Package Leaflet: Information for the patient

Levetiracetam 100 mg/ml concentrate for solution for infusion

Read all of this leaflet carefully before you or your child start using this medicine because it contains important information for you.
- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor or pharmacist.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet

1. What Levetiracetam is and what it is used for
2. What you need to know before you are given Levetiracetam
3. How Levetiracetam is given
4. Possible side effects
5. How to store Levetiracetam
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1. What Levetiracetam is and what it is used for

Levetiracetam is an antiepileptic medicine (a medicine used to treat seizures in epilepsy).

Levetiracetam is used:
- on its own in adults and adolescents from 16 years of age with newly diagnosed epilepsy, to treat a certain form of epilepsy. Epilepsy is a condition where the patients have repeated fits (seizures). Levetiracetam is used for the epilepsy form in which the fits initially affect only one side of the brain but could thereafter extend to larger areas on both sides of the brain (partial onset seizure with or without secondary generalisation). Levetiracetam has been given to you by your doctor to reduce the number of fits.
- as an add-on to other antiepileptic medicines to treat:
  - partial onset seizures with or without generalisation in adults, adolescents and children from 4 years of age
  - myoclonic seizures (short, shock-like jerks of a muscle or group of muscles) in adults and adolescents from 12 years of age with juvenile myoclonic epilepsy.
  - primary generalised tonic-clonic seizures (major fits, including loss of consciousness) in adults and adolescents from 12 years of age with idiopathic generalised epilepsy (the type of epilepsy that is thought to have a genetic cause).

Levetiracetam concentrate for solution for infusion is an alternative for patients when administration of the antiepileptic oral Levetiracetam medicine is temporarily not feasible.

2. What you need to know before you are given Levetiracetam

Do not use Levetiracetam
- If you are allergic to levetiracetam, pyrrolidone derivatives or any of the other ingredients of this medicine (listed in Section 6).

Warnings and precautions
Talk to your doctor before you are given Levetiracetam
- If you suffer from kidney problems, follow your doctor's instructions. He/she may decide if your dose should be adjusted.
- If you notice any slowdown in the growth or unexpected puberty development of your child, please contact your doctor.

- A small number of people being treated with anti-epileptics such as Levetiracetam have had thoughts of harming or killing themselves. If you have any symptoms of depression and/or suicidal ideation, please contact your doctor.
- If you have a family or medical history of irregular heart rhythm (visible on an electrocardiogram), or if you have a disease and/or take a treatment that make(s) you prone to heartbeat irregularities or salt imbalances.

Tell your doctor or pharmacist if any of the following side effects gets serious or last longer than a few days:
- Abnormal thoughts, feeling irritable or reacting more aggressively than usually, or if you or your family and friends notice important changes in mood or behaviour.
- Aggravation of epilepsy:
  Your seizures may rarely become worse or happen more often, mainly during the first month after the start of the treatment or increase of the dose.
  In a very rare form of early-onset epilepsy (epilepsy associated with SCN8A mutations) that causes multiple types of seizures and loss of skills you may notice that the seizures remain present or are becoming worse during your treatment.

If you experience any of these new symptoms while taking Levetiracetam, see a doctor as soon as possible.

Children and adolescents

- Levetiracetam is not indicated in children and adolescents below 16 years on its own (monotherapy)

Other medicines and Levetiracetam
Tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines, including medicines obtained without a prescription.

Do not take macrogol (a drug used as laxative) for one hour before and one hour after taking levetiracetam as this may results in a reduction of its effect.

Pregnancy and breast-feeding
If you are pregnant or breastfeeding, think you may be pregnant or are planning to have a baby, ask your doctor for advice before taking this medicine.

Levetiracetam can be used during pregnancy, only if after careful assessment it is considered necessary by your doctor.

You should not stop your treatment without discussing this with your doctor.

A risk of birth defects for your unborn child cannot be completely excluded. Two studies do not suggest an increased risk of autism or intellectual disability in children born to mothers treated with levetiracetam during pregnancy. However, the available data regarding the impact of levetiracetam on neurodevelopment in children is limited.

Breast-feeding is not recommended during treatment.

Driving and using machines
Levetiracetam may impair your ability to drive or operate any tools or machinery, as it may make you feel sleepy. This is more likely at the beginning of treatment or after an increase in the dose. You should not drive or use machines until it is established that your ability to perform such activities is not affected.

Levetiracetam contains sodium
One maximum single dose of Levetiracetam concentrate contains 2.5 mmol (or 57 mg) of sodium (0.8

mmol (or 19 mg) of sodium per vial). This is equivalent to 2.85% of the recommended maximum daily dietary intake of sodium for an adult. This should be taken into consideration if you are on a controlled sodium diet.

3. How Levetiracetam is given

A doctor or a nurse will administer you Levetiracetam as an intravenous infusion.
Levetiracetam must be administered twice a day, once in the morning and once in the evening, at about the same time each day.

The intravenous formulation is an alternative to your oral administration. You can switch from the film-coated tablets or from the oral solution to the intravenous formulation or reverse directly without dose adaptation. Your total daily dose and frequency of administration remain identical.

Adjunctive therapy and Monotherapy (from 16 years of age).

Adults (≥18 years) and adolescents (12 to 17 years) weighing 50 kg or more:
Recommended dose: between 1000 mg and 3000 mg each day.
When you will first start taking Levetiracetam, your doctor will prescribe you a **lower dose** during 2 weeks before giving you the lowest daily dose.

Dose in children (4 to 11 years) and adolescents (12 to 17 years) weighing less than 50 kg:
Recommended dose: between 20 mg per kg bodyweight and 60 mg per kg bodyweight each day.

Method and route of administration:
Levetiracetam is for intravenous use.

The recommended dose must be diluted in at least 100 ml of a compatible diluent and infused over 15-minutes.

For doctors and nurses, more detailed direction for the proper use of Levetiracetam is provided in section 6.

Duration of treatment:
- There is no experience with administration of intravenous levetiracetam for a longer period than 4 days.

If you stop using Levetiracetam:
If stopping treatment, as with other antiepileptic medicines, Levetiracetam should be discontinued gradually to avoid an increase of seizures. Should your doctor decide to stop your Levetiracetam treatment, he/she will instruct you about the gradual withdrawal of Levetiracetam.

If you have any further questions on the use of this medicine, ask your doctor or pharmacist.

4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Tell your doctor immediately, or go to your nearest emergency department, if you experience:

- weakness, feel light-headed or dizzy or have difficulty breathing, as these may be signs of a serious allergic (anaphylactic) reaction
- swelling of the face, lips, tongue and throat (Quincke's oedema)
- flu-like symptoms and a rash on the face followed by an extended rash with a high temperature, increased levels of liver enzymes seen in blood tests and an increase in a type of white blood cell

(eosinophilia), enlarged lymph nodes and the involvement of other body organs (Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]).

- symptoms such as low urine volume, tiredness, nausea, vomiting, confusion and swelling in the legs, ankles or feet, as this may be a sign of sudden decrease of kidney function
- a skin rash which may form blisters and look like small targets (central dark spots surrounded by a paler area, with a dark ring around the edge) (*erythema multiforme*)
- a widespread rash with blisters and peeling skin, particularly around the mouth, nose, eyes and genitals (*Stevens-Johnson syndrome*)
- a more severe form of rash causing skin peeling in more than 30% of the body surface (*toxic epidermal necrolysis*)
- signs of serious mental changes or if someone around you notices signs of confusion, somnolence (sleepiness), amnesia (loss of memory), memory impairment (forgetfulness), abnormal behaviour or other neurological signs including involuntary or uncontrolled movements. These could be symptoms of an encephalopathy.

The most frequently reported adverse reactions were nasopharyngitis, somnolence (sleepiness), headache, fatigue and dizziness. At the beginning of the treatment or at dose increase side effects like sleepiness, tiredness and dizziness may be more common. These effects should however decrease over time.

Very common: may affect more than 1 in 10 people

- nasopharyngitis;
- somnolence (sleepiness), headache.

Common: may affect up to 1 in 10 people

- anorexia (loss of appetite);
- depression, hostility or aggression, anxiety, insomnia, nervousness or irritability;
- convulsion, balance disorder (equilibrium disorder), dizziness (sensation of unsteadiness), lethargy (lack of energy and enthusiasm), tremor (involuntary trembling);
- vertigo (sensation of rotation);
- cough;
- abdominal pain, diarrhoea, dyspepsia (indigestion), vomiting, nausea;
- rash;
- asthenia/fatigue (tiredness).

Uncommon: may affect up to 1 in 100 people

- decreased number of blood platelets, decreased number of white blood cells;
- weight decrease, weight increase;
- suicide attempt and suicidal ideation, mental disorder, abnormal behaviour, hallucination, anger, confusion, panic attack, emotional instability/mood swings, agitation;
- amnesia (loss of memory), memory impairment (forgetfulness), abnormal coordination/ataxia (impaired coordinated movements), paraesthesia (tingling), disturbance in attention (loss of concentration);
- diplopia (double vision), vision blurred;
- elevated/abnormal values in a liver function test;
- hair loss, eczema, pruritus;
- muscle weakness, myalgia (muscle pain);
- injury.

Rare: may affect up to 1 in 1000 people

- infection;
- decreased number of all blood cell types;
- severe allergic reactions (DRESS, anaphylactic reaction [severe and important allergic reaction], Quincke's oedema [swelling of the face, lips, tongue and throat]);
- decreased blood sodium concentration;

- suicide, personality disorders (behavioural problems), thinking abnormal (slow thinking, unable to concentrate);
- delirium;
- encephalopathy (see sub-section "Tell your doctor immediately" for a detailed description of symptoms);
- seizures may become worse or happen more often;
- uncontrollable muscle spasms affecting the head, torso and limbs, difficulty in controlling movements, hyperkinesia (hyperactivity);
- change of the heart rhythm (Electrocardiogram);
- pancreatitis;
- liver failure, hepatitis;
- sudden decrease in kidney function;
- skin rash, which may form blisters and looks like small targets (central dark spots surrounded by a paler area, with a dark ring around the edge) (*erythema multiforme*), a widespread rash with blisters and peeling skin, particularly around the mouth, nose, eyes and genitals (*Stevens-Johnson syndrome*), and a more severe form causing skin peeling in more than 30% of the body surface (*toxic epidermal necrolysis*);
- rhabdomyolysis (breakdown of muscle tissue) and associated blood creatine phosphokinase increase. Prevalence is significantly higher in Japanese patients when compared to non-Japanese patients.
- limp or difficulty walking.

Evidence also suggests a possible predisposition of the Japanese population to neuroleptic malignant syndrome (NMS).

Very rare: may affect up to 1 in 10000 people
- repeated unwanted thoughts or sensations or the urge to do something over and over again (Obsessive Compulsive Disorder).

Reporting of side effects
If you get any side effects talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via Yellow Card Scheme Website: www.mhra.gov.uk/yellowcard or search for MHRA Yellow Card in the Google Play or Apple App Store. By reporting side effects you can help provide more information on the safety of this medicine.

5. How to store Levetiracetam

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date stated on the vial and carton box after EXP: The expiry date refers to the last day of the month.

This medicine does not require any special storage conditions.

6. Contents of the pack and other information

What Levetiracetam concentrate for solution for infusion contains
The active substance is called levetiracetam. Each ml contains 100 mg of levetiracetam.
The other ingredients are sodium acetate trihydrate, glacial acetic acid, sodium chloride, water for injections.

What Levetiracetam looks like and contents of the pack
Levetiracetam concentrate for solution for infusion (sterile concentrate) is a clear, colourless liquid.

Levetiracetam concentrate for solution for infusion is packed in a cardboard box containing 10 vials of 5 ml.

Marketing Authorisation Holder and Manufacturer
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The following information is intended for healthcare professionals only:

Directions for the proper use of Levetiracetam 100mg/ml concentrate for solution for infusion is provided in section 3.

One vial of Levetiracetam 100mg/ml concentrate for solution for infusion contains 500 mg levetiracetam (5 ml concentrate of 100 mg/ml). See Table 1 for the recommended preparation and administration of Levetiracetam 100mg/ml concentrate for solution for infusion to achieve a total daily dose of 500 mg, 1000 mg, 2000 mg, or 3000 mg in two divided doses.

Table 1. Preparation and administration of Levetiracetam 100mg/ml concentrate for solution for infusion

Dose	Withdrawal Volume	Volume of Diluent	Infusion Time	Frequency of administration	Total Daily Dose
250 mg	2.5 ml (half 5 ml vial)	100 ml	15 minutes	Twice daily	500 mg/day
500 mg	5 ml (one 5 ml vial)	100 ml	15 minutes	Twice daily	1000 mg/day
1000 mg	10 ml (two 5 ml vials)	100 ml	15 minutes	Twice daily	2000 mg/day
1500 mg	15 ml (three 5 ml vials)	100 ml	15 minutes	Twice daily	3000 mg/day

This medicinal product is for single use only, any unused solution should be discarded.

In use shelf life: from a microbiological point of view, the product should be used immediately after dilution. If not used immediately, in-use storage time and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8°C, unless dilution has taken place in controlled and validated aseptic conditions.

Levetiracetam 100mg/ml concentrate for solution for infusion was found to be physically compatible and chemically stable when mixed with the following diluents for at least 24 hours and stored in PVC bags at controlled room temperature 15- 25°C.
Diluents:
- Sodium chloride 9 mg/ml (0.9%) solution for injection
- Lactated Ringer's solution for injection
- Dextrose 50 mg/ml (5%) solution for injection