

## NEW ZEALAND DATA SHEET

### 1 PRODUCT NAME

ELTROXIN® (50 mcg, 100 mcg tablets)

### 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Tablets containing 50 micrograms (0.05 mg) or 100 micrograms (0.1 mg) anhydrous levothyroxine sodium, which is the monosodium salt of the levorotary isomer of thyroxine.

100 mcg levothyroxine is equivalent in activity to 20 to 30 mcg liothyronine or 60 mg thyroid BP.

For the full list of excipients, see section 6.1

### 3 PHARMACEUTICAL FORM

Eltroxin 50 microgram (0.05 mg) tablets are white to off-white, round, biconvex tablets, imprinted with GS 11E on one face and 50 on the other.

Eltroxin 100 microgram (0.1 mg) tablets are white to off-white, round, biconvex tablets, imprinted with GS 21C on one face and 100 on the other.

### 4 CLINICAL PARTICULARS

#### 4.1 Therapeutic indications

Levothyroxine is indicated for the treatment of hypothyroidism.

#### 4.2 Dose and method of administration

##### Dose

Thyroxine has a narrow therapeutic index. Appropriate thyroxine dosage is based upon clinical assessment and laboratory monitoring of thyroid function tests. During the initial titration period, careful dosage titration and monitoring is necessary to avoid the consequences of under- or over-treatment. The symptoms of excessive thyroxine dosage are the same as many features of endogenous thyrotoxicosis.

If the dose of thyroxine is increased too rapidly, symptoms such as diarrhoea, nervousness, rapid pulse, insomnia, tremors and sometimes anginal pain where there is latent myocardial ischaemia may occur, and the dosage must be reduced or withheld for a day or two, then restarted at a lower level. A pre-therapy ECG is valuable, as changes induced by hypothyroidism may be confused with ECG evidence of ischaemia.

Thyroxine tablets should preferably be taken on an empty stomach.

Missed dosage – If a scheduled daily dose is missed, the dose should be taken as soon as the patient remembers, unless it is almost time for the patient's next dose. Two doses should not be taken together.

In patients whose medications include levothyroxine and known interfering agents, administration should be separated by at least 4 hours (see Section 4.5 Interactions).

##### **Adults**

Initially 50 to 100 micrograms daily and adjusted at four or six week intervals by 50 micrograms until attainment of clinical and biochemical euthyroidism. This may require doses of 100 to 200 micrograms daily.

##### **Patients over 50 years, elderly, or with diabetes or cardiac symptoms**

With patients aged over 50 years, it is not advisable to exceed 50 micrograms a day initially. Where there is cardiac disease 25 micrograms, given as 50 micrograms on alternate days, is more suitable. In this condition the daily dosage may be slowly increased by 25 micrograms increments (given as 50 micrograms on alternate days) at intervals of perhaps four weeks. This dosing regimen is illustrated in Table 1 below;

| DAILY DOSE    | DOSING REGIMEN   |
|---------------|--|
| 25 microgram  | One 50 microgram tablet on alternate days                                    |
| 50 microgram  | One 50 microgram tablet daily  |
| 75 microgram  | One 50 microgram tablet daily and one 50 microgram tablet on alternate days  |
| 100 microgram | One 100 microgram tablet daily   |
| 125 microgram | One 100 microgram tablet daily and one 50 microgram tablet on alternate days |

The initial dose and any dose increments should be carefully chosen in elderly and in patients with cardiac symptoms, diabetes mellitus or insipidus: too high initial dose or too rapid increase may cause or aggravate symptoms of angina, arrhythmias, myocardial infarction, cardiac failure or a sudden raise in blood pressure.

#### **Paediatric population**

In congenital hypothyroidism and juvenile myxoedema, the largest dose consistent with freedom from toxic effects should be given. The dosage is guided by clinical response, growth assessment and appropriate thyroid function tests - clinically normal pulse rate and absence of diarrhoea or constipation are the most useful indicators. Thyrotrophin levels may remain elevated during the first year of life in children with neonatal hypothyroidism due to resetting of the hypothalamic-pituitary axis.

For infants with congenital hypothyroidism a suitable starting dose is 25 micrograms levothyroxine sodium given as 50 micrograms every other day is advisable. This may be slowly increased by increments of 25 micrograms (given as 50 micrograms on alternate days) every two to four weeks until optimal response is achieved. This dosing regimen is illustrated in Table 1 above. The same dosing regimen applies to juvenile myxoedema, except that the starting dose for children older than one year may be 2.5 to 5 micrograms/kg/day. The calculated daily dose equivalent should be rounded to the nearest 25 micrograms to determine the actual prescribed dose.

#### Method of administration

Eltroxin tablets should be swallowed whole, and taken with a full glass of water. Eltroxin tablets should not be split.

### **4.3 Contraindications**

Hypersensitivity to any component of the preparation.

Thyrotoxicosis.

Acute myocardial infarction

Acute myocarditis

Acute pancarditis.

#### 4.4 Special warnings and precautions for use

##### Adrenal insufficiency

Treatment with thyroxine in patients with panhypopituitarism or other causes predisposing to adrenal insufficiency may cause reactions including dizziness, weakness, malaise, weight loss, hypotension and adrenal crisis. It is advisable to initiate corticosteroid therapy before giving levothyroxine sodium in these cases.

##### Elderly / cardiac symptoms / diabetes

Special care is needed in the elderly and in patients with symptoms of myocardial insufficiency or ECG evidence of myocardial infarction or ischaemia and also those with diabetes mellitus or insipidus.

Levothyroxine raises blood sugar levels and this may upset the stability of patients receiving antidiabetic agents.

##### Effects on bone mineral density

Subclinical hyperthyroidism may be associated with bone loss. In women, long-term levothyroxine sodium therapy has been associated with increased bone resorption, thereby decreasing bone mineral density, especially in post-menopausal women on greater than replacement doses or in women who are receiving suppressive doses of levothyroxine sodium. The increased bone resorption may be associated with increased serum levels and urinary excretion of calcium and phosphorus, elevations in bone alkaline phosphate and suppressed serum parathyroid hormone levels. To minimize the risk of osteoporosis, dosage of levothyroxine should be titrated to the lowest possible effective level.

##### Paediatric population

Parents of children receiving levothyroxine should be advised that partial loss of hair may occur during the first few months of therapy, but this effect is usually transient and subsequent regrowth usually occurs.

##### Thyroxine should not be used for the treatment of obesity or weight loss

In euthyroid patients, doses within the range of daily hormonal requirements are ineffective for weight reduction. Larger doses may produce serious or even life threatening manifestations of toxicity, particularly when given in association with sympathomimetic amines such as those used for anorectic effects.

##### Malabsorption syndromes

Thyroxine absorption is decreased in patients with malabsorption syndromes. It is advised to treat the malabsorption condition to ensure effective thyroxine treatment with regular thyroxine dose.

##### Myxoedema

Patients with myxoedema have an increased sensitivity for thyroid hormones; in these patients the starting dose should be low with slow dosing increments.

##### Pregnancy

During pregnancy, serum thyroxine levels may decrease with a concomitant increase in serum TSH level to values outside the normal range. Patients taking levothyroxine should have their TSH measured during each trimester. An elevated serum TSH level should be corrected by an increase in the dose of levothyroxine. Since postpartum TSH serum levels are similar to preconception values, levothyroxine dosage can be reduced to the pre-pregnancy dose.

### Neonates

Haemodynamic parameters should be monitored when levothyroxine therapy is initiated in very low birth weight preterm neonates as circulatory collapse may occur due to the immature adrenal function.

#### **4.5 Interaction with other medicines and other forms of interaction**

Levothyroxine increases the effect of anticoagulants and it may be necessary to reduce the dose of anticoagulant if excessive hypoprothrombinaemia and bleeding are to be avoided.

Phenytoin levels may be increased by levothyroxine.

Anticonvulsants such as carbamazepine and phenytoin enhance the metabolism of thyroid hormones and may displace them from plasma proteins. Initiation or discontinuation of anticonvulsant therapy may alter levothyroxine sodium dose requirements. Enzyme inducers like rifampicin and barbiturates increase the metabolism and excretion of thyroxine, resulting in increased thyroxine requirements.

Medicines that (partially) inhibit the peripheral transformation of T4 to T3 – like propranolol, amiodarone, lithium, iodide, oral contrast agents, propylthiouracil and glucocorticoids – lower the T3 level and therefore also the therapeutic effect.

If co-administered with cardiac glycosides, adjustment of dosage of cardiac glycoside may be necessary.

The effects of sympathomimetic agents are also enhanced.

Levothyroxine increases receptor sensitivity to catecholamines thus accelerating the response to tricyclic antidepressants.

Cholestyramine, calcium-, aluminium-, magnesium-, iron supplements, polystyrene sulfonates, sucralfate, lanthanum, bile acid sequestrants (e.g. colestipol), anion/cation exchange resins (e.g. kayexalate, sevelamer), and proton pump inhibitors decrease the absorption of thyroxine. Separate the dosages of thyroxine and the above mentioned medicines as much as possible to avoid interaction in the stomach or the small bowel.

Soy-containing compounds and high-fibre diets can decrease the intestinal absorption of thyroxine. Therefore, a dosage adjustment of thyroxine may be necessary, in particular at the beginning or after termination of nutrition with soy supplements.

Weight loss drugs: Orlistat may decrease levothyroxine absorption which may result in hypothyroidism. To avoid this orlistat and levothyroxine should be administered at least 4 hours apart. Regular monitoring for changes in thyroid function is required.

Thyroxine can increase the need for insulin or oral antidiabetics in patients with diabetes. Lowering the dose of thyroxine can cause hypoglycemia if the insulin or oral antidiabetics dose remains unchanged.

Co-administration of oral contraceptives, as well as a number of other drugs, including oestrogen, tamoxifene, clofibrate, methadone and 5-fluorouracil may increase serum concentration of thyroxine-binding globulin, and therefore increase thyroxine dosage requirements.

Reports indicate that some HMG-CoA reductase inhibitors (statins), such as simvastatin and lovastatin, may increase thyroid hormone requirements in patients receiving thyroxine therapy. It is unknown if this occurs with all statins. Close monitoring of thyroid function

and appropriate thyroxine dose adjustments may be necessary when thyroxine and statins are co-prescribed.

A number of drugs may decrease serum concentration of thyroxine-binding globulin, and therefore decrease thyroxine dosage requirements, including androgens and anabolic steroids.

False low plasma concentrations have been observed with concurrent anti-inflammatory treatment such as phenylbutazone or acetylsalicylic acid and thyroxine therapy. Administration of acetylsalicylic acid together with thyroxine results in an initial transient increase in serum free T4. Continued administration results in normal free T4 and TSH concentrations, and therefore, patients become clinically euthyroid.

Treatment with tyrosine kinase inhibitors (eg imatinib and sunitinib) was associated with increased thyroxine dosage requirements in hypothyroid patients.

The concurrent use of sertraline can reduce serum levels of thyroxine (with concomitant increased TSH levels).

Post-marketing cases have been reported indicating a potential interaction between ritonavir containing products and levothyroxine. Thyroid-stimulating hormone (TSH) should be monitored in patients treated with levothyroxine at least the first month after starting and/or ending ritonavir treatment.

A number of drugs may affect thyroid function tests and this should be borne in mind when monitoring a patient on levothyroxine sodium therapy.

There are limited case reports that oral ciprofloxacin may decrease the absorption of levothyroxine. An interval of six hours between the administration of the two medications is recommended and monitoring to changes in thyroid function should be carried out.

#### **4.6 Fertility, pregnancy and lactation**

Levothyroxine has been taken by a large number of pregnant women and women of childbearing age without any form of definite disturbances in the reproductive process having been observed so far. Thyroid hypo- or hyperactivity in the mother may, however, unfavourably influence the fetal outcome or well-being.

Levothyroxine is excreted in breast milk in low concentrations and this may be sufficient to interfere with neonatal screening for hypothyroidism.

#### **4.7 Effects on ability to drive and use machines**

From the pharmacokinetic and pharmacodynamic properties of levothyroxine, treatment with Eltroxin would not be expected to interfere with ability to drive or operate machinery.

#### **4.8 Undesirable effects**

The following effects are indicative of excessive dosage and usually disappear on reduction of dosage or withdrawal of treatment for a few days.

The frequency classification for these adverse reactions is not known due to a lack of robust clinical trial data to accurately determine frequency estimates.

|                          |   |
|--------------------------|---|
| Immune system disorders: | Hypersensitivity reactions such as skin rash, pruritis and anaphylactic reactions |
| Metabolism and nutrition | Increased appetite, excessive loss of weight                                      |

|   |   |
|---|---|
| disorders:  |   |
| Gastrointestinal disorders                              | Abdominal cramps, nausea, vomiting and diarrhea   |
| Nervous system disorders:                               | Headache, tremors, seizure. Rare cases of pseudotumor cerebri (benign intracranial hypertension) have been reported especially in children.   |
| Psychiatric disorders                                   | Anxiety, emotional lability, nervousness, excitability, insomnia, restlessness, psychotic depression  |
| Cardiac disorders:                                      | Anginal pain, cardiac arrhythmias, palpitations, tachycardia, increased blood pressure, heart failure, myocardial infarction  |
| Endocrine disorders                                     | Hyperthyroidism   |
| Respiratory, thoracic and mediastinal disorders:        | Dyspnea   |
| Skin and subcutaneous tissue disorders:                 | Sweating, hair loss   |
| Vascular disorders                                      | Flushing  |
| Musculoskeletal, connective tissue and bone disorders : | Cramps in the skeletal muscle, muscular weakness. Excessive dose may result in craniosynostosis in infants, and premature closure of epiphyses in children with compromised adult height. |
| Investigations  | Decreased bone mineral density  |
| Reproductive system and breast disorders:               | Menstrual irregularity, impaired fertility  |
| General disorders and administration site conditions:   | Fatigue, heat intolerance, fever  |

### Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicine is important. It allows continued monitoring of the benefit/risk balance of the medicine. Healthcare professionals are asked to report any suspected adverse reactions <https://nzphvc.otago.ac.nz/reporting/>

## 4.9 Overdose

### Symptoms and Signs

In addition to exaggeration of side effects the following symptoms may be seen: agitation, confusion, irritability, hyperactivity, headache, sweating, mydriasis, tachycardia, arrhythmias, tachypnoea, pyrexia, increased bowel movements and convulsions. The appearance of clinical hyper-thyroidism may be delayed for up to five days. Thyrotoxic crisis has been occasionally reported following massive or chronic intoxication, leading to cardiac arrhythmias, heart failure and coma.

### Treatment

The goal of therapy is restoration of clinical and biochemical euthyroid state by omitting or

reducing the thyroxine dosage, and other measures as needed depending on clinical status.

Treatment is symptomatic, and tachycardia has been controlled in adults by 40mg doses of propranolol given every 6 hr and other symptoms by diazepam and/or chlorpromazine as appropriate.

Further management should be as clinically indicated or as recommended by the national poisons centre, where available. For advice on the management of overdose please contact the National Poisons Centre on 0800 POISON (0800 764766).

## **5 PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic properties**

Levothyroxine sodium is the monosodium salt of the levorotary isomer of thyroxine.

Levothyroxine (T4) is a naturally occurring hormone produced by the thyroid gland and converted to the more active hormone triiodothyronine (T3) in peripheral tissues. The precise signals controlling the conversion of T4 to T3 within the cell are not known. The thyroid hormones are required for normal growth and development, particularly of the nervous system. They increase the resting or basal metabolic rate of the whole organism and have stimulatory effects on the heart, skeletal muscle, liver and kidney. Thyroid hormones enhance lipolysis and the utilization of carbohydrate.

100 mcg levothyroxine is equivalent in activity to 20 to 30 mcg liothyronine/triiodothyronine or 60 mg Thyroid BP and/or local pharmacopoeia specification.

### **5.2 Pharmacokinetic properties**

#### Absorption and Distribution

Following oral administration the absorption of levothyroxine is incomplete and variable especially when taken with food. The amount absorbed increases during fasting conditions.

Levothyroxine is nearly totally bound to serum protein.

#### Metabolism and Elimination

The main pathway for the metabolism of levothyroxine (T4) is its conversion, by deiodination, to the active metabolite triiodothyronine (T3). Further deiodination of T4 and T3 leads to production of inactive products.

Levothyroxine is eliminated slowly from the body with a half-life of approximately 7 days in a normal person. This may be reduced in hyperthyroid states or increased in hypothyroid patients.

Renal or hepatic disease do not appear to have any significant effect on the disposition of levothyroxine.

In man approximately 20-40% of levothyroxine is eliminated in the faeces and approximately 30-55% of a dose of levothyroxine is excreted in the urine.

### **5.3 Preclinical safety data**

No data included.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Microcrystalline cellulose, Pregelatinised maize starch, Talc, Colloidal anhydrous silica, Magnesium stearate.

**6.2 Incompatibilities**

Not applicable

**6.3 Shelf life**

24 months

**6.4 Special precautions for storage**

Store below 25 °C. Protect from light.

**6.5 Nature and contents of container**

50 mcg tablets in a polypropylene bottle fitted with a tamper evident, push-fit, white opaque low-density polyethylene (LDPE) closure containing 1000 tablets.

100 mcg tablets in a polypropylene bottle fitted with a tamper evident, push-fit, white opaque low-density polyethylene (LDPE) closure containing 1000 tablets.

**6.6 Special precautions for disposal**

No special requirements for disposal

**7 MEDICINE SCHEDULE**

Prescription Only Medicine

**8 SPONSOR**

Pharmacy Retailing (NZ) Limited trading as Healthcare Logistics  
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**9 DATE OF FIRST APPROVAL**

16 November 2006

**10 DATE OF REVISION OF THE TEXT**

17 May 2022

**SUMMARY TABLE OF CHANGES**

| <b>Section Changed</b> | <b>Summary of New Information</b>  |
|------------------------|--|
| 4.5                    | Addition of ritonavir interaction  |
| 4.8                    | Craniosynostosis ADR moved under Musculoskeletal and connective tissue disorders |
| 4.4                    | Addition of warning re. circulatory collapse in neonates                         |
| 4.5                    | Addition of ciprofloxacin interaction  |