1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Leventa 1 mg/ml oral solution for dogs

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each ml contains:

Active substances:

Levothyroxine sodium (as multihydrate) 1 milligram
(equivalent to 0.97 milligram levothyroxine)

Excipients:

Qualitative composition of excipients and other constituents	**Quantitative composition if that information is essential for proper administration of the veterinary medicinal product**
Ethanol 96% (v/v)	0.15 ml
Hydroxypropylbetadex	
Sodium hydrogen carbonate	
Sodium hydroxide	
Hydrochloric acid	
Water, purified	

Clear colourless to slight reddish solution.

3. CLINICAL INFORMATION

3.1 Target species

Dogs.

3.2 Indications for use for each target species

Treatment of hypothyroidism in dogs.

3.3 Contraindications

Do not use in dogs with hyperthyroidism or uncorrected adrenal insufficiency (hypoadrenocorticism).
Do not use in cases of hypersensitivity to the active substance or to any of the excipients.

3.4 Special warnings

None.

3.5 Special precautions for use

Special precautions for safe use in the target species:

The veterinary medicinal product should be used with caution in dogs with cardiac disease, diabetes mellitus or treated adrenal insufficiency (hypoadrenocorticism). For these dogs, gradual introduction of levothyroxine therapy, starting with 25% of the normal dose and increasing by 25% increments every two weeks until optimal stabilisation is achieved is recommended.
The clinical diagnosis of hypothyroidism should be confirmed by laboratory tests.

Special precautions to be taken by the person administering the veterinary medicinal product to animals:

In case of accidental ingestion, seek medical advice immediately and show the package leaflet or the label to the physician. Note: this veterinary medicinal product contains a high concentration of L-thyroxine sodium and may present a risk to humans if ingested.
Wash hands after use.
In case of eye contact, flush immediately with water.

Special precautions for the protection of the environment:

Not applicable.

3.6 Adverse events

Dogs:

Rare (1 to 10 animals / 10 000 animals treated):	Weight loss, Polydipsia Polyuria Hyperactivity Vomiting, Diarrhoea.
Very rare (<1 animal / 10 000 animals treated, including isolated reports):	Polyphagia Tachycardia Skin reaction (e.g. scale[1])[2]

[1] Mild to moderate formation.
[2] Transient and self-resolving.

Adverse reactions associated with treatment with L-thyroxine sodium are primarily those of hyperthyroidism due to therapeutic overdose.

Reporting adverse events is important. It allows continuous safety monitoring of a veterinary medicinal product. Reports should be sent, preferably via a veterinarian, to either the marketing authorisation holder or its local representative or the national competent authority via the national reporting system. See the package leaflet for respective contact details.

3.7 Use during pregnancy, lactation or lay

The safety of the veterinary medicinal product has not been established during pregnancy.

Pregnancy and lactation:

However, thyroxine is essential for normal foetal development. Hypothyroidism during pregnancy may be associated with impaired cognitive development and increased foetal mortality. During

pregnancy, maternal thyroid hormone requirements may increase. Pregnant bitches receiving treatment should therefore be monitored on a regular basis from conception until several weeks after delivery, as dose requirements may change during pregnancy and lactation.
Use in lactating bitches or animals intended for future breeding has not been evaluated.

3.8 Interaction with other medicinal products and other forms of interaction

L-thyroxine absorption may be impaired by the concomitant administration of antacids, e.g. aluminium or magnesium salts or calcium carbonate, or ferrous sulphate, and sucralfate. Therefore, concomitant administration of veterinary medicinal product with the above mentioned compounds should be avoided. At least 2 hours should elapse between administration of veterinary medicinal product and such products.

The therapeutic response to veterinary medicinal product may be altered by any compound that influences thyroid hormone metabolism and disposition (e.g. drugs displacing protein-binding site, modifying serum thyroxine-binding globulin concentration, or altering hepatic degradation of thyroxine or peripheral conversion of thyroxine to triiodothyronine). Thus, in case of concomitant administration of veterinary medicinal product with a compound exhibiting one of these properties, it is recommended to recheck that thyroid hormone concentrations are appropriate and to adjust the dose of veterinary medicinal product accordingly if needed.
Conversely, L-thyroxine supplementation may affect the pharmacokinetics and activity of concurrent therapies. In diabetic dogs treated with insulin, L-thyroxine supplementation may alter insulin requirements. In dogs with cardiac insufficiency, therapeutic response to cardiac glycosides may be decreased by L-thyroxine supplementation. Therefore, if treated with any of these compounds, dogs should be monitored carefully during initiation of treatment with veterinary medicinal product.

Please inform your veterinary surgeon if your dog receives any other medication before or during treatment with the veterinary medicinal product.

3.9 Administration routes and dosage

Oral use.
In thyroid hormone replacement therapy with L-thyroxine, the dose rate and regime have to be tailored individually to each dog. A starting dose rate of 20 microgram L-thyroxine sodium/kg once daily is recommended; this corresponds to 0.2 ml of the veterinary medicinal product per 10 kg bodyweight.
At re-examination four weeks later, dose adjustment should be performed based on the clinical response to treatment and thyroid hormone concentration evaluated 4-6 hours after administration of the veterinary medicinal product. Further assessment of hormonal responses and dose adjustment may be repeated at 4 week intervals if required.
A maintenance dose rate between 10 and 40 microgram/kg body weight once daily is generally sufficient to control the clinical signs of hypothyroidism and to restore thyroid hormone concentrations to within the reference range. Depending on the dose rate determined as suitable for the dog and on its body weight, the volume (in ml) of the veterinary medicinal product to be administered once daily can be estimated using the following table:

Body weight (kg)	**Dosage (microgram/kg)**			
	10	**20**	**30**	**40**
	Volume of the veterinary medicinal product (ml)			
5	0.05	0.10	0.15	0.20
10	0.10	0.20	0.30	0.40
15	0.15	0.30	0.45	0.60
20	0.20	0.40	0.60	0.80
25	0.25	0.50	0.75	1.00

30	0.30	0.60	0.90	1.20
35	0.35	0.70	1.05	1.40
40	0.40	0.80	1.20	1.60
45	0.45	0.90	1.35	1.80
50	0.50	1.00	1.50	2.00

The dose for dogs weighing more than 50 kg should be calculated according to bodyweight in the same way.

Once a suitable dose rate and regime have been established, it is recommended to recheck every 6 months that thyroid hormone concentrations are appropriate.
The improvement in clinical signs occurs differentially following the onset of treatment with L-thyroxine: whilst metabolic signs improve within two weeks after the onset of treatment, dermatological signs may require 6 weeks or more of treatment before improvement is seen.
The veterinary medicinal product should be administered at the same time every day. The absorption of L-thyroxine is influenced by food. In order to achieve consistent absorption of L-thyroxine, it is recommended to administer L-thyroxine 2-3 hours prior to feeding, which will maximise the degree of absorption and minimize variation in absorption (see also section 4.3). If L-thyroxine is administered less than 2 hours before feeding, at or after feeding, the feed given (type and amount) should be standardized.

Instruction for use of the oral syringe:
Open the bottle. Attach the dosing syringe to the bottle by gently pushing the end of the syringe onto the insert in the bottle. Turn the bottle/syringe upside down and draw the solution into the syringe by pulling the plunger out until the edge of the ring on the end of the plunger coincides with the expected volume or body weight in kilograms. Turn the bottle/syringe right way up and remove the syringe from the insert. After administering the veterinary medicinal product, clean the syringe by flushing with clean water and allow to dry naturally.

3.10 Symptoms of overdose (and where applicable, emergency procedures and antidotes)

Clinical signs of overdose with L-thyroxine are identical to those of hyperthyroidism and include body weight loss, hyperactivity, tachycardia, polydipsia, polyuria, polyphagia and diarrhoea. These signs are generally mild and fully reversible. Overdose may be accompanied by reversible changes in blood biochemistry, e.g. elevated glucose, inorganic phosphorus and albumin: globulin ratio, and reduced total protein and cholesterol.
In a tolerance study, healthy dogs treated with the veterinary medicinal product at 40 µg/kg body weight once daily during 91 consecutive days did not present any relevant clinical sign. At dose rates of 120 and 200 µg/kg body weight, dogs did not exhibit signs other than those of hyperthyroidism, mainly body weight loss. These signs were mild and reversible, with recovery occurring within 5 weeks after cessation of treatment.

Standard measures should be taken to remove non-absorbed drug from the gastro-intestinal tract.
If chronic overdosage is suspected, the dose should be re-evaluated.

3.11 Special restrictions for use and special conditions for use, including restrictions on the use of antimicrobial and antiparasitic veterinary medicinal products in order to limit the risk of development of resistance

Not applicable.

3.12 Withdrawal periods

Not applicable.

4. PHARMACOLOGICAL INFORMATION

4.1 ATCvet code: QH03AA01

4.2 Pharmacodynamics

L-thyroxine is identical in structure and mode of action to the thyroxine (T4) secreted physiologically and present in mammals with a normally functioning thyroid gland. Thyroxine is metabolised mainly to tri-iodothyronine (T3). T4 and T3 have a large variety of biological effects throughout the body. They are essential for the regulation of basal metabolism, cardiac function and blood flow, lipid and carbohydrate metabolism. They are also essential for the normal growth and development of the neurological and skeletal systems.

4.3 Pharmacokinetics

There is considerable variation in the pharmacokinetics between individual dogs. After oral administration of the veterinary medicinal product to euthyroid, fasted dogs, tmax occurred at approximately 2.5 - 3 hours. The serum half-life of L-thyroxine was approximately 7 hours. Bioavailability was 22%. After repeated oral administration over 14 consecutive days at a dose rate of 40 µg/kg/day, there was no accumulation of L-thyroxine in serum. Concomitant administration of food with the veterinary medicinal product delays absorption and reduces the extent of absorption of L-thyroxine from the gastrointestinal tract by approximately 50%. L-thyroxine is highly protein bound. The major site of thyroxine (T4) metabolism is the liver. The main pathway for the metabolism of T4 is its conversion, by deiodination, to the active metabolite triiodothyronine (T3). Further deiodination of T4 and T3 leads to production of inactive compounds. Excretion is mainly observed via biliary and, to a lesser extent, urinary routes.

5. PHARMACEUTICAL PARTICULARS

5.1 Major incompatibilities

None known.

5.2 Shelf life

Shelf-life of the veterinary medicinal product as packaged for sale: 2 years.
Shelf life after first opening the immediate packaging: 6 months.

5.3 Special precautions for storage

Store in a refrigerator (2 °C – 8 °C).
Store in the original container.

5.4 Nature and composition of immediate packaging

30 ml amber glass bottle with a transparent LDPE insert and with a white HDPE child-resistant cap with tamper-proof closure in a printed carton.
A 1 mL oral syringe graduated in 0.05 mL increments is supplied with the veterinary medicinal product.
Pack sizes: 1 x 30 ml, 6 x 30 ml and 12 x 30 ml.
Not all pack sizes may be marketed.

5.5 Special precautions for the disposal of unused veterinary medicinal products or waste materials derived from the use of such products

Medicines should not be disposed of via wastewater or household waste.
Use take-back schemes for the disposal of any unused veterinary medicinal product or waste materials derived thereof in accordance with local requirements and with any national collection systems applicable to the veterinary medicinal product concerned.

6. NAME OF THE MARKETING AUTHORISATION HOLDER

Intervet Ireland Limited

7. MARKETING AUTHORISATION NUMBER(S)

VPA10996/199/001

8. DATE OF FIRST AUTHORISATION

29/06/2007

9. DATE OF THE LAST REVISION OF THE SUMMARY OF THE PRODUCT CHARACTERISTICS

16/05/2025

10. CLASSIFICATION OF VETERINARY MEDICINAL PRODUCTS

Veterinary medicinal product subject to prescription.

Detailed information on this veterinary medicinal product is available in the Union Product Database (https://medicines.health.europa.eu/veterinary).