≥90.4% effectiveness 48 hours after re-infestation for at least 28 days. Against *Amblyomma americanum*, SIMPARICA TRIO demonstrated ≥99.4% effectiveness 72 hours after treatment of existing infestations, and maintained ≥98.4% effectiveness 72 hours after re-infestation for at least 28 days.

Intestinal Nematode Treatment and Control
Elimination of roundworms (immature adult and adult *Toxocara canis* and adult *Toxascaris leonina*) and adult hookworms (*Ancylostoma caninum* and *Uncinaria stenocephala*) was demonstrated in well-controlled laboratory studies.

In a 10-day multi-center field study, SIMPARICA TRIO was effective against *Toxocara canis* and reduced fecal egg counts 99.2%.

ANIMAL SAFETY
Margin of Safety: SIMPARICA TRIO was administered orally to 8-week-old Beagle puppies at doses of 1, 3, and 5X the maximum labeled dose (2.4 mg/kg sarolaner, 48 µg/kg moxidectin, and 10 mg/kg pyrantel) at 28 day intervals for 7 treatments. Dogs in the control group received placebo. There were no clinically-relevant, treatment related effects on clinical observations, body weights, food consumption, clinical pathology (hematology, coagulation, serum chemistry, and urinalysis), gross pathology, histopathology, or organ weights. During the end-of-study ophthalmic examination, the following change was found: one 1X dog had retinal dysplasia (OS folds).

Ivermectin-sensitive Collie Safety:
SIMPARICA TRIO was administered orally once at 1, 3 and 5X the maximum labeled dose to Collies that had been pre-screened for avermectin sensitivity. Dogs in the control group received placebo. Clinical signs (ataxia, muscle fasciculations, mydriasis) associated with avermectin sensitivity were observed in the 5X group. All dogs were completely recovered by the third day of the study.

Heartworm-Positive Safety:
SIMPARICA TRIO was administered orally at 1 and 3X the maximum labeled dose at 28 day intervals for 3 treatments to Beagle dogs with patent adult heartworm infections and circulating microfilariae. Dogs in the control group received placebo. Diarrhea occurred more commonly in the treated dogs and also more often in the 3X group compared with the 1X group. Two dogs (1 each in 1X and 3X) developed a fever less than 24 hours after the first dose. The fever may have been a transient reaction to a rapid microfilaria reduction. Both dogs recovered without treatment.

Field Safety: In three well-controlled field studies, SIMPARICA TRIO was used concurrently with other medications such as vaccines, antimicrobials, anthelmintics, antiprotozoals, steroidal and non-steroidal anti-inflammatory agents, anesthetic agents and analgesics. No adverse reactions were associated with the concurrent use of SIMPARICA TRIO and other medications.

STORAGE CONDITIONS
Store at or below 30°C (86°F).

HOW SUPPLIED
SIMPARICA TRIO is available in six flavored tablet sizes (see **DOSAGE AND ADMINISTRATION**). Each tablet size is available in packages of one, three, or six tablets.

Approved by FDA under NADA # 141-521

zoetis

Distributed by:
Zoetis Inc.
Kalamazoo, MI 49007

Revised: March 2020

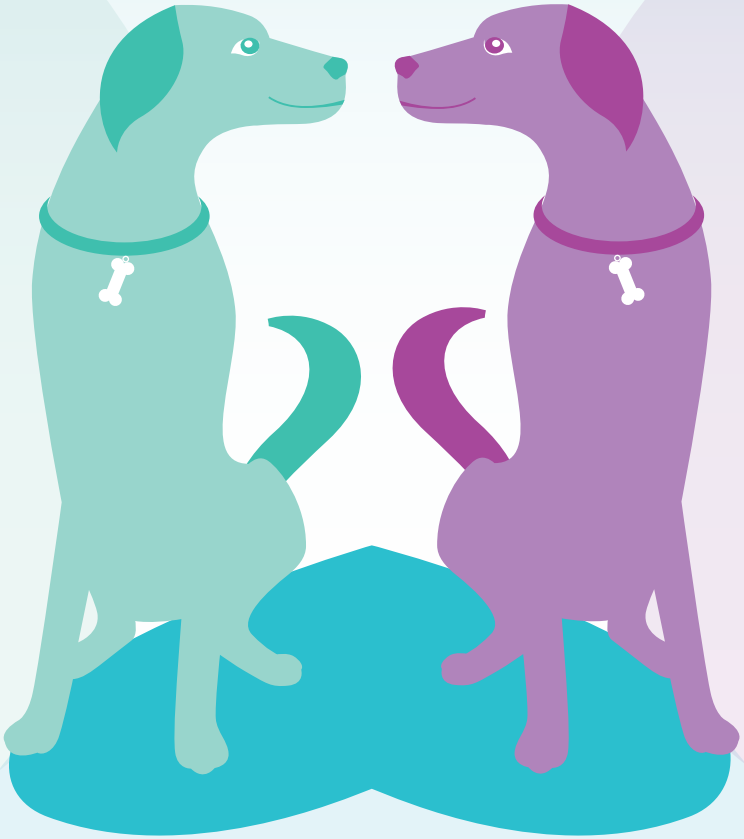
51000401A&P

WHEN TO REACH FOR APOQUEL® OR CYTOPOINT®

apoquel® (oclacitinib tablet)

FIRST CHOICE FOR FAST RELIEF

- Rapid allergic itch relief begins **within 4 hours**[1]
- Reduces inflammation due to allergic and atopic dermatitis[1]
- Start-and-stop itch control that can be used during diagnostic trials[2]
- Management of pruritic flares
- Short- and long-term management of allergic itch
- For dogs at least 12 months of age



CYTOPOINT®

ONE INJECTION. LASTING RELIEF.

- Begins to relieve allergic pruritus within 24 hours and **lasts for 4 to 8 weeks**[3]
- Dogs of all ages
- Lifelong disease management
- Management of pruritic flares
- Owners seeking nondrug therapy
- Dogs who are difficult to pill or cases in which owner compliance is a concern
- For dogs with comorbidities

Provide individualized treatment of allergic and atopic dermatitis with 2 trusted treatment options

Reach for relief based on your patient's needs:

RORY

FIRST TIMER

- 2 years old
- First-time itch patient
- Licks his paws and rubs his face due to allergic itch with secondary skin inflammation
- **Reach for Apoquel® for rapid allergic itch relief beginning within 4 hours and reduction of inflammation[1]**

SKYLAR

NATURE LOVER

- 3 years old
- Enjoys playing outside, running and rolling around in the grass
- Suffers from atopic dermatitis and severe, seasonal pruritic flares
- **Reach for either Apoquel or Cytopoint® for pruritic flares during allergy season**

NALA

SHOTGUN RIDER

- 5 years old
- Tags along on road trips
- Owner with a busy schedule who forgets to give daily allergic pruritus treatment
- **Reach for Cytopoint to achieve lasting allergic pruritus relief for dogs who have owners with on-the-go lifestyles**

The examples above represent hypothetical patient scenarios.

Cytopoint Indications: Cytopoint has been shown to be effective for the treatment of dogs against allergic dermatitis and atopic dermatitis.

Apoquel Indications: Control of pruritus associated with allergic dermatitis and control of atopic dermatitis in dogs at least 12 months of age.

Apoquel Important Safety Information: Do not use Apoquel in dogs less than 12 months of age or those with serious infections. Apoquel may increase the chances of developing serious infections, and may cause existing parasitic skin infestations or pre-existing cancers to get worse. Consider the risks and benefits of treatment in dogs with a history of recurrence of these conditions. New neoplastic conditions (benign and malignant) were observed in clinical studies and post-approval. Apoquel has not been tested in dogs receiving some medications including some commonly used to treat skin conditions such as corticosteroids and cyclosporines. Do not use in breeding, pregnant, or lactating dogs. Most common side effects are vomiting and diarrhea. Apoquel has been used safely with many common medications including parasiticides, antibiotics and vaccines.

For more information, please see the full Prescribing Information.

References: 1. Gadeyne C, Little P, King VL, et al. Efficacy of oclacitinib (Apoquel®) compared with prednisolone for the control of pruritus and clinical signs associated with allergic dermatitis in client-owned dogs in Australia. *Vet Dermatol*. 2014;25(6):512-e86. doi:10.1111/vde.12166. **2.** Aleo MM, Galvan EA, Fleck JT, et al. Effects of oclacitinib and prednisolone on skin test sensitivity [abstract]. *Vet Dermatol*. 2013;24(3):297. **3.** Data on file, Study No. C863R-US-12-018, Zoetis Inc. **4.** Data on file, Study No. C961R-US-13-051, Zoetis Inc.

zoetis

apoquel
(oclacitinib tablet)

3.6 mg 5.4 mg 16 mg

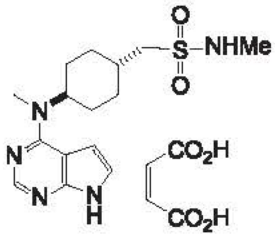
Immunomodulator

For oral use in dogs only

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

Description: APOQUEL (oclacitinib maleate) is a synthetic Janus Kinase (JAK) inhibitor. The chemical composition of APOQUEL is N-methyl[trans-4-(methyl-7H-pyrrolo[2,3-d]pyrimidin-4-ylamino) cyclohexyl]methanesulfonamide (2Z)-2-butenedioate.

The chemical structure of oclacitinib maleate is:



Indications: Control of pruritus associated with allergic dermatitis and control of atopic dermatitis in dogs at least 12 months of age.

Dosage and Administration: The dose of APOQUEL (oclacitinib maleate) tablets is 0.18 to 0.27 mg oclacitinib/lb (0.4 to 0.6 mg oclacitinib/kg) body weight, administered orally, twice daily for up to 14 days, and then administered once daily for maintenance therapy. APOQUEL may be administered with or without food.

Dosing Chart

Weight Range (in lb)		Weight Range (in Kg)		Number of Tablets to be Administered		
Low	High	Low	High	3.6 mg Tablets	5.4 mg Tablets	16 mg Tablets
6.6	9.9	3.0	4.4	0.5	-	-
10.0	14.9	4.5	5.9	-	0.5	-
15.0	19.9	6.0	8.9	1	-	-
20.0	29.9	9.0	13.4	-	1	-
30.0	44.9	13.5	19.9	-	-	0.5
45.0	59.9	20.0	26.9	-	2	-
60.0	89.9	27.0	39.9	-	-	1
90.0	129.9	40.0	54.9	-	-	1.5
130.0	175.9	55.0	80.0	-	-	2

Warnings:
APOQUEL is not for use in dogs less than 12 months of age (see **Animal Safety**).

APOQUEL modulates the immune system.

APOQUEL is not for use in dogs with serious infections.

APOQUEL may increase susceptibility to infection, including demodicosis, and exacerbation of neoplastic conditions (see **Precautions, Adverse Reactions, Post-Approval Experience and Animal Safety**).

New neoplastic conditions (benign and malignant) were observed in dogs treated with APOQUEL during clinical studies and have been reported in the post-approval period (see **Adverse Reactions and Post-Approval Experience**).

Consider the risks and benefits of treatment prior to initiating APOQUEL in dogs with a history of recurrent serious infections or recurrent demodicosis or neoplasia (see **Adverse Reactions, Post-Approval Experience**, and **Animal Safety**).

Keep APOQUEL in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Human Warnings:
This product is not for human use. Keep this and all drugs out of reach of children. For use in dogs only. Wash hands immediately after handling the tablets. In case of accidental eye contact, flush immediately with water or saline for at least 15 minutes and then seek medical attention. In case of accidental ingestion, seek medical attention immediately.

Precautions:
Dogs receiving APOQUEL should be monitored for the development of infections, including demodicosis, and neoplasia.

The use of APOQUEL has not been evaluated in combination with glucocorticoids, cyclosporine, or other systemic immunosuppressive agents.

APOQUEL is not for use in breeding dogs, or pregnant or lactating bitches.

Adverse Reactions:
Control of Atopic Dermatitis
In a masked field study to assess the effectiveness and safety of oclacitinib for the control of atopic dermatitis in dogs, 152 dogs treated with APOQUEL and 147 dogs treated with placebo (vehicle control) were evaluated for safety. The majority of dogs in the placebo group withdrew from the 112-day study by Day 16. Adverse reactions reported (and percent of dogs affected) during Days 0-16 included diarrhea (4.6% APOQUEL, 3.4% placebo), vomiting (3.9% APOQUEL, 4.1% placebo), anorexia (2.6% APOQUEL, 0% placebo), new cutaneous or subcutaneous lump (2.6% APOQUEL, 2.7% placebo), and lethargy (2.0% APOQUEL, 1.4% placebo). In most cases, diarrhea, vomiting, anorexia, and lethargy spontaneously resolved with continued dosing. Dogs on APOQUEL had decreased leukocytes (neutrophil, eosinophil, and monocyte counts) and serum globulin, and increased cholesterol and lipase compared to the placebo group but group means remained within the normal range. Mean lymphocyte counts were transiently increased at Day 14 in the APOQUEL group.

Dogs that withdrew from the masked field study could enter an unmasked study where all dogs received APOQUEL. Between the masked and unmasked study, 283 dogs received at least one dose of APOQUEL. Of these 283 dogs, two dogs were withdrawn from study due to suspected treatment-related adverse reactions: one dog that had an intense flare-up of dermatitis and severe secondary pyoderma after 19 days of APOQUEL administration, and one dog that developed generalized demodicosis after 28 days of APOQUEL administration. Two other dogs on APOQUEL were withdrawn from study due to suspected or confirmed malignant neoplasia and subsequently euthanized, including one dog that developed signs associated with a heart base mass after 21 days of APOQUEL administration, and one dog that developed a Grade III mast cell tumor after 60 days of APOQUEL administration.

One of the 147 dogs in the placebo group developed a Grade I mast cell tumor and was withdrawn from the masked study. Additional dogs receiving APOQUEL were hospitalized for diagnosis and treatment of pneumonia (one dog), transient bloody vomiting and stool (one dog), and cystitis with urolithiasis (one dog).

In the 283 dogs that received APOQUEL, the following additional clinical signs were reported after beginning APOQUEL (percentage of dogs with at least one report of the clinical sign as a non-pre-existing finding): pyoderma (12.0%), non-specified dermal lumps (12.0%), otitis (9.9%), vomiting (9.2%), diarrhea (6.0%), histiocytoma (3.9%), cystitis (3.5%), anorexia (3.2%), lethargy (2.8%), yeast skin infections (2.5%), pododermatitis (2.5%), lipoma (2.1%), polydipsia (1.4%), lymphadenopathy (1.1%), nausea (1.1%), increased appetite (1.1%), aggression (1.1%), and weight loss (0.7).

Control of Pruritus Associated with Allergic Dermatitis
In a masked field study to assess the effectiveness and safety of oclacitinib for the control of pruritus associated with allergic dermatitis in dogs, 216 dogs treated with APOQUEL and 220 dogs treated with placebo (vehicle control) were evaluated for safety. During the 30-day study, there were no fatalities and no adverse reactions requiring hospital care. Adverse reactions reported (and percent of dogs affected) during Days 0-7 included diarrhea (2.3% APOQUEL, 0.9% placebo), vomiting (2.3% APOQUEL, 1.8% placebo), lethargy (1.8% APOQUEL, 1.4% placebo), anorexia (1.4% APOQUEL, 0% placebo), and polydipsia (1.4% APOQUEL, 0% placebo). In most of these cases, signs spontaneously resolved with continued dosing. Five APOQUEL group dogs were withdrawn from study because of: darkening areas of skin and fur (1 dog); diarrhea (1 dog); fever, lethargy and cystitis (1 dog); an inflamed footpad and vomiting (1 dog); and diarrhea, vomiting, and lethargy (1 dog). Dogs in the APOQUEL group had a slight decrease in mean white blood cell counts (neutrophil, eosinophil, and monocyte counts) that remained within the normal reference range. Mean lymphocyte count for dogs in the APOQUEL group increased at Day 7, but returned to pretreatment levels by study end without a break in APOQUEL administration. Serum cholesterol increased in 25% of APOQUEL group dogs, but mean cholesterol remained within the reference range.

Continuation Field Study
After completing APOQUEL field studies, 239 dogs enrolled in an unmasked (no placebo control), continuation therapy study receiving APOQUEL for an unrestricted period of time. Mean time on this study was 372 days (range 1 to 610 days). Of these 239 dogs, one dog developed demodicosis following 273 days of APOQUEL administration. One dog developed dermal pigmented viral plaques following 266 days of APOQUEL administration. One dog developed a moderately severe bronchopneumonia after 272 days of APOQUEL administration; this infection resolved with antimicrobial treatment and temporary discontinuation of APOQUEL. One dog was euthanized after developing abdominal ascites and pleural effusion of unknown etiology after 450 days of APOQUEL administration. Six dogs were euthanized because of suspected malignant neoplasms: including thoracic metastatic, abdominal metastatic, splenic, frontal sinus, and intracranial neoplasms, and transitional cell carcinoma after 17, 120, 175, 49, 141, and 286 days of APOQUEL administration, respectively. Two dogs each developed a Grade II mast cell tumor after 52 and 91 days of APOQUEL administration, respectively. One dog developed low grade B-cell lymphoma after 392 days of APOQUEL administration. Two dogs each developed an apocrine gland adenocarcinoma (one dermal, one anal sac) after approximately 210 and 320 days of APOQUEL administration, respectively. One dog developed a low grade oral spindle cell sarcoma after 320 days of APOQUEL administration.

Post-Approval Experience (2020):
The following adverse events are based on post-approval adverse drug experience reporting for APOQUEL. Not all adverse events are reported to FDA/CVM. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data.

The following adverse events reported in dogs are listed in decreasing order of reporting frequency.

Vomiting, lethargy, anorexia, diarrhea, elevated liver enzymes, dermatitis (i.e. crusts, pododermatitis, pyoderma), seizures, polydipsia, and demodicosis.

Benign, malignant, and unclassified neoplasms, dermal masses (including papillomas and histiocytomas), lymphoma and other cancers have been reported.

Death (including euthanasia) has been reported.

Contact Information:
To report suspected adverse events, for technical assistance or to obtain a copy of the Safety Data Sheet, contact Zoetis Inc. at 1-888-963-8471 or www.zoetis.com.

For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at www.fda.gov/reportanimalae.

Clinical Pharmacology:

Mechanism of Action

Oclacitinib inhibits the function of a variety of pruritogenic cytokines and pro-inflammatory cytokines, as well as cytokines involved in allergy that are dependent on JAK1 or JAK3 enzyme activity. It has little effect on cytokines involved in hematopoiesis that are dependent on JAK2. Oclacitinib is not a corticosteroid or an antihistamine.

Pharmacokinetics

In dogs, oclacitinib maleate is rapidly and well absorbed following oral administration, with mean time to peak plasma concentrations (T_{max}) of less than 1 hour. Following oral administration of 0.4-0.6 mg oclacitinib/kg to 24 dogs, the mean (90% confidence limits [CL]) maximum concentration (C_{max}) was 324 (281, 372) ng/mL and the mean area under the plasma concentration-time curve from 0 and extrapolated to infinity (AUC_{0-inf}) was 1890 (1690, 2110) ng·hr/mL. The prandial state of dogs does not significantly affect the rate or extent of absorption. The absolute bioavailability of oclacitinib maleate was 89%.

Oclacitinib has low protein binding with 66.3-69.7% bound in fortified canine plasma at nominal concentrations ranging from 10-1000 ng/mL. The apparent mean (95% CL) volume of distribution at steady-state was 942 (870, 1014) mL/kg body weight.

Oclacitinib is metabolized in the dog to multiple metabolites and one major oxidative metabolite was identified in plasma and urine. Overall the major clearance route is metabolism with minor contributions from renal and biliary elimination. Inhibition of canine cytochrome P450 enzymes by oclacitinib is minimal; the inhibitory concentrations (IC_{50s}) are 50 fold greater than the observed C_{max} values at the use dose.

Mean (95% CL) total body oclacitinib clearance from plasma was low – 316 (237, 396) mL/h/kg body weight (5.3 mL/min/kg body weight). Following IV and PO administration, the terminal $t_{1/2}$ appeared similar with mean values of 3.5 (2.2, 4.7) and 4.1 (3.1, 5.2) hours, respectively.

Effectiveness:

Control of Atopic Dermatitis

A double-masked, 112-day, controlled study was conducted at 18 U.S. veterinary hospitals. The study enrolled 299 client-owned dogs with atopic dermatitis. Dogs were randomized to treatment with APOQUEL (152 dogs: tablets administered at a dose of 0.4-0.6 mg/kg per dose twice daily for 14 days and then once daily) or placebo (147 dogs: vehicle control, tablets administered on the same schedule). During the study, dogs could not be treated with other drugs that could affect the assessment of effectiveness, such as corticosteroids, anti-histamines, or cyclosporine. Treatment success for pruritus for each dog was defined as at least a 2 cm decrease from baseline on a 10 cm visual analog scale (VAS) in pruritus, assessed by the Owner, on Day 28. Treatment success for skin lesions was defined as a 50% decrease from the baseline Canine Atopic Dermatitis Extent and Severity Index (CADESI) score, assessed by the Veterinarian, on Day 28. The estimated proportion of dogs with Treatment Success in Owner-assessed pruritus VAS score and in Veterinarian-assessed CADESI score was greater and significantly different for the APOQUEL group compared to the placebo group.

Estimated Proportion of Dogs with Treatment Success, Atopic Dermatitis

Effectiveness Parameter	APOQUEL	Placebo	P-value
Owner-Assessed Pruritus VAS	0.66 (n = 131)	0.04 (n = 133)	$p<0.0001$
Veterinarian-Assessed CADESI	0.49 (n = 134)	0.04 (n = 134)	$p<0.0001$

Compared to the placebo group, mean Owner-assessed pruritus VAS scores (on Days 1, 2, 7, 14, and 28) and Veterinarian-assessed CADESI scores (on Days 14 and 28) were lower (improved) in dogs in the APOQUEL group. By Day 30, 86% (127/147) of the placebo group dogs and 15% (23/152) of the APOQUEL group dogs withdrew from the masked study because of worsening clinical signs, and had the option to enroll in an unmasked study and receive APOQUEL. For dogs that continued APOQUEL treatment beyond one month, the mean Owner-assessed pruritus VAS scores and Veterinarian-assessed CADESI scores continued to improve through study end at Day 112.

Control of Pruritus Associated with Allergic Dermatitis

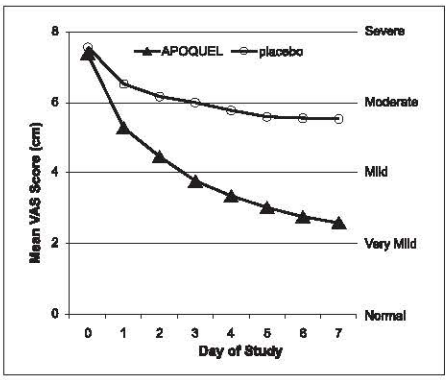
A double-masked, 30-day, controlled study was conducted at 26 U.S. veterinary hospitals. The study enrolled 436 client-owned dogs with a history of allergic dermatitis attributed to one or more of the following conditions: atopic dermatitis, flea allergy, food allergy, contact allergy, and other/unspecified allergic dermatitis. Dogs were randomized to treatment with APOQUEL (216 dogs: tablets administered at a dose of 0.4-0.6 mg/kg twice daily) or placebo (220 dogs: vehicle control, tablets administered twice daily). During the study, dogs could not be treated with other drugs that could affect the assessment of pruritus or dermal inflammation such as corticosteroids, anti-histamines, or cyclosporine. Treatment success for each dog was defined as at least a 2 cm decrease from baseline on a 10 cm visual analog scale (VAS) in pruritus, assessed by the Owner, on at least 5 of the 7 evaluation days. The estimated proportion of dogs with Treatment Success was greater and significantly different for the APOQUEL group compared to the placebo group.

Owner-Assessed Pruritus VAS Treatment Success, Allergic Dermatitis

Effectiveness Parameter	APOQUEL (n = 203)	Placebo (n = 204)	P-value
Estimated Proportion of Dogs with Treatment Success	0.67	0.29	$p<0.0001$

After one week of treatment, 86.4% of APOQUEL group dogs compared with 42.5% of placebo group dogs had achieved a 2 cm reduction on the 10 cm Owner-assessed pruritus VAS. On each of the 7 days, mean Owner-assessed pruritus VAS scores were lower in dogs in the APOQUEL group (See Figure 1). Veterinarians used a 10 cm VAS scale to assess each dog's dermatitis. After one week of treatment, the mean Veterinarian-assessed VAS dermatitis score for the dogs in the APOQUEL group was lower at 2.2 cm (improved from a baseline value of 6.2 cm) compared with the placebo group mean score of 4.9 cm (from a baseline value of 6.2 cm). For dogs that continued APOQUEL treatment beyond one week, the Veterinarian-assessed dermatitis scores continued to improve through study end at Day 30.

Figure 1: Owner Assessed Pruritus VAS Scores by treatment for Days 0-7



Animal Safety:

Margin of Safety in 12 Month Old Dogs

Oclacitinib maleate was administered to healthy, one-year-old Beagle dogs twice daily for 6 weeks, followed by once daily for 20 weeks, at 0.6 mg/kg (1X maximum exposure dose, 8 dogs), 1.8 mg/kg (3X, 8 dogs), and 3.0 mg/kg (5X, 8 dogs) oclacitinib for 26 weeks. Eight dogs received placebo (empty gelatin capsule) at the same dosage schedule. Clinical observations that were considered likely to be related to oclacitinib maleate included papillomas and a dose-dependent increase in the number and frequency of interdigital furunculosis (cysts) on one or more feet during the study. Additional clinical observations were primarily related to the interdigital furunculosis and included dermatitis (local alopecia, erythema, abrasions, scabbing/crusts, and edema of feet) and lymphadenopathy of peripheral nodes. Microscopic findings considered to be oclacitinib maleate-related included decreased cellularity (lymphoid) in Gut-Associated Lymphoid Tissue (GALT), spleen, thymus, cervical and mesenteric lymph node; and decreased cellularity of sternal and femoral bone marrow. Lymphoid hyperplasia and chronic active inflammation was seen in lymph nodes draining feet affected with interdigital furunculosis. Five oclacitinib maleate-treated dogs had microscopic evidence of mild interstitial pneumonia. Clinical pathology findings considered to be oclacitinib maleate-related included mild, dose-dependent reduction in hemoglobin, hematocrit, and reticulocyte counts during the twice daily dosing period with decreases in the leukocyte subsets of lymphocytes, eosinophils, and basophils. Total proteins were decreased over time primarily due to the albumin fraction.

Vaccine Response Study

An adequate immune response (serology) to killed rabies (RV), modified live canine distemper virus (CDV), and modified live canine parvovirus (CPV) vaccination was achieved in eight 16-week old vaccine naïve puppies that were administered oclacitinib maleate at 1.8 mg/kg oclacitinib (3X maximum exposure dose) twice daily for 84 days. For modified live canine parainfluenza virus (CPI), < 80% (6 of 8) of the dogs achieved adequate serologic response. Clinical observations that were considered likely to be related to oclacitinib maleate treatment included enlarged lymph nodes, interdigital furunculosis, cysts, and pododermatitis. One oclacitinib maleate-treated dog (26-weeks-old) was euthanized on Day 74 after physical examination revealed the dog to be febrile, lethargic, with pale mucous membranes and frank blood in stool. Necropsy revealed pneumonia of short duration and evidence of chronic lymphadenitis of mesenteric lymph nodes. During the three month recovery phase to this study, one oclacitinib maleate-treated dog (32-weeks old) was euthanized on Day 28 due to clinical signs which included enlarged prescapular lymph nodes, bilateral epiphora, lethargy, mild dyspnea, and fever. The dog showed an elevated white blood cell (WBC) count. Necropsy revealed lesions consistent with sepsis secondary to immunosuppression. Bone marrow hyperplasia was consistent with response to sepsis.

Margin of Safety in 6 Month Old Dogs

A margin of safety study in 6-month-old dogs was discontinued after four months due to the development of bacterial pneumonia and generalized demodex mange infections in dogs in the high dose (3X and 5X) treatment groups, dosed at 1.8 and 3.0 mg/kg oclacitinib twice daily, for the entire study.

Storage Conditions:

APOQUEL should be stored at controlled room temperature between 20° to 25°C (68° to 77°F) with excursions between 15° to 40°C (59° to 104°F).

How Supplied:

APOQUEL tablets contain 3.6 mg, 5.4 mg, or 16 mg of oclacitinib as oclacitinib maleate per tablet. Each strength tablets are packaged in 100 and 250 count bottles. Each tablet is scored and marked with AQ and either an S, M, or L that correspond to the different tablet strengths on both sides.

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