

PRODUCT MONOGRAPH  
INCLUDING PATIENT MEDICATION INFORMATION

**Pr BRIVLERA™**

brivaracetam

10 mg, 25 mg, 50 mg, 75 mg, and 100 mg tablets,  
10mg/mL oral solution  
and 10 mg/mL injection

Antiepileptic Agent



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Oakville, ON  
L6H 5R7

**Date of Preparation:**

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**Control Number: 183355**

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Pr **BRIVLERA™**

brivaracetam

**PART I: HEALTH PROFESSIONAL INFORMATION**

**SUMMARY PRODUCT INFORMATION**

<b>Route of Administration</b>	<b>Dosage Form / Strength</b>	<b>Nonmedicinal Ingredients</b>
Oral	Tablets / 10 mg, 25 mg, 50 mg, 75 mg, and 100 mg	croscarmellose sodium, lactose monohydrate, betadex ( $\beta$ -cyclodextrin), anhydrous lactose, and magnesium stearate and additional ingredients listed below: 10 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide 25 mg and 100 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide, yellow iron oxide, black iron oxide 50 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide, yellow iron oxide, red iron oxide 75 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide, yellow iron oxide, red iron oxide, black iron oxide
Oral	Oral solution / 10 mg/mL	sodium citrate, anhydrous citric acid, methylparaben, carboxymethylcellulose sodium, sucralose, sorbitol solution, glycerin, raspberry flavor, and purified water
Intravenous	Injection / 10 mg/mL	sodium acetate (trihydrate), glacial acetic acid, sodium chloride, water for injection

**INDICATIONS AND CLINICAL USE**

**Adults (>18 years of age):**

BRIVLERA (brivaracetam) is indicated as adjunctive therapy in the management of partial-onset seizures in adult patients with epilepsy who are not satisfactorily controlled with conventional therapy.

BRIVLERA (brivaracetam) injection for intravenous use is an alternative when oral administration is temporarily not feasible.

### **Geriatrics (> 65 years of age):**

The clinical experience with BRIVLERA in elderly patients with epilepsy is limited (29 elderly patients aged between 65 and 80 years). No dose adjustment based on age is necessary. In general, dose selection for an elderly patient should be judicious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy (see **WARNINGS AND PRECAUTIONS, Special Populations, Geriatrics, DOSAGE AND ADMINISTRATION and ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Geriatrics**).

### **Pediatrics (< 18 years of age):**

The safety and efficacy of BRIVLERA in pediatric patients (<18 years of age) have not been established and its use in this patient population is not indicated (see **WARNINGS AND PRECAUTIONS, Special Populations, Pediatrics**).

## **CONTRAINDICATIONS**

Patients who are hypersensitive to this drug or to any ingredient in the formulation or component of the container. For a complete listing, see the **DOSAGE FORMS, COMPOSITION AND PACKAGING** section of the product monograph.

## **WARNINGS AND PRECAUTIONS**

### **General**

#### **Withdrawal of Antiepileptic Drugs (AEDs)**

As with all AEDs, BRIVLERA (brivaracetam) should be withdrawn gradually to minimize the potential of increased seizure frequency and status epilepticus (see **DOSAGE AND ADMINISTRATION, Recommended Dose and Dosage Adjustment**).

### **Hematologic**

BRIVLERA can cause hematologic abnormalities. In the Phase 3 controlled adjunctive epilepsy studies, a total of 1.8% of BRIVLERA-treated patients and 1.1% of placebo-treated patients had at least one clinically significant decreased white blood cell count ( $<3.0 \times 10^9/L$ ), and 0.3% of BRIVLERA-treated patients and 0% of placebo-treated patients had at least one clinically significant decreased neutrophil count ( $<1.0 \times 10^9/L$ ).

### **Hypersensitivity**

#### **Bronchospasm and Angioedema**

BRIVLERA can cause hypersensitivity reactions. Rare cases of bronchospasm and angioedema have been reported in patients taking BRIVLERA. If a patient develops hypersensitivity reactions after treatment with BRIVLERA, the drug should be discontinued and an alternative considered.

#### **Serious Dermatologic Reactions**

Multi-organ hypersensitivity syndrome (also known as Drug Rash Eosinophilia and Systemic Symptoms or DRESS), is a serious condition sometimes induced by anti-epileptic drugs. Typically, although not exclusively, DRESS initially presents with fever and rash, then with other organ

system involvement that may or may not include eosinophilia, lymphadenopathy, hepatitis, nephritis, and/or myocarditis. Because DRESS is variable in its expression, other organ system signs and symptoms not noted here may also occur. Organ involvement may be more severe than skin involvement. If any of these hypersensitivity reactions are suspected and an alternative cause cannot be established, BRIVLERA should be discontinued and alternative treatment started.

### **Neurologic**

BRIVLERA treatment has been associated with somnolence, dizziness, fatigue, and disturbance in coordination. Patients should be monitored for such signs and symptoms and advised not to drive a car or to operate other potentially hazardous machines until they are familiar with the effects of BRIVLERA on their ability to perform such activities (see **ADVERSE REACTIONS**).

#### **Somnolence and Fatigue**

BRIVLERA causes dose-dependent increases in somnolence and fatigue-related adverse reactions (fatigue, malaise, hypersomnia, sedation, and lethargy). In the Phase 3 controlled adjunctive epilepsy trials, these events were reported in 25% of patients randomized to receive BRIVLERA at least 50 mg/day (20% at 50 mg/day, 26% at 100 mg/day, and 27% at 200 mg/day) compared to 14% of placebo-treated patients. The risk is greatest early in treatment but can occur at any time (see **ADVERSE REACTIONS**).

#### **Dizziness and Disturbance in Gait and Coordination**

BRIVLERA causes adverse reactions related to dizziness and disturbance in gait and coordination (dizziness, vertigo, balance disorder, ataxia, nystagmus, gait disturbance, and abnormal coordination). In the Phase 3 controlled adjunctive epilepsy trials, these events were reported in 16% of patients randomized to receive BRIVLERA at least 50 mg/day (16% at 50 mg/day, 14% at 100 mg/day, and 18% at 200 mg/day) compared to 10% of placebo-treated patients. The risk is greatest early in treatment but can occur at any time (see **ADVERSE REACTIONS**).

### **Psychiatric**

#### **Behavioural Disorders**

BRIVLERA causes both psychotic and non-psychotic adverse reactions which are not dose-dependent. In the Phase 3 controlled adjunctive epilepsy trials, psychiatric events were reported in approximately 13% of patients randomized to receive BRIVLERA at least 50 mg/day compared to 8% of placebo-treated patients. Non-psychotic events (e.g., irritability, anxiety, nervousness, aggression, anger, agitation, restlessness, depression, altered mood, affect lability, psychomotor hyperactivity, etc) occurred in 12% of the patients treated with BRIVLERA at least 50mg/day compared to 7% of placebo-treated patients. A total of 1.7% of adult patients treated with BRIVLERA discontinued treatment due to psychiatric events (e.g., aggression, irritability, depression) compared to 1.3% of patients who received placebo. In the Phase 3 controlled epilepsy studies, irritability, depression, and anxiety symptoms occurred in 2% of BRIVLERA-treated patients and 1% of placebo-treated patients.

#### **Suicidal ideation and behaviour**

Suicidal ideation and behaviour have been reported in patients treated with antiepileptic agents in several indications.

All patients treated with antiepileptic drugs, irrespective of indication, should be monitored for signs of suicidal ideation and behaviour and appropriate treatment should be considered. Patients

(and caregivers of patients) should be advised to seek medical advice should signs of suicidal ideation or behaviour emerge.

An FDA meta-analysis of randomized placebo controlled trials, in which antiepileptic drugs were used for various indications, has shown a small increased risk of suicidal ideation and behaviour in patients treated with these drugs. The mechanism of this risk is not known.

There were 43,892 patients treated in the placebo controlled clinical trials that were included in the meta-analysis. Approximately 75% of patients in these clinical trials were treated for indications other than epilepsy and, for the majority of non-epilepsy indications the treatment (antiepileptic drug or placebo) was administered as monotherapy. Patients with epilepsy represented approximately 25% of the total number of patients treated in the placebo controlled clinical trials and, for the majority of epilepsy patients, treatment (antiepileptic drug or placebo) was administered as adjunct to other antiepileptic agents (i.e., patients in both treatment arms were being treated with one or more antiepileptic drug). Therefore, the small increased risk of suicidal ideation and behaviour reported from the meta-analysis (0.43% for patients on antiepileptic drugs compared to 0.24% for patients on placebo) is based largely on patients that received monotherapy treatment (antiepileptic drug or placebo) for non-epilepsy indications. The study design does not allow an estimation of the risk of suicidal ideation and behaviour for patients with epilepsy that are taking antiepileptic drugs, due both to this population being the minority in the study, and the drug-placebo comparison in this population being confounded by the presence of adjunct antiepileptic drug treatment in both arms.

### **Special Populations**

**Women of Childbearing Potential / Contraception:** In a drug-drug interaction study, BRIVLERA 100 mg/day did not significantly influence the pharmacokinetics of oral contraceptives (0.03 mg ethinylestradiol and 0.15 mg levonorgestrel). In another study, BRIVLERA 400 mg/day (twice the recommended daily dose) reduced exposure to oral contraceptives by 27% for estrogen and 23% for progestin (see **DRUG INTERACTIONS, Drug-Drug Interactions, Oral Contraceptives**).

Physicians should discuss family planning and contraception with women of childbearing potential taking BRIVLERA (see **WARNINGS AND PRECAUTIONS, Special Populations, Pregnant Women**).

**Pregnant Women:** There is a limited amount of data from the use of BRIVLERA in pregnant women. BRIVLERA was used as adjunctive therapy in clinical studies in non-pregnant individuals, and when used with carbamazepine, it induced a dose-related increase in the concentration of an active metabolite, carbamazepine-epoxide (see **DRUG INTERACTIONS, Drug-Drug Interactions, Drug-Interaction Studies with AEDs, Carbamazepine**). The clinical significance of this increase in carbamazepine-epoxide in pregnant women is unknown.

Animal studies did not detect any teratogenic potential of brivaracetam in either the rat or the rabbit, however embryo-fetal and maternal toxicity was seen in rabbits with systemic exposure (AUC) at the no-effect dose about 8 times that at the 200 mg/day human dose. In rats, brivaracetam has been shown to readily cross the placenta (see **TOXICOLOGY, Reproduction Studies**). There are no data on human placental transfer. The potential risk for humans is unknown.

BRIVLERA should not be used during pregnancy unless clinically necessary (if the benefit to the mother clearly outweighs the potential risk to the fetus). If a woman decides to become pregnant, the use of BRIVLERA should be carefully re-evaluated.

**Pregnancy Registry:** Physicians are advised to recommend that pregnant patients taking BRIVLERA enroll in the North American Antiepileptic Drug Pregnancy Registry. This can be done by calling the toll free number 1-888-233-2334, and must be done by patients themselves. Information on the registry can also be found at the website <http://www.aedpregnancyregistry.org/>.

**Labour and delivery:** The effect of BRIVLERA on labour and delivery in humans is unknown.

**Nursing Women:** It is not known whether BRIVLERA is excreted in human milk. Studies in rats have shown that brivaracetam is readily excreted in breast milk. If BRIVLERA is to be co-administered with carbamazepine, the amount of carbamazepine epoxide in breast milk can increase (see **DRUG INTERACTIONS, Drug-Drug Interactions, Drug- Interaction Studies with AEDs, Carbamazepine**).

Because many drugs are excreted into human milk, a decision should be made as to whether to discontinue nursing or to discontinue BRIVLERA, taking into account the benefit of the drug to the mother.

**Fertility:** No human data on the effect of BRIVLERA on fertility are available. In rats, there was no effect on fertility with brivaracetam at doses associated with systemic exposures up to 6 and 13 times that at the 200 mg/day human dose, in male and female rats, respectively (see **TOXICOLOGY, Reproduction Studies**).

**Pediatrics (< 18 years of age):** BRIVLERA is not indicated for use in pediatrics (< 18 years of age) as there is insufficient data on safety and efficacy of the drug in this population (see **INDICATIONS and DOSAGE AND ADMINISTRATION**).

**Geriatrics (≥ 65 years of age):** There were insufficient numbers of patients 65 years of age and older in the double-blind, placebo controlled epilepsy studies (n=29) to adequately assess the safety and efficacy of BRIVLERA in this population. No BRIVLERA dose adjustment based on age is necessary (see **DOSAGE AND ADMINISTRATION and ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Geriatrics**).

**Renal Impairment:** There are limited clinical data on the use of BRIVLERA in patients with pre-existing renal impairment as these patients were excluded from pre-market clinical studies of epilepsy. Based on a single-dose pharmacokinetic study, dose adjustments are not required for patients with impaired renal function.

There are no data in patients with end-stage renal disease undergoing dialysis. Thus, BRIVLERA is not recommended in this population (see **DOSAGE AND ADMINISTRATION, Patients with Renal Impairment and ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Renal Impairment**).

**Hepatic Impairment:** There are limited clinical data on the use of BRIVLERA in patients with pre-existing hepatic impairment. A 25 mg twice daily (50 mg per day) starting dose should be considered. A maximum dose of 75 mg twice daily (150 mg per day) is recommended for all stages of hepatic impairment (see **DOSAGE AND ADMINISTRATION** and **ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Hepatic Impairment**).

### **Carcinogenesis and Mutagenesis**

See **Product Monograph Part II: TOXICOLOGY, Carcinogenicity and Mutagenicity** for discussion on animal data.

## **ADVERSE REACTIONS**

### **Adverse Drug Reaction Overview**

In pooled placebo-controlled adjunctive therapy studies involving 1558 adult patients with partial-onset seizures (1099 patients treated with BRIVLERA (brivaracetam) and 459 treated with placebo), 68.3% of patients treated with BRIVLERA and 62.1% of patients treated with placebo experienced adverse events.

The most frequently reported adverse events (>10%) with BRIVLERA treatment were: somnolence (14.3%) and dizziness (11.0%). They were usually mild to moderate in intensity. Somnolence and fatigue were reported at a higher incidence with increasing dose. The types of adverse events reported during the first 7 days of treatment were similar to those reported for the overall treatment period. The most common adverse events requiring clinical intervention (dose adjustment/interruption or requiring additional therapy) were cough (1.5%), nausea (1.0%), and fatigue (0.8%).

### ***Discontinuation Due to Adverse Events in Pre-marketing Controlled Clinical Studies***

In pooled placebo-controlled adjunctive therapy studies, the discontinuation rate due to adverse events was 6.0%, 7.4%, and 6.8% for patients randomized to receive BRIVLERA at the recommended doses of 50 mg, 100 mg, and 200 mg/day, respectively, and 3.5% in patients randomized to receive placebo. The adverse reactions most commonly leading to discontinuation were dizziness (0.8%), depression (0.5%), and fatigue (0.5%).

### **Clinical Trial Adverse Drug Reactions**

*Because clinical trials are conducted under very specific conditions the adverse event rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse drug event information from clinical trials is useful for identifying drug-related adverse events and for approximating rates.*

## **Table 1: Incidence of Treatment-Emergent Adverse Events in Double-Blind, Placebo-Controlled, Phase 3 Partial-Onset Seizure Studies (Events ≥1% of Patients in Any**



**BRIVLERA Group and More Frequent Than in the Placebo Group).**

<u>System Organ Class/ Preferred Term</u>	<b>PLACEBO (N=459) %</b>	<b>BRIVLERA 50 mg/day (N=200) %</b>	<b>BRIVLERA 100 mg/day (N=353) %</b>	<b>BRIVLERA 200 mg/day (N=250) %</b>
<b>Ear and labyrinth disorders</b>				
Vertigo	2	2	3	2
<b>Eye disorders</b>				
Vision blurred	<1	2	<1	2
Diplopia	<1	2	<1	<1
Conjunctivitis	0	1	<1	<1
Eye pain	0	1	0	<1
Visual impairment	0	<1	1	0
<b>Gastrointestinal disorders</b>				
Nausea	2	4	4	4
Diarrhoea	3	4	2	3
Vomiting	<1	5	1	1
Constipation	<1	3	1	2
Abdominal pain upper	<1	3	1	1
Toothache	1	2	<1	2
Abdominal discomfort	<1	0	1	0
Gastritis	<1	0	1	0
<b>General disorders and administration site conditions</b>				
Fatigue	4	7	8	12
Irritability	1	5	3	3
Gait disturbance	<1	1	<1	<1
Chest pain	<1	1	0	0
<b>Infections and infestations</b>				
Nasopharyngitis	3	3	3	4
Upper respiratory tract infection	2	<1	2	2
Influenza	1	2	2	<1
Viral infection	<1	1	1	<1
Bacteriuria	<1	<1	<1	2
Oral herpes	0	2	0	<1

<b><u>System Organ Class/ Preferred Term</u></b>	<b>PLACEBO (N=459) %</b>	<b>BRIVLERA 50 mg/day (N=200) %</b>	<b>BRIVLERA 100 mg/day (N=353) %</b>	<b>BRIVLERA 200 mg/day (N=250) %</b>
<b>Injury, poisoning and procedural complications</b>				
Fall	1	2	1	1
Excoriation	1	2	<1	<1
Head injury	<1	2	<1	<1
<b>Investigations</b>				
Weight decreased	<1	2	<1	1
Gamma-glutamyltransferase increased	1	2	<1	1
Weight increased	<1	2	<1	<1
Blood cholesterol increased	0	1	<1	0
Blood triglycerides increased	<1	1	<1	0
Neutrophil count decreased	<1	1	0	<1
Urine analysis abnormal	<1	1	0	<1
<b>Metabolism and nutrition disorders</b>				
Decreased appetite	<1	3	<1	2
Hyponatraemia	<1	0	1	2
Dyslipidemia	<1	0	1	1
<b>Musculoskeletal disorders</b>				
Myalgia	1	3	1	<1
Back pain	<1	3	1	<1
Pain in extremity	1	3	<1	<1
Muscle spasms	0	1	<1	<1
Arthralgia	<1	1	<1	<1
<b>Nervous system disorders</b>				
Somnolence	9	12	16	17
Dizziness	7	12	9	14
Headache	10	16	7	8
Convulsion	2	3	3	1
Tremor	1	2	<1	2
Balance disorder	<1	2	<1	1

<b><u>System Organ Class/ Preferred Term</u></b>	<b>PLACEBO (N=459) %</b>	<b>BRIVLERA 50 mg/day (N=200) %</b>	<b>BRIVLERA 100 mg/day (N=353) %</b>	<b>BRIVLERA 200 mg/day (N=250) %</b>
Memory impairment	1	2	<1	1
Paraesthesia	1	2	1	<1
Ataxia	<1	2	<1	<1
Disturbance in attention	<1	<1	1	<1
Amnesia	0	1	<1	<1
Hypoaesthesia	<1	1	<1	<1
Migraine	<1	0	<1	1
Sedation	0	0	0	2
Psychomotor hyperactivity	0	1	<1	0
<b>Psychiatric disorders</b>				
Insomnia	2	5	2	2
Anxiety	1	2	1	3
Depression	1	5	1	1
Nervousness	<1	2	<1	<1
Agitation	0	1	<1	0
Depressed mood	<1	1	<1	<1
Mood swings	0	<1	0	1
Restlessness	0	0	1	0
Sleep disorder	<1	1	<1	0
<b>Renal and urinary disorders</b>				
Haematuria	0	1	<1	<1
<b>Respiratory, thoracic and mediastinal disorders</b>				
Cough	2	2	3	2
Dyspnoea	0	2	<1	<1
Oropharyngeal pain	<1	1	<1	0
<b>Reproductive system and breast disorders</b>				
Dysmenorrhoea	<1	<1	<1	1
<b>Skin and subcutaneous tissue disorders</b>				
Rash	1	2	1	<1

<u>System Organ Class/ Preferred Term</u>	<b>PLACEBO (N=459) %</b>	<b>BRIVLERA 50 mg/day (N=200) %</b>	<b>BRIVLERA 100 mg/day (N=353) %</b>	<b>BRIVLERA 200 mg/day (N=250) %</b>
Pruritis	<1	2	<1	2
Eczema	0	<1	0	2

### **Dose-Related Adverse Reactions**

There was a dose-related increase in the incidences of somnolence and fatigue across the therapeutic range of BRIVLERA (50 mg/day to 200 mg/day). Somnolence was reported at a higher frequency with increasing BRIVLERA dose, ranging from 11.5% in the BRIVLERA 50 mg/day group to 16.8% in the BRIVLERA 200 mg/day group. Fatigue was also reported at a slightly higher incidence with increasing BRIVLERA dose, ranging from 7.0 % in the BRIVLERA 50 mg/day group to 11.6% in the BRIVLERA 200 mg/day group.

### **Less Common Clinical Trial Adverse Drug Reactions (<1%)**

Other adverse events reported by <1% of patients with partial-onset seizures in the total BRIVLERA group in placebo-controlled clinical studies that occurred more frequently than in the placebo group were:

**Blood and lymphatic system disorders:** neutropenia

**Psychiatric disorders:** aggression

Events included in this list above from the controlled studies are included based on consideration of BRIVLERA pharmacology, frequency above that expected in the population, seriousness, and likelihood of a relationship to BRIVLERA.

### **Other Adverse Reactions in Patients with Partial-Onset Seizures:**

The following is a description of treatment-emergent adverse events reported by patients treated with BRIVLERA in clinical trials in patients with partial-onset seizures, including controlled trials and long-term open-label extension trials. Events addressed in other tables or sections are not listed here.

#### Suicidal Ideation and Behaviour

In the short-term clinical studies of BRIVLERA in epilepsy patients, there were no cases of completed suicide and suicide attempt, however both have been reported in open-label extension studies (<0.1% and 0.5% respectively). Suicidal ideation was also reported in open-label extension studies (1.9%).

### **Intravenous Adverse Reactions**

Adverse reactions with intravenous administration were generally similar to those observed with oral administration. Intravenous administration was associated with infusion site pain in 2.8% of patients.

### **Comparison of Gender and Race**

No significant gender differences were noted in the incidence of adverse reactions. Although the

majority of patients were Caucasian (approximately 74% of patients were Caucasian and 26% were non-Caucasian), no differences in the incidences of adverse reactions compared to Caucasian patients were observed.

### **Drug Abuse and Dependence**

In an open-label cross-over human abuse potential study in 44 subjects, aged 18-55 years, single doses of BRIVLERA 50 mg, 200 mg and 1000 mg were compared to placebo and alprazolam (1.5 mg and 3 mg). All subjects had a history or were current users of central nervous system depressants. BRIVLERA showed fewer sedative, euphoric, stimulant, dizziness, and negative effects as compared to alprazolam; however, BRIVLERA was not significantly different from alprazolam on some measures of balance and positive effects at the supratherapeutic doses (200 mg and 1000 mg).

Somnolence, euphoric mood, dizziness, and fatigue were the most commonly reported adverse events in this study. Overall, 1000 mg BRIVLERA was associated with the highest incidence of euphoric mood (66%), followed by the other BRIVLERA doses (40% at 200 mg, 32% at 50 mg), while the incidence of euphoric mood following alprazolam was lower (17% at both 1.5 mg and 3.0 mg doses). Sedative effects were observed in healthy subjects in the single ascending dose and multiple ascending dose studies; however, no euphoria or stimulant-like effects were observed using controlled pharmacodynamic measures (e.g., ARCI, VAS).

In the overall brivaracetam clinical program, the incidence of euphoric mood and feeling drunk was 0.5% in patient populations but higher (19.9%) in Phase 1 studies. The common adverse events associated with abuse were dizziness, somnolence, fatigue and asthenia.

There was no evidence of physical dependence potential or a withdrawal syndrome with BRIVLERA in a pooled review of placebo-controlled adjunctive therapy studies. However, psychological dependence cannot be excluded because of reports of euphoric type effects even at therapeutic doses.

## **DRUG INTERACTIONS**

### **In vitro Studies**

#### **Drug-Metabolizing Enzyme Inhibition**

In vitro, brivaracetam did not inhibit CYP1A2, 2A6, 2B6, 2C8, 2C9, 2D6, or 3A4. Brivaracetam weakly inhibited CYP2C19 and would not be expected to cause significant interaction with substrates of CYP2C19 in humans. Brivaracetam was an inhibitor of epoxide hydrolase, ( $IC_{50} = 8.2 \mu M$ ), suggesting that brivaracetam can inhibit the enzyme *in vivo*

#### **Drug-Metabolizing Enzyme Induction**

Brivaracetam at concentrations up to 10  $\mu M$  caused little or no change of mRNA expression of CYP1A2, 2B6, 2C9, 2C19, 3A4, and epoxide hydrolase. It is unlikely that brivaracetam will induce these enzymes *in vivo*.

### **Transporters**

Brivaracetam was not a substrate of P-gp, MRP1, or MRP2. Brivaracetam did not inhibit or weakly

inhibited BCRP, BSEP, MATE1, MATE2/K, MRP2, OAT1, OAT3, OCT1, OCT2, OATP1B1, OATP1B3, or P-gp, suggesting that brivaracetam is unlikely to inhibit these transporters *in vivo*.

### **Drug-Drug Interactions**

#### **Drug- Interaction Studies with Anti-Epileptic Drugs (AEDs):**

Potential interactions between BRIVLERA (brivaracetam) (25 mg twice daily to 100 mg twice daily) and other AEDs were investigated in a pooled analysis of plasma drug concentrations (n=1771 subjects) and in a population pharmacokinetics analysis (n=1248 subjects) from all Phase 2 and 3 studies, and in a population exposure-response analysis of placebo-controlled, Phase 3 studies in adjunctive therapy in the treatment of partial-onset seizures (n=1549 subjects).

**Table 2: Drug Interactions Between BRIVLERA and Concomitant Antiepileptic Drugs**

<b>Concomitant AED</b>	<b>Influence of AED on BRIVLERA</b>	<b>Influence of BRIVLERA on AED</b>
Carbamazepine	26% decrease in plasma concentration. <b>See also Carbamazepine section below.</b>	None for carbamazepine Increase of carbamazepine-epoxide.* <b>See also Carbamazepine section below.</b>
Clobazam	No data	None
Clonazepam	No data	None
Lacosamide	No data	None
Lamotrigine	None	None
Levetiracetam	None	None
Oxcarbazepine	None	None (monohydroxy derivative, MHD)
Phenobarbital	19% decrease in plasma concentration. No dose adjustment required.	None
Phenytoin	21% decrease in plasma concentration. No dose adjustment required.	Up to 20% increase in plasma concentration**
Topiramate	None	None
Valproic acid	None	None

\* Brivaracetam is a reversible inhibitor of epoxide hydrolase resulting in an increased concentration of carbamazepine epoxide, an active metabolite of carbamazepine. The carbamazepine epoxide plasma concentration increased up to 198% at a BRIVLERA dose of 100 mg twice daily.

\*\* At a supratherapeutic dose of 400 mg/day brivaracetam, there was a 20% increase in phenytoin plasma concentration.

### Carbamazepine

Brivaracetam is a moderate reversible inhibitor of epoxide hydrolase resulting in increased concentration of carbamazepine epoxide, an active metabolite of carbamazepine.

In a phase 1, single-center, open-label, bilateral pharmacokinetic interaction study with carbamazepine, 14 young healthy male subjects were titrated to carbamazepine 600 mg/day during 35 days and received BRIVLERA 400 mg/day during the last 10 days. Plasma concentrations were collected at single dose and steady-state for brivaracetam and over time for carbamazepine and carbamazepine epoxide. Carbamazepine 600 mg/day decreased the brivaracetam (200 mg single dose) AUC by 29% and  $C_{max}$  by 13% on Study Day 22. No further effect was seen on Day 35 after multiple dose administration of brivaracetam and carbamazepine. No brivaracetam dose adjustment was deemed necessary. Brivaracetam 400 mg/day did not significantly alter carbamazepine exposure ( $AUC_{\tau}$ ) and  $C_{max}$ , but resulted in a 2.6-fold increase in exposure to the metabolite, carbamazepine-epoxide

In two phase 1, single-center, open-label, unilateral metabolic interaction studies, 18 male and female subjects with epilepsy being chronically treated with stable dosages of carbamazepine alone or in combination with valproate, were titrated in weekly increments with BRIVLERA 100 mg/day, 200 mg/day, 400 mg/day and 200 mg/day, respectively. Trough plasma samples were obtained for determination of each substance including carbamazepine epoxide and carbamazepine diol. Following brivaracetam 200 mg/day, the increase from baseline in carbamazepine-epoxide was 1.98-fold (with carbamazepine alone) and 1.78-fold (in combination with valproate) indicating that valproate does not appear to further increase epoxide levels in the presence of brivaracetam.

In controlled epilepsy adjunctive therapy studies of BRIVLERA, a total of 722 patients took varying daily doses of carbamazepine (median (range) daily dose of carbamazepine was 800 mg (200-1400 mg). In these studies, carbamazepine epoxide plasma concentration increased by a mean of 1.37-, 1.62- and 1.98-fold from baseline, at BRIVLERA doses of 50 mg/day, 100 mg/day and 200 mg/day, respectively. In these studies, there was no correlation between carbamazepine-epoxide levels and symptoms which are recognized as being among the more common symptoms of carbamazepine-epoxide toxicity, namely ataxia, diplopia, dizziness, nystagmus and somnolence. However, prescribers should take caution upon initiation and during up-titration of either BRIVLERA or carbamazepine in the presence of steady-state levels of the other and to monitor patients for possible symptoms, adverse events, or tolerability issues. Prescribers should also take into account the patients' other concomitant drugs that can affect plasma levels of carbamazepine and/or carbamazepine epoxide.

### **Drug-Drug Interaction Studies with Other Drugs:**

#### Oral Contraceptives

In a two-way crossover pharmacokinetic interaction study in 28 healthy female volunteers, 19 to 39 years of age, co-administration of BRIVLERA 100 mg/day with an oral contraceptive containing ethinylestradiol (0.03 mg) and levonorgestrel (0.15 mg) did not significantly influence the pharmacokinetics of brivaracetam, ethinylestradiol, or levonorgestrel.

In another two-way crossover pharmacokinetic interaction study in 24 healthy female volunteers, 20 to 40 years of age, co-administration of BRIVLERA 400 mg/day (twice the recommended maximum daily dose) with an oral contraceptive containing ethinylestradiol (0.03 mg) and

levonorgestrel (0.15 mg) reduced ethinylestradiol and levonorgestrel AUCs by 27% and 23%, respectively. This interaction is not expected to be clinically significant.

Studies with lower dose oral contraceptives have not been conducted.

#### Rifampin and Gemfibrozil

In 2 two-way crossover pharmacokinetic interaction studies in two groups of 26 healthy adult male volunteers, a single 150 mg dose of BRIVLERA was co-administered with the strong CYP450 inducer and pan-inducer affecting among others CYP2B6, CYP2C8, CYP2C9, CYP2C19, CYP3A4, rifampin (600 mg/day for 5 days), or with the CYP2C8 and CYP2C9 inhibitor, gemfibrozil (1200 mg/day for 7 days). Gemfibrozil did not influence brivaracetam pharmacokinetics whereas rifampin resulted in a 45% decrease in AUC and half-life of brivaracetam. The dose of BRIVLERA should be adjusted when rifampin treatment is initiated or discontinued. There are no data on the effects of BRIVLERA on rifampin or gemfibrozil pharmacokinetics.

#### Pregabalin

In a pooling of phase 2 and 3 studies in epilepsy, BRIVLERA did not influence pregabalin plasma concentrations. There are no data on the effects of pregabalin on brivaracetam pharmacokinetics.

#### Drug-Food Interactions

BRIVLERA is completely absorbed after oral administration. Food does not affect the extent of absorption.

#### Drug-Lifestyle Interactions

##### **BRIVLERA and Alcohol**

In a pharmacokinetic and pharmacodynamic interaction study in 18 healthy male subjects, aged 21-47 years, BRIVLERA (single dose 200 mg) was co-administered with ethanol (continuous intravenous infusion to achieve a blood alcohol concentration of 60 mg/100 mL during 5 hours). Although there was no significant pharmacokinetic interaction between BRIVLERA and ethanol, BRIVLERA significantly increased alcohol-induced impairment of subjects' psychomotor function, attention, and memory. Co-administration of BRIVLERA and ethanol caused a larger decrease from baseline in saccadic peak velocity, smooth pursuit, adaptive tracking performance, and Visual Analog Scale (VAS) alertness, and a larger increase from baseline in body sway and in saccadic reaction time compared with BRIVLERA alone or ethanol alone. Use of alcohol during BRIVLERA therapy is not recommended.

#### Drug-Herb Interactions

Interactions with herbal products have not been evaluated.

#### Drug-Laboratory Interactions

Interactions with laboratory tests have not been evaluated.

## **DOSAGE AND ADMINISTRATION**



### **Dosing Considerations**

BRIVLERA (brivaracetam) may be taken with or without food.

#### **BRIVLERA Tablets**

BRIVLERA tablets should be swallowed whole with liquid. BRIVLERA tablets should not be chewed or crushed.

#### **BRIVLERA Oral Solution**

When using BRIVLERA oral solution, no dilution is necessary. BRIVLERA oral solution may also be administered using a nasogastric tube or gastrostomy tube.

#### **BRIVLERA Injection**

BRIVLERA injection is for intravenous use only. It may be administered as a bolus injection or as a 15-minute IV infusion.

### **Recommended Dose and Dosage Adjustment Adults**

The recommended starting dose is 50 mg twice daily (100 mg per day). Based on individual patient response and tolerability, the dose may be adjusted between 25 mg twice daily (50 mg per day) and 100 mg twice daily (200 mg per day). Maximum recommended daily dose of BRIVLERA is 200 mg, administered in two equal intakes.

BRIVLERA can be initiated with either intravenous or oral administration. When switching to or from oral to intravenous administration of BRIVLERA, the total daily dose and frequency of administration should be maintained.

#### **Patients with Renal Impairment**

There are limited clinical data on the use of BRIVLERA in patients with pre-existing renal impairment as these patients were excluded from pre-market clinical studies of epilepsy. Based on a single-dose pharmacokinetic study, dose adjustments are not required for patients with impaired renal function.

There are no data in patients with end-stage renal disease undergoing dialysis. Thus, BRIVLERA is not recommended in this population (see **WARNINGS AND PRECAUTIONS, Special Populations, Renal Impairment and ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Renal Impairment**)

#### **Patients with Hepatic Impairment**

A reduced starting dose of 25 mg twice daily (50 mg per day) should be considered. A maximum dose of 75 mg twice daily (150 mg per day) is recommended for all stages of hepatic impairment (see **ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Hepatic Impairment**).

#### **Geriatrics (≥65 years of age)**

There were insufficient number of patients 65 years of age and older in the double-blind placebo controlled epilepsy studies (29 elderly patients aged between 65 and 80 years completed phase 3 clinical trials) to adequately assess the safety and efficacy of BRIVLERA in this population. According to data obtained from a pharmacokinetic study that was conducted in patients ≥65 years of age, no BRIVLERA dose adjustment based on age is necessary (see **INDICATIONS and ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions**,

**Geriatrics).**

**Pediatrics (<18 years of age)**

BRIVLERA is not indicated for use in pediatrics (< 18 years of age) as there is insufficient data on safety and efficacy of the drug in this population (see **INDICATIONS** and **ACTION AND CLINICAL PHARMACOLOGY, Special Populations and Conditions, Pediatrics**).

**Missed Dose**

Should patients miss a dose by a few hours, they should be instructed to take BRIVLERA as soon as they remember. If it is close to their next dose, they should be instructed to take their medication at the next regular time.

**Administration**

**BRIVLERA Injection**

BRIVLERA injection is for intravenous use only. BRIVLERA injection can be administered intravenously without further dilution or may be mixed with the diluents listed below. Withdraw the exact amount of BRIVLERA injection required for administration.

**Diluents**

Sodium chloride 9 mg/mL (0.9%) solution for injection

Lactated Ringer's solution for injection

Glucose 50 mg/mL (5%) solution for injection

Brivaracetam concentration: 0.1 to 1.5 mg/mL brivaracetam in diluent

The product should be used immediately after dilution. If not used immediately, the diluted solution should not be stored for more than 4 hours at room temperature and may be stored in polyvinyl chloride (PVC) or polyolefin bags. As with all parenteral drug products, intravenous admixtures should be inspected visually for clarity, particulate matter, precipitate, discoloration and leakage prior to administration. Solution showing haziness, particulate matter, precipitate, discoloration or leakage should not be used. Discard unused portions. The clinical study experience of intravenous BRIVLERA is limited to 4 days of consecutive treatment.

**Discontinuation**

As with all antiepileptic drugs, BRIVLERA should be withdrawn gradually because of the risk of increased seizure frequency and status epilepticus. When discontinuing BRIVLERA, reduce the dosage gradually (e.g., taper it gradually by 50 mg/day on a weekly basis. After 1 week of treatment at 50 mg/day, a final week of treatment at the dose of 20 mg/day is recommended).

**OVERDOSAGE**

For management of a suspected drug overdose, contact your regional Poison Control Centre.

**Signs, Symptoms, and Laboratory Findings of Acute Overdose in Humans**

There is limited clinical experience with BRIVLERA (brivaracetam) overdose in humans. During

pre-marketing clinical trials of BRIVLERA, the types of adverse events experienced by patients exposed to acute BRIVLERA overdose were mostly similar to those observed in patients administered therapeutic doses of the drug. Somnolence and dizziness have been reported in a patient taking a single dose of 1400 mg of BRIVLERA, which is the highest known non-lethal overdose. The following additional adverse reactions were reported with BRIVLERA overdose: vertigo, balance disorder, fatigue, nausea, diplopia and anxiety.

### **Treatment or Management of Overdose**

There is no specific antidote for overdose with BRIVLERA. In the event of overdose, standard medical practice for the management of any overdose should be used. An adequate airway, oxygenation, and ventilation should be ensured; monitoring of cardiac rhythm and vital sign measurement is recommended. A certified poison control center should be contacted for updated information on the management of overdose with BRIVLERA. There is no data on the potential removal of BRIVLERA using hemodialysis. Since less than 10% of BRIVLERA is excreted in urine, hemodialysis is not expected to significantly enhance BRIVLERA clearance.

## **ACTION AND CLINICAL PHARMACOLOGY**

### **Mechanism of Action**

The precise mechanism by which brivaracetam exerts its antiepileptic effect in humans is unknown (see Product Monograph, **Part II: DETAILED PHARMACOLOGY, Preclinical Pharmacology**, for experimental *in vitro* and *in vivo* data in animals).

### **Pharmacodynamics**

A statistically significant correlation has been demonstrated between brivaracetam plasma concentration and seizure frequency reduction from baseline in confirmatory clinical studies in adjunctive treatment of partial onset seizures. The EC<sub>50</sub> (brivaracetam plasma concentration corresponding to 50% of the maximum effect) was estimated to be 0.57 mg/L. This plasma concentration is slightly above the median exposure obtained after BRIVLERA (brivaracetam) doses of 50 mg/day. Further seizure frequency reduction is obtained by increasing the dose to 100 mg/day and reaches a plateau at 200 mg/day.

### **Electrocardiography**

The effect of BRIVLERA on cardiac electrophysiology was evaluated in a randomized, double-blind, positive and placebo-controlled parallel group study in 184 healthy subjects. BRIVLERA was administered as 75 mg twice daily (150 mg/day) and 400 mg twice daily (800 mg/day) for 7 days. BRIVLERA 75 mg twice daily had no significant effect on the QTcF interval, the QRS duration, the PR interval, or heart rate during the 12 hour post-dosing ECG assessment on day 7. The suprathreshold BRIVLERA 400 mg BID treatment was associated with a reduction in heart rate (placebo-adjusted mean change from baseline ranging from -2 bpm to -6 bpm) and a transient shortening of the QTcF interval: mean placebo-adjusted change from baseline of -5.8 ms (90% CI -9.8, -1.8) at 1.5 h post-dose.

### **Pharmacokinetics**

BRIVLERA tablets, oral solution, and injection are bioequivalent. Brivaracetam exhibits linear and time-independent pharmacokinetics with low intra- and inter-subject variability.

**Absorption:** Brivaracetam is highly permeable and is rapidly and completely absorbed after oral administration. Pharmacokinetics are dose-proportional from 10 to 600 mg. The median  $T_{max}$  for tablets taken without food is 1 hour ( $T_{max}$  range is 0.25 to 3 h). Co-administration with a high-fat meal slowed down the absorption rate of brivaracetam while the extent of absorption remained unchanged. When BRIVLERA (50 mg tablet) is administered with a high fat meal,  $C_{max}$  is decreased by 37% and  $T_{max}$  is delayed by 3 hours while AUC is decreased by 5%.

**Distribution:** Brivaracetam is weakly bound ( $\leq 20\%$ ) to plasma proteins. The volume of distribution is 0.5 L/kg, a value close to that of the total body water. Due to its favorable lipophilicity (Log P) resulting in high cell membrane permeability, brivaracetam penetrates rapidly into the brain. Brivaracetam is rapidly and evenly distributed in most tissues. In rodents, the brain-to-plasma concentration ratio equilibrates rapidly, indicating fast brain penetration, and is close to 1, indicating absence of active transport.

**Metabolism:** Brivaracetam is primarily metabolized by hydrolysis of the amide moiety to form the corresponding carboxylic acid, and secondarily by hydroxylation on the propyl side chain.

The hydrolysis of the amide moiety leading to the carboxylic acid metabolite (34% of the dose in urine) is supported by hepatic and extra-hepatic amidase. In vitro, the hydroxylation pathway is mediated primarily by CYP2C19. In vivo, in human subjects possessing ineffective mutations of CYP2C19, production of the hydroxy metabolite is decreased 2- or 10-fold while brivaracetam itself is increased by 22% or 42% in individuals with one or both mutated alleles, respectively. Therefore, hydroxylation of brivaracetam is a secondary biotransformation pathway (mediated by CYP2C19) and inhibitors of CYP2C19 are unlikely to have a significant effect on BRIVLERA. An additional metabolite (the hydroxy acid metabolite) is created predominantly by hydroxylation of the propyl side chain on the carboxylic acid metabolite (mainly by CYP2C9). The 3 metabolites are not pharmacologically active.

**Excretion:** Brivaracetam is eliminated primarily by metabolism and by excretion in the urine. More than 95% of the dose, including metabolites, is excreted in the urine within 72 hours after intake. Fecal excretion accounts for less than 1% of the dose. Less than 10% of the dose is excreted unchanged in the urine. The terminal plasma half-life ( $t_{1/2}$ ) is approximately 9 hours.

### **Special Populations and Conditions**

**Pediatrics (<18 years of age):** In a pharmacokinetic study in 99 subjects aged 1 month to <16 years receiving BRIVLERA oral solution, plasma concentrations were shown to be dose-proportional in all age groups. BRIVLERA is not indicated in pediatric population (see **INDICATIONS AND CLINICAL USE, Pediatrics**).

There are limited safety data for children from 1 month to <17 years of age. A total of 152 children (1 month to <17 years of age) have been treated with brivaracetam in the adjunctive therapy epilepsy clinical programme. From the limited available data, the most frequently reported treatment emergent adverse events (TEAEs) were pyrexia (20%), nasopharyngitis (20%), convulsion (15%), headache (14%), and upper respiratory tract infection (13%). The most frequent TEAEs leading to discontinuation were aggression (3%, n=5 subjects), somnolence, weight decreased and suicidal ideation (1.3%, n=2 subjects each). No data are available on neurodevelopment or in neonates.

**Geriatrics (≥ 65 years of age):** In a study in 15 elderly subjects (65 to 79 years old; with creatinine clearance 53 to 98 mL/min/1.73 m<sup>2</sup>) receiving BRIVLERA 400 mg/day (200 mg twice daily), the plasma half-life of brivaracetam was 7.9 hours and 9.3 hours in the 65 to 75 and >75 years groups, respectively. At steady-state, C<sub>max</sub> was increased by 47% and AUC was decreased by 13% compared to single dose administration. The steady-state plasma clearance of brivaracetam was slightly lower (0.76 mL/min/kg) than in young healthy controls (0.83 mL/min/kg). No dose adjustments are required.

**Gender:** There are no differences in the pharmacokinetics of brivaracetam by gender.

**Race:** Approximately 74% of the patients in controlled adjunctive epilepsy studies were Caucasian. A population pharmacokinetic analysis comparing Caucasian (n=904) and non-Caucasian patients (n=344) showed no significant pharmacokinetic differences.

**Hepatic Impairment:** A 100 mg single-dose pharmacokinetic study in subjects with hepatic cirrhosis (Child-Pugh grades A, B, and C) showed that, compared to matched healthy controls, exposure to brivaracetam increased by 50%, 57% and 59% respectively, in patients with mild, moderate, and severe hepatic impairment (**see DOSAGE AND ADMINISTRATION, Special Populations, Hepatic Impairment**).

**Renal Impairment:** A study in subjects with severe renal impairment (creatinine clearance <30 mL/min/1.73m<sup>2</sup> and not requiring dialysis) revealed that the plasma AUC of brivaracetam (200mg single dose) was moderately increased (+21%) relative to healthy controls, while the AUC of the acid, hydroxy and hydroxyacid metabolites were increased 3-, 4-, and 21-fold, respectively. The renal clearance of these metabolites was also decreased by approximately 10-fold. Nonclinical studies were performed to characterize the safety of the hydroxyacid metabolite, and they did not reveal any safety issues.

There are limited clinical data on the use of BRIVLERA in patients with pre-existing renal impairment as these patients were excluded from pre-market clinical studies of epilepsy. BRIVLERA has not been studied in patients with end-stage renal disease undergoing hemodialysis (**see WARNINGS AND PRECAUTIONS, Special Populations, Renal Impairment and DOSAGE AND ADMINISTRATION, Patients with Renal Impairment**).

## **STORAGE AND STABILITY**

Store at room temperature (15 – 30°C). Do not freeze BRIVLERA (brivaracetam) injection or oral solution.

Discard any unused BRIVLERA oral solution remaining after 5 months of first opening the bottle.

## **DOSAGE FORMS, COMPOSITION AND PACKAGING**

### **BRIVLERA (brivaracetam) tablets**

BRIVLERA tablets are supplied as follows:

**10 mg Tablets:** BRIVLERA (brivaracetam) tablets 10 mg are white to off-white, round, film-coated, and debossed with "u10" on one side.

**25 mg Tablets:** BRIVLERA (brivaracetam) tablets 25 mg are grey, oval, film-coated, and debossed with "u25" on one side.

**50 mg Tablets:** BRIVLERA (brivaracetam) tablets 50 mg are yellow, oval, film-coated, and debossed with "u50" on one side.

**75 mg Tablets:** BRIVLERA (brivaracetam) tablets 75 mg are purple, oval, film-coated, and debossed with "u75" on one side.

**100 mg Tablets:** BRIVLERA (brivaracetam) tablets 100 mg are green-grey, oval, film-coated, and debossed with "u100" on one side.

BRIVLERA tablets contain the following nonmedicinal ingredients: croscarmellose sodium, lactose monohydrate, betadex ( $\beta$ -cyclodextrin), anhydrous lactose, and magnesium stearate, and dye pigments as specified below:

BRIVLERA tablets are supplied as debossed tablets and contain the following film-coat and coloring agents:

10 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide

25 mg and 100 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide, yellow iron oxide, black iron oxide

50 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide, yellow iron oxide, red iron oxide

75 mg tablets: polyvinyl alcohol, talc, polyethylene glycol 3350, titanium dioxide, yellow iron oxide, red iron oxide, black iron oxide

BRIVLERA tablets are supplied in white HDPE bottles of 60 tablets, PVC/PCTFE - Aluminium blisters of 14 tablets and single unit dose blisters.

### **BRIVLERA oral solution**

BRIVLERA (brivaracetam) oral solution 10 mg/mL is a slightly viscous, clear, colorless to yellowish, raspberry-flavored liquid. The nonmedicinal ingredients are sodium citrate anhydrous citric acid, methylparaben, carboxymethylcellulose sodium, sucralose, sorbitol solution, glycerin, raspberry flavor, and purified water.

BRIVLERA (brivaracetam) oral solution 10 mg/mL is supplied in 300 mL amber glass bottles.

### **BRIVLERA injection**

BRIVLERA (brivaracetam) injection 10mg/mL is a clear, colorless, sterile solution.

The nonmedicinal ingredients are sodium acetate (trihydrate), glacial acetic acid, sodium chloride, and water for injection.

BRIVLERA injection 10mg/mL is supplied in 6 mL colorless single-use glass vials. Each vial contains 5 mL of brivaracetam injection

## PART II: SCIENTIFIC INFORMATION

### PHARMACEUTICAL INFORMATION

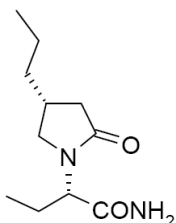
#### Drug Substance

Common name: brivaracetam

Chemical name: (2S)-2-[(4R)-2-oxo-4-propylpyrrolidin-1-yl] butanamide

Molecular formula and molecular mass: C<sub>11</sub>H<sub>20</sub>N<sub>2</sub>O<sub>2</sub> 212.29

Structural formula:



Physicochemical properties: Brivaracetam is a white to off-white crystalline powder. It is very soluble in water, buffer (pH 1.2, 4.5, and 7.4), ethanol, methanol, and glacial acetic acid. It is freely soluble in acetonitrile and acetone and soluble in toluene. It is very slightly soluble in n-hexane. The melting point of brivaracetam is between 76.0°C and 78.7°C. The specific rotation of a 10 mg/mL aqueous solution of brivaracetam at 25°C with a Na lamp at 589 nm is  $-60.1 \pm 1.6^\circ$ .

### CLINICAL TRIALS

#### Study demographics and trial design

The efficacy of BRIVLERA (brivaracetam) as adjunctive therapy in partial-onset seizures was established in 3 fixed-dose, randomized, double-blind, placebo-controlled, multicenter studies (Studies 1, 2 and 3) which included a total of 1558 patients (1099 patients were exposed to brivaracetam and 459 patients received placebo). The patients' mean age was 38.3 years. The median baseline seizure frequency was 9.0 seizures per 28 days. Across the 3 studies, the mean duration of epilepsy ranged from 22 to 24 years.

Patients had partial onset seizures with or without secondary generalization and were not adequately controlled with 1 to 2 concomitant Anti-Epileptic Drugs (AEDs). In Studies 1 and 2, approximately 80% of the patients were taking 2 concomitant AEDs, and in Study 3, 71% were taking 2 concomitant AEDs with or without vagal nerve stimulation. The most commonly used AEDs across the three studies were carbamazepine (41%), lamotrigine (25%), valproate (21%), oxcarbazepine (16%), topiramate (14%), phenytoin (10%) and levetiracetam (10%). Patients on levetiracetam were excluded from Study 3.

All studies had an 8-week baseline period, during which patients were required to have at least 8 partial-onset seizures. The baseline period was followed by a 12-week treatment period. As there

was no titration period in any of these studies, patients were initiated and remained on a fixed dose of study drug throughout trials. In Studies 1 and 2, the study drug dose could be reduced once (ie, fallback option), if necessary for tolerability reasons (see **ADVERSE REACTIONS, Adverse Drug Reaction Overview**). No fallback was allowed in Study 3.

Study 1 compared doses of BRIVLERA 50 mg/day and 100 mg/day with placebo. Study 2 compared BRIVLERA 50 mg/day with placebo. Study 3 compared doses of BRIVLERA 100 mg/day and 200 mg/day with placebo. All daily doses were administered in two equal intakes. Across the 3 studies, the completion rates for placebo, BRIVLERA 50mg/day, 100mg/day, and 200mg/day were 94.7%, 91.3%, 90.1%, and 90.4%, respectively.

### **Study results**

In Study 1, a statistically significant treatment effect was not observed for the 50 mg/day dose. The 100 mg/day dose in this study was nominally significant. In Study 2, the 50 mg/day dose showed a statistically significant treatment effect. In Study 3, both 100 mg/day and 200 mg/day doses showed a statistically significant treatment effect compared to placebo (see Table 3). The 200 mg/day dose did not provide additional efficacy compared to the 100 mg/day dose.

**Table 3: Median Percent Reduction in 28-day Total Partial Seizure Frequency and Proportion of Patients with ≥50% Reduction in Seizure Frequency from Baseline to the end of double-blind Treatment Phase (ITT population).**

Study	Efficacy Results	AEDs + Placebo	AEDs + BRIVLERA		
			50 mg/day	100 mg/day	200 mg/day
1	n	100	99	100	
	Median percent reduction from baseline (%)	17.0	26.8 (p=0.092)	32.5 <sup>(1)</sup> (p=0.004)	~
	50% Responder rate **	20.0	27.3 (p=0.372)	36.0 <sup>(1)</sup> (p=0.023)	~
2	n	96	101		
	Median percent reduction from baseline (%)	17.8	30.5* (p=0.003)	~	~
	50 % Responder rate **	16.7	32.7* (p=0.008)	~	~
3	n	259		252	249
	Median percent reduction from baseline (%)	17.6	~	37.2* (p<0.001)	35.6* (p<0.001)
	50% Responder rate **	21.6	~	38.9* (p<0.001)	37.8* (p<0.001)

n = randomised patients who received at least 1 dose of study medication

~ Dose not studied

\* Statistically significant

\*\* Responder rate: defined as percentage of subjects who achieved at least a 50% reduction in partial onset seizure frequency per 28 days from baseline to the treatment period

<sup>(1)</sup> The primary outcome for Study 1 did not achieve statistical significance based on the sequential testing procedure, which required statistical significance at the 0.050 level for BRIVLERA 50 mg/day versus placebo prior to the testing of BRIVLERA 100 mg/day. The 100 mg/day dose was nominally significant.



In these 3 clinical studies, 2.5% (4/161), 5.1% (17/332) and 4.0% (10/249) of the patients on BRIVLERA 50 mg/day, 100 mg/day and 200 mg/day respectively, became seizure free during the 12-week treatment period compared with 0.5% (2/418 patients) on placebo.

There were no significant differences in seizure control as a function of gender. Data on race were limited (approximately 28% of the patients were non-Caucasian).

### **Treatment with Levetiracetam**

In Studies 1 and 2, which evaluated BRIVLERA dosages of 50 mg and 100 mg daily, approximately 20% of the patients were on concomitant levetiracetam. Although not powered for this analysis and the number of subjects is limited, there was no observed benefit versus placebo when BRIVLERA was added to levetiracetam.

Patients on concomitant levetiracetam were excluded from Study 3, which evaluated brivaracetam 100 and 200 mg daily. Approximately 54% of patients in this study had prior exposure to levetiracetam.

## **DETAILED PHARMACOLOGY**

### **Preclinical Pharmacology**

#### **Receptor Binding Studies**

The primary mechanism of brivaracetam appears to relate to its high affinity for the synaptic vesicle protein 2A (SV2A) in the brain (pIC<sub>50</sub> values=7.1 and 7.0 for the rat and human form respectively, as shown by displacement of the selective SV2A radioligand [<sup>3</sup>H] ucb 30889 by brivaracetam incubated with rat brain membrane proteins and CHO cells expressing human SV2A, respectively). Systemic administration of anticonvulsant doses of brivaracetam in mice was shown to be associated with significant occupancy of central SV2A, supporting the involvement of this target in its antiseizure properties. Furthermore, the binding of brivaracetam to SV2A appears selective as it did not (10µM) produce any inhibition >50% for binding to 50 different radioligands specific for various receptors, uptake systems and ion channels. Thus, binding to SV2A appears to be the primary mechanism for brivaracetam anticonvulsant activity, however, the precise mechanism by which brivaracetam exerts its anticonvulsant activity has not been fully elucidated.

#### **Preclinical Pharmacodynamics**

The primary pharmacodynamics of brivaracetam has been evaluated in a wide range of *in vitro* and *in vivo* models of seizures and epilepsy.

While only high dose treatment protects against acute seizures induced by electrical stimulation and chemoconvulsants in mice, brivaracetam exhibits significant and potent protection against seizures with focal onset in rodents. Brivaracetam produced protective ED<sub>50</sub> values of 3.5 and 1.2mg/kg ip, respectively, against secondarily generalized seizures in fully 6Hz- and corneally-kindled mice. In fully amygdala kindled rats, brivaracetam significantly elevated after discharge and generalized seizure threshold currents from a dose of 0.68mg/kg ip and produced a protective

ED value against expression of secondarily generalized seizures, induced by supra-threshold stimulation at a dose of 44mg/kg ip. Finally, protective ED<sub>50</sub> values were also observed against acute, partial 6Hz seizures in mice (4.4mg/kg ip) and against phenytoin-resistant secondarily generalized seizures (68mg/kg ip) in fully amygdala-kindled mice.

Brivaracetam showed a protection against generalized seizures by a significant suppression of spontaneous spike-and-wave discharges from a dose of 6.8mg/kg ip in Genetic Absence Epilepsy Rats (GAERS) from Strasbourg and by producing a protective ED<sub>50</sub> value of 2.4mg/kg ip against clonic convulsions in sound susceptible mice. In line with these findings, brivaracetam also significantly reduced the myoclonus and seizure score from a dose of 0.3mg/kg ip in a rat model of post-hypoxic myoclonus.

### **Preclinical Safety Pharmacology**

The results safety pharmacology studies conducted with brivaracetam did not raise any significant concerns regarding central nervous system (CNS), cardiovascular, respiratory, and gastrointestinal function.

Rotarod testing in rodents suggested that brivaracetam possesses a relatively wide safety margin between doses inducing seizure protection and acute motor adverse effects in models of partial and generalized seizures in man. CNS- related clinical signs (mainly transient CNS depression and decreased spontaneous locomotor activity) were seen at high oral doses (from 100 mg/kg) relative to pharmacologically active doses (ED<sub>50</sub> ≥ 2 mg/kg ip). In addition, brivaracetam did not affect learning and memory in rats.

Brivaracetam *in vitro* did not interfere with human cardiac potassium (hERG), sodium, and calcium channels at concentrations up to 100 μM in HEK293 cells indicating that it is unlikely to affect cardiac conduction, depolarization, and repolarization. It is also unlikely to alter QRS complex duration, QT interval, cardiac contractility, or ventricular conduction velocity based on studies in isolated canine cardiac Purkinje fibers. Significant cardiovascular liabilities were not identified in acute *in vivo* cardiovascular safety pharmacology studies in dogs or in repeated dose toxicology studies conducted in dogs and monkeys for up to 9 months.

The only finding in a respiratory study conducted in male rats was slightly reduced expiratory and relaxation times at ≥100 mg/kg, indicative of slight respiratory stimulation.

Dose-dependent decreases in gastrointestinal transit and gastric emptying in male rats were evident after 300 and 600 mg/kg, with 100 mg/kg identified as a no observed effect level (NOEL). The abuse potential was investigated in rats and the studies did not indicate significant potential for abuse or dependence.

## **TOXICOLOGY**

### **Acute Toxicity**

After acute administration, the maximum non-lethal oral dose in the rat was ≥1000 mg/kg, since 2000 mg/kg was not considered tolerable and a no-effect level of 500 mg/kg (both sexes) was identified based on the absence of clinical signs.

### **Long Term Toxicity**

The toxicity potential of brivaracetam was investigated in the following repeated administration for 3 months in mice, up to 6 months in rats and dogs and 9 months in monkeys by the oral route and for up to 4 weeks in rats and dogs by i.v. infusion.

The liver was the main target organ with different sensitivity across species. The dog was the most sensitive species with no safety margin identified based on systemic exposure to brivaracetam. In dogs, the adverse changes in the liver were characterized by porphyrin deposits in hepatocytes, bile canaliculi, and Kupffer cells (i.e. porphyria) accompanied by increases in plasma biomarkers (increased ALT, AST, alkaline phosphatase, GGT, SDH, 5' nucleotidase, and bile acids) and histopathologic findings of centrilobular fibrosis and hyperplasia of oval cells/bile ducts, single hepatocyte necrosis, and centrilobular inflammation, as well as concretions in the lumen of the gall bladder. The high sensitivity of the dog for hepatotoxicity may be related to the relatively species-specific formation of a reactive metabolite, based mainly on data for an analog compound that causes similar hepatic effects.

Liver changes were also evident in mice in which hepatocellular hypertrophy, with in males single cell necrosis of hepatocytes and increased plasma aminotransferases and glutamate dehydrogenase activities occurred at 675 and 1000 mg/kg/day with the 450 mg/kg/day dose considered a no observed adverse effect level (NOAEL) at which systemic exposure to brivaracetam was approximately double that at the maximum recommended human dose (MRHD). These histopathological findings, along with lipofuscin pigment in hepatocytes and Kupffer cells, were also seen mainly in male mice chronically exposed for two years at all dose levels (carcinogenicity study).

In rats, centrilobular hepatocellular hypertrophy occurred at all dose levels; however no adverse liver changes were seen following chronic administration of brivaracetam at exposures up to 8 times (6 months) that at the MRHD of 200mg/day. Lipofuscin, bile, and porphyrin pigment deposits in bile ducts, minimal bile duct hyperplasia, and peribiliary inflammation were observed in rats, but only after short term administration (4 weeks) with brivaracetam doses at or above a maximum tolerated dose ( $\geq 1000$  mg/kg/day).

No adverse liver changes were seen in monkeys following administration of brivaracetam at exposures up to 42 times the mean human exposure at the clinical dose of 200 mg/day.

### **Reproduction Studies**

In male and female rats administered brivaracetam (oral doses of 100, 200 or 400 mg/kg/day) prior to and throughout mating and continuing in females until gestation day 6, there were no effects on fertility. Based on toxicokinetic data from a repeated dose study in rats, the exposure margins are considered to be at least 6 and 13 times that at the MRHD, in male and female rats, respectively.

In embryo-fetal development studies, brivaracetam was administered to rats at oral dose levels of 150, 300 and 600 mg/kg/day and rabbits at 30, 60, 120, and 240 mg/kg/day during the period of organogenesis. Brivaracetam showed no evidence of teratogenicity. Brivaracetam caused maternal toxicity at 600 mg/kg/day, but no embryo-fetal toxicity in rats up to the maximum dose tested, 600 mg/kg/day, at which plasma exposure (AUC) was 32 times that at the MRHD of 200 mg/day. Brivaracetam caused developmental toxicity consisting of increased post-implantation loss, reduced

fetal weight, and increased incidences of fetal minor abnormalities and variants related to the extent of ossification in the rabbit at 240 mg/kg/day, a maternal toxic dose, with systemic exposure at the no-effect dose (120 mg/kg/day) 8 times the AUC at the MRHD of 200 mg/day.

When brivaracetam (150, 300, or 600 mg/kg/day) was orally administered to rats throughout gestation, parturition, and lactation, lower body weight gains were observed in the offspring at the highest dose, with associated slight increase in age of attainment of vaginal patency and lower locomotor activity. The no-effect dose for pre- and post-natal developmental toxicity in rats (300 mg/kg/day) was associated with a maternal plasma brivaracetam AUC approximately 7 times that in humans at the MRHD.

After [<sup>14</sup>C]-brivaracetam administration to rats, brivaracetam and/or its metabolites readily crossed the placental barrier with maternal blood radioactivity levels similar to those in the fetus, placenta and amniotic fluid. Brivaracetam and/or its metabolites were excreted into milk of lactating female rats following a single radioactive dose, with mean milk/plasma ratio close to unity.

The potential adverse effects of long-term oral administration of brivaracetam on neonatal growth and development was investigated in juvenile rats and dogs with dosing starting on post natal day (PND) 4. In juvenile rats, the highest dose tested, 600 mg/kg/day, resulted in mortality, clinical signs, decreased body weight, delayed sexual maturation of males, hepatocellular hypertrophy, and lower brain weight. The no effect level for all effects except lower brain weight was 300 mg/kg/day, at which exposure to brivaracetam was 3-9 times that at the MRHD. A no-effect dose for lower brain weight was not identified; however, the differences from controls at the low and mid dose levels were small ( $\leq 6.5\%$ ) and there were no adverse effects at any dose level on behaviour, learning, and memory or no microscopic findings, which included a comprehensive histopathologic evaluation of the brain. In juvenile dogs, the dose of 100 mg/kg/day induced hepatotoxicity similar to those observed in adult animals. There were no adverse effects on growth, bone density or strength, brain (including brain weight) and neurobehavioral assessments and neuropathology evaluation. Similar exposure to brivaracetam was achieved in adult and juvenile animals at the NOAEL, except at post-natal day 4 where higher exposure was achieved in juvenile animals compared to adults. Based on hepatic toxicity at 100 mg/kg/day, 30 mg/kg/day was considered a NOAEL at which systemic exposure to brivaracetam was slightly higher than that at the MRHD.

### **Carcinogenicity**

Carcinogenicity studies were conducted in the mouse at dose levels of 400, 550, and 700 mg/kg/day for 104 weeks and rat at 150, 230, 450, and 700 mg/kg/day for 104 weeks. In mice, there were higher incidences of liver tumors (hepatocellular adenoma and carcinoma) in males at the mid and high dose levels with systemic exposures (AUC) to brivaracetam at the no effect level (400 mg/kg/day) approximately equal to those at the MRHD of 200 mg/day. The liver tumors are considered to be the result of pleiotrophic effects on the liver that includes hepatocellular hypertrophy and induction of microsomal enzymes, a mode of action comparable to phenobarbitone that is not likely relevant for humans. In rats, there were higher incidences of thyroid tumors at  $\geq 230$  mg/kg/day, that were considered secondary to hepatic enzyme induction and not relevant for humans, and benign thymomas (thymic tumors) in high dose females. Systemic exposure at the no-effect dose level (450 mg/kg/day) for thymomas was about 9 times that at the MRHD.

### **Mutagenicity**

Brivaracetam is not considered genotoxic-based on evaluations in *in vitro* assays in bacterial (Ames test) and mammalian cells (mouse lymphoma assay, chromosomal aberration test in CHO cells) and *in vivo* in rats (bone marrow micronucleus assay) and mice (Muta™ mice).

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**READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE  
PATIENT MEDICATION INFORMATION**

**BRIVLERA™  
brivaracetam tablets  
brivaracetam oral solution  
brivaracetam injection**

Read this carefully before you start taking BRIVLERA and each time you get a refill. This leaflet is a summary and will not tell you everything about this drug. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about BRIVLERA.

**What is BRIVLERA used for?**

BRIVLERA is used in adults with epilepsy to treat partial-onset seizures when taken together with other anti-seizure medicines.

**How does BRIVLERA work?**

BRIVLERA works in the brain to block the spread of seizure activity. The precise way that BRIVLERA works to treat partial-onset seizures is unknown.

**What are the ingredients in BRIVLERA?**

Medicinal ingredients: brivaracetam

Non-medicinal ingredients:

Tablets: anhydrous lactose, betadex ( $\beta$ -cyclodextrin), black iron oxide (25 mg, 75 mg, 100 mg), croscarmellose sodium, lactose monohydrate, magnesium stearate, polyethylene glycol 3350, polyvinyl alcohol, red iron oxide (50 mg, 75 mg), talc, titanium dioxide, yellow iron oxide (25 mg, 50 mg, 75 mg, 100 mg)

Oral Solution: anhydrous citric acid, carboxymethylcellulose sodium, glycerin, methylparaben, purified water, raspberry flavor, sodium citrate, sorbitol solution, sucralose

Injection: glacial acetic acid, sodium acetate (trihydrate), sodium chloride, water for injection

**BRIVLERA comes in the following dosage forms:**

Tablets: 10 mg, 25 mg, 50 mg, 75 mg and 100 mg

Oral Solution: 10 mg/mL

Injection: 10 mg/mL

**Do not use BRIVLERA if:**

- you are allergic to brivaracetam or any of the other ingredients of this medicine (listed in section **What are the ingredients in BRIVLERA?**)

**To help avoid side effects and ensure proper use, talk to your healthcare professional before you take BRIVLERA. Talk about any health conditions or problems you may have, including if you:**

- have ever had a rash or unusual reaction while taking BRIVLERA or any other anti-epileptic drug
- have or have had depression, mood problems or suicidal thoughts or behaviour
- have liver problems. Your doctor may need to adjust the dose.
- have kidney problems
- are allergic to lactose. BRIVLERA tablets contain lactose.
- **are pregnant or planning to become pregnant. You must only take BRIVLERA during pregnancy if your doctor tells you to.**
- **If you become pregnant while you are taking BRIVLERA, ask your healthcare professional about joining the North American Antiepileptic Drug (NAAED) Pregnancy Registry. The purpose of this registry is to collect information about the safety of anti-epileptic medicine during pregnancy. You can enroll in this registry by calling (888) 233-2334 (toll free). Information on the registry can also be found at: <http://www.aedpregnancyregistry.org/>;**
- **are nursing or plan to nurse your baby. It is not known if BRIVLERA passes into breast milk and if it can harm your baby. You and your doctor should decide whether you should take BRIVLERA or breastfeed, but not both.**

**Other warnings you should know about:**

- **New or Worsened Emotional Problems:** A small number of people being treated with anti-epileptic medicines such as BRIVLERA have had thoughts of harming or killing themselves. If you have any of these thoughts at any time, contact your healthcare professional immediately.
- **Serious Skin Reactions:** Serious allergic skin reactions can be caused by anti-epileptic medicines. Seek immediate medical help if you develop a rash together with a fever at any point during treatment. This includes skin peeling, itching, redness, and blisters of the lips, eyes, mouth, nasal passages or genitals along with other symptoms such as sore throat, swollen glands, joint pain or any problems related to the liver, kidneys, heart, lungs or other organs.
- **Driving and Using Machines:** BRIVLERA may make you feel dizzy, drowsy and affect your coordination. Do not drive, operate machinery, or engage in other hazardous activities until you know how BRIVLERA affects you.

**Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.**

**The following may interact with BRIVLERA:**

- Rifampin, an antibiotic used to treat infections
- Other anti-epileptic medicines including carbamazepine and phenytoin
- Alcohol. You should not drink alcohol while you are taking BRIVLERA. BRIVLERA can make the effects of alcohol worse.

**How to take BRIVLERA:**

- Always take BRIVLERA exactly as your healthcare professional has told you. Check with your healthcare professional if you are not sure.



- Treatment with BRIVLERA can be started either orally (oral solution or tablets) or by injection.
- The injection can be given for a short period of time when BRIVLERA can't be taken by mouth. It will be administered by a healthcare professional.
- It is possible to switch directly from taking BRIVLERA by mouth to being given BRIVLERA by injection and the other way around. The amount of BRIVLERA you take and when you take it will not change.
- **Do not stop taking BRIVLERA without talking to your healthcare professional.** Stopping BRIVLERA suddenly can cause serious problems, including seizures that will not stop. Your healthcare professional will decide how long you should take BRIVLERA.

#### BRIVLERA Tablets

Swallow BRIVLERA tablets whole with a glass of water. Do not crush or chew the tablets. BRIVLERA tablets can be taken with or without food.

#### BRIVLERA Oral Solution

BRIVLERA oral solution does not need to be diluted before swallowing and may be taken with or without food.

#### BRIVLERA Injection

BRIVLERA injection is administered into a vein by a healthcare professional.

#### **Usual adult dose:**

- The recommended starting dose is 50 mg twice a day (100 mg/day).
- The dose may be adjusted to between 25 mg twice a day (50 mg/day) and 100 mg twice a day (200 mg/day), to be taken once in the morning and once in the evening at about the same time each day.
- The maximum dose is 100 mg twice a day (200 mg/day).

**Overdose:** You may experience dizziness and sleepiness.

If you think you have taken too much BRIVLERA, contact your healthcare professional, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

#### **Missed Dose:**

If you miss a dose by a few hours, take it as soon as you remember. Take your next dose at the time you would normally take it. If you are not sure what to do, ask your healthcare professional.

#### **What are possible side effects from using BRIVLERA?**

These are not all the possible side effects you may feel when taking BRIVLERA. If you experience any side effects not listed here, contact your healthcare professional.

Side effects may include:

- Sleepiness/drowsiness
- Feeling tired/fatigue

- Headache
- Dizziness
- Poor coordination
- Nausea, vomiting
- Irritability

<b>Serious side effects, how often they happen and what to do about them</b>			
Symptom / effect	Talk to your healthcare professional		Get immediate medical help
	Only if severe	In all cases	
<b>UNCOMMON</b> <b>New or Worsened Emotional Problems:</b> Thoughts of suicide or hurting yourself			√
<b>RARE</b> <b>Allergic Reaction:</b> swelling in the mouth, tongue, face and throat, itching, rash			√
<b>RARE:</b> <b>Bronchospasm and Angioedema:</b> severe allergic reactions involving swelling of the face, eyes, or tongue, difficulty swallowing, wheezing, hives and generalized itching, rash, fever, abdominal cramps, chest discomfort or tightness, difficulty breathing, unconsciousness			√
<b>UNKNOWN:</b> <b>Serious Allergic Skin Reactions:</b> any combination of itchy skin rash, redness, blistering and peeling of the skin and/or inside of the lips, eyes, mouth, nasal passages or genitals, accompanied by fever, chills, headache, cough, body aches or swollen glands, joint pain, yellowing of the skin or eyes, dark urine, chest pain			√

If you have a troublesome symptom or side effect that is not listed here or becomes bad enough

to interfere with your daily activities, talk to your healthcare professional.

### **Reporting Side Effects**

You can help improve the safe use of health products for Canadians by reporting serious and unexpected side effects to Health Canada. Your report may help to identify new side effects and change the product safety information.

#### **3 ways to report:**

- Online at MedEffect ([www.healthcanada.gc.ca/medeffect](http://www.healthcanada.gc.ca/medeffect));
- By calling 1-866-234-2345 (toll-free);
- By completing a Consumer Side Effect Reporting Form and sending it by:
  - Fax to 1-866-678-6789 (toll-free), or
  - Mail to: Canada Vigilance Program  
Health Canada, Postal Locator 0701E  
Ottawa, ON  
K1A 0K9Postage paid labels and the Consumer Side Effect Reporting Form are available at MedEffect.

*NOTE: Contact your healthcare professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.*

### **Storage:**

Store BRIVLERA at room temperature, 15 to 30°C.

Do not freeze BRIVLERA oral solution.

Do not use BRIVLERA oral solution more than 5 months after you first open the bottle.  
Store in the original container.

Keep out of reach and sight of children.

### **If you want more information about BRIVLERA:**

- Talk to your healthcare professional
- Find the full product monograph that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the Health Canada website ([www.healthcanada.gc.ca](http://www.healthcanada.gc.ca)); the manufacturer's website <http://www.ucb-canada.ca>, or by calling 1-866-709-8444.

This information is current up to the time of the last revision date shown below, but more current information may be available from the manufacturer.

This leaflet was prepared by UCB Canada Inc.

Last Revised: March 9, 2016

BRIVLERA™ is a trademark of the UCB Group of Companies.