

## HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use GABAPENTIN CAPSULES safely and effectively. See full prescribing information for GABAPENTIN CAPSULES.

**GABAPENTIN capsules, for oral use**  
Initial U.S. Approval: 1993

### RECENT MAJOR CHANGES

Warnings and Precautions, Respiratory Depression (5.7) 4/2020

### INDICATIONS AND USAGE

Gabapentin capsules are indicated for:

- Postherpetic neuralgia in adults (1)
- Adjunctive therapy in the treatment of partial onset seizures, with and without secondary generalization, in adults and pediatric patients 3 years and older with epilepsy (1)

### DOSSAGE AND ADMINISTRATION

- Postherpetic Neuralgia (2.1)
  - Dose can be titrated up as needed to a dose of 1,800 mg/day
  - Day 1: Single 300 mg dose
  - Day 2: 600 mg/day (i.e., 300 mg two times a day)
  - Day 3: 900 mg/day (i.e., 300 mg three times a day)
- Epilepsy with Partial Onset Seizures (2.2)
  - Patients 12 years of age and older: starting dose is 300 mg three times daily; may be titrated up to 600 mg three times daily
  - Patients 3 to 11 years of age: starting dose range is 10 to 15 mg/kg/day, given in three divided doses; recommended dose in patients 3 to 4 years of age is 40 mg/kg/day, given in three divided doses; the recommended dose in patients 5 to 11 years of age is 25 to 35 mg/kg/day, given in three divided doses. The recommended dose is reached by upward titration over a period of approximately 3 days
- Dose should be adjusted in patients with reduced renal function (2.3, 2.4)

### DOSSAGE FORMS AND STRENGTHS

- Capsules: 100 mg, 300 mg, and 400 mg (3)

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## CONTRAINDICATIONS

Known hypersensitivity to gabapentin or its ingredients (4)

## WARNINGS AND PRECAUTIONS

- Drug Reaction with Eosinophilia and Systemic Symptoms (Multigorgan hypersensitivity): Discontinue if alternative etiology is not established (5.1)
- Anaphylaxis and Angioedema: Discontinue and evaluate patient immediately (5.2)
- Driving Impairment/Somnolence/Sedation and Dizziness: Warn patients not to drive until they have gained sufficient experience to assess whether their ability to drive or operate heavy machinery will be impaired (5.3, 5.4)
- Increased seizure frequency may occur in patients with seizure disorders if gabapentin is abruptly discontinued (5.5)
- Suicidal Behavior and Ideation: Monitor for suicidal thoughts/behavior (5.6)
- Respiratory Depression: May occur with gabapentin when used with concomitant central nervous system (CNS) depressants, including opioids, or in the setting of underlying respiratory impairment. Monitor patients and adjust dosage as appropriate (5.7)
- Neuropsychiatric Adverse Reactions in Children 3 to 12 Years of Age: Monitor for such events (5.8)

## ADVERSE REACTIONS

Most common adverse reactions (incidence ≥8% and at least twice that for placebo) were:

- Postherpetic neuralgia; Dizziness, somnolence, and peripheral edema (6.1)
- Epilepsy in patients >12 years of age: Somnolence, dizziness, ataxia, fatigue, and nystagmus (6.1)
- Epilepsy in patients 3 to 12 years of age: Viral infection, fever, nausea and/or vomiting, somnolence, and hostility (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Laurus Generics Inc. at 1-833-3-LAURUS (1-833-352-8787) or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

## DRUG INTERACTIONS

Concentrations increased by morphine; may need dose adjustment (5.4, 7.1)

## USE IN SPECIFIC POPULATIONS

Pregnancy: Based on animal data, may cause fetal harm (8.1)

See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.

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## 7.2 Other Antiepileptic Drugs

Maalox<sup>®</sup> (aluminum hydroxide, magnesium hydroxide)

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is variable in its expression, and other organ systems not noted here may be involved. It is important to note that early manifestations of hypersensitivity, such as fever or lymphadenopathy, may be present even though rash is not evident. If such signs or symptoms are present, the patient should be evaluated immediately. Gabapentin should be discontinued if an alternative etiology for the signs or symptoms cannot be established.

**5.2 Anaphylaxis and Angioedema**  
Gabapentin can cause anaphylaxis and angioedema after the first dose or at any time during treatment. Signs and symptoms in reported cases have included difficulty breathing, swelling of the lips, throat, and tongue, and hypotension requiring emergency treatment. Patients should be instructed to discontinue gabapentin and seek immediate medical care should they experience signs or symptoms of anaphylaxis or angioedema.

**5.3 Effects on Driving and Operating Heavy Machinery**  
Patients taking gabapentin should not drive until they have gained sufficient experience to assess whether gabapentin impairs their ability to drive. Driving performance studies conducted with a product of gabapentin (gabapentin enacarbil tablet, extended-release) indicate that gabapentin may cause significant driving impairment. Prescribers and patients should be aware that patients' ability to assess their own driving competence, as well as their ability to assess the degree of somnolence caused by gabapentin, can be imperfect. The impairment may be more pronounced when starting therapy with gabapentin is unknown. Whether the impairment is related to somnolence [see Warnings and Precautions (5.4)] or other effects of gabapentin is unknown.

Moreover, because gabapentin causes somnolence and dizziness [see Warnings and Precautions (5.4)], patients should be advised not to operate complex machinery until they have gained sufficient experience on gabapentin to assess whether gabapentin impairs their ability to perform such tasks.

**5.4 Somnolence/Sedation and Dizziness**  
During the controlled efficacy trials in patients older than 12 years of age receiving doses of gabapentin up to 1,800 mg daily, somnolence, dizziness, and ataxia were reported at a greater rate in patients receiving gabapentin (i.e., 19% in patients receiving 9% in placebo for somnolence, 17% in drug versus 7% in placebo for dizziness, and 13% in drug versus 6% in placebo for ataxia). In these trials somnolence, ataxia and fatigue were common adverse effects leading to discontinuation of gabapentin in patients older than 12 years of age, with 1.2%, 0.8% and 0.6% discontinuing for these events, respectively.

During the controlled trials in patients with post-herpetic neuralgia, somnolence, and dizziness were reported at a greater rate compared to placebo in patients receiving gabapentin, in dosages up to 3,600 mg per day; i.e., 21% in gabapentin-treated patients versus 5% in placebo-treated patients for somnolence and 28% in gabapentin-treated patients versus 8% in placebo-treated patients for dizziness. Dizziness and somnolence were among the most common adverse reactions leading to discontinuation of gabapentin. Patients should be carefully observed for signs of central nervous system (CNS) depression, such as somnolence and sedation, when gabapentin is used with other drugs with sedative properties because of potential synergy. In addition, patients who require concomitant therapy on gabapentin should be monitored for additive CNS depression, and may require dose adjustment [see Drug Interactions (7.1)].

**5.5 Withdrawal Precipitated Seizure, Status Epilepticus**  
Antiepileptic drugs should not be abruptly discontinued because of the possibility of increasing seizure frequency.

In the placebo-controlled efficacy studies in patients >12 years of age, the incidence of status epilepticus in patients receiving gabapentin was 0.43%, compared to 0.5% in patients receiving placebo (2 of 378). Among the 2,074 patients >12 years of age treated with gabapentin across all efficacy studies (controlled and uncontrolled), 31 (1.5%) had status epilepticus. Of these, 14 patients had no prior history of status epilepticus. The incidence of status epilepticus was higher in patients receiving gabapentin than in placebo-treated patients. The background risk of status epilepticus is not available, it is impossible to say whether or not treatment with gabapentin is associated with a higher or lower rate of status epilepticus than would be expected to occur in a similar population not treated with gabapentin.

**5.6 Suicidal Behavior and Ideation**  
Antiepileptic drugs (AEDs), including gabapentin, increase the risk of suicidal thoughts or behavior in patients taking these drugs for any indication. Patients treated with any AED for any indication should be monitored for the emergence or worsening of depression, suicidal thoughts or behavior, and/or any unusual changes in mood or behavior.

Pooled analyses of 199 placebo-controlled clinical trials (mono- and adjunctive therapy) of 11 different AEDs showed that patients randomized to one of the AEDs had approximately twice the risk (adjusted Relative Risk 1.8, 95% CI:1.2, 2.7) of suicidal thinking or behavior compared to patients randomized to placebo. In these trials, which had a median treatment duration of 12 weeks, the estimated incidence rate of suicidal thinking or behavior in patients receiving gabapentin was 0.43%, compared to 0.24% among 16,029 placebo-treated patients, representing an increase of approximately one case of suicidal thinking or behavior for every 530 patients treated. There were four suicides in drug-treated patients in the trials and none in placebo-treated patients, but the number is too small to allow any conclusion about drug effect on suicide.

The increased risk of suicidal thoughts or behavior with AEDs was observed as early as one week after starting drug treatment with AEDs and persisted for the duration of treatment assessed. Because most trials included in the analysis did not extend beyond 24 weeks, the risk of suicidal thoughts or behavior beyond 24 weeks could not be assessed.

The risk of suicidal thoughts or behavior was generally consistent among drugs in the data analyzed. The following table shows the incidence of suicidal thoughts or behavior and across a range of indications suggests that the risk applies to all AEDs used for any indication. The risk did not vary substantially by age (5 to 100 years) in the clinical trials analyzed. Table 2 shows absolute and relative risk for indication for all evaluated AEDs.

**TABLE 2 Risk by Indication for Antiepileptic Drugs in the Pooled Analysis**

Indication	Placebo Patients with Events Per 1,000 Patients		Drug Patients with Events Per 1,000 Patients		Relative Risk: Incidence of Events in Drug Patients vs. Incidence in Placebo Patients		Risk Difference: Additional Drug Patients with Events Per 1,000 Patients	
	No.	%	No.	%	95% CI	95% CI	No.	%
Epilepsy	1.0	3.4	3.5	3.5	1.5	2.4	2.5	2.9
Psychiatric	5.7	8.5	1.5	1.5	0.8	0.9	0.3	0.5
Other	1.0	1.0	1.8	1.8	1.8	2.4	0.8	0.24%
Total	4.3	4.3	1.8	1.8	1.8	2.4	0.5	0.24%

The relative risk for suicidal thoughts or behavior was higher in clinical trials for epilepsy than in clinical trials for psychiatric or other conditions, but the absolute risk differences were similar for the epilepsy and psychiatric indications.

Anyone considering prescribing gabapentin or any other AED must balance the risk of suicidal thoughts or behavior with the risk of untreated illness. Epilepsy and many other illnesses for which AEDs are prescribed are themselves associated with morbidity and mortality and an increased risk of suicidal thoughts and behavior. Should suicidal thoughts and behavior emerge during treatment, the prescriber needs to consider whether the emergence of these symptoms in any given patient may be related to the illness being treated.

Patients, their caregivers, and families should be informed that AEDs increase the risk of suicidal thoughts and behavior and should be advised of the need to alert for the emergence or worsening of the signs and symptoms of depression, any unusual changes in mood or behavior, or the emergence of suicidal thoughts, behaviors, or thoughts about self-harm. Behaviors of concern should be reported immediately to healthcare providers.

## 5.7 Respiratory Depression

There is evidence from case reports, human studies, and animal studies associating gabapentin with serious, life-threatening, or fatal respiratory depression when coadministered with CNS depressants, including opioids, or in the setting of underlying respiratory impairment. When the decision is made to co-prescribe gabapentin with another CNS depressant, particularly an opioid, or to prescribe gabapentin to patients with underlying respiratory impairment, monitor patients for symptoms of respiratory depression and sedation, and consider initiating gabapentin at a low dose. The management of respiratory depression may include close observation, supportive measures, and reduction or withdrawal of CNS depressants (including gabapentin).

**5.8 Neuropsychiatric Adverse Reactions (Pediatric Patients 3 to 12 Years of Age)**  
Gabapentin use in pediatric patients with epilepsy 3 to 12 years of age is associated with the occurrence of CNS related adverse reactions. The most significant of these can be classified into the following categories: 1) emotional lability (primarily behavioral problems), 2) hostility, including aggressive behaviors, 3) thought disorder, including concentration problems and change in school performance, and 4) hyperkinesia (primarily restlessness and hyperactivity). Among the gabapentin-treated patients, most of the reactions were mild to moderate in intensity.

In controlled clinical epilepsy trials in pediatric patients 3 to 12 years of age, the incidence of these adverse reactions was: emotional lability 6% (gabapentin-treated patients) versus 1.3% (placebo-treated patients); hostility 5.2% versus 1.3%; hyperkinesia 4.7% versus 2.9%; and thought disorder 1.7% versus 0%. One of these reactions, a report of hostility, was considered serious. Discontinuation of gabapentin treatment occurred in 1.3% of patients reporting emotional lability and hyperkinesia and 0.9% of gabapentin-treated patients reporting hostility and thought disorder. One placebo-treated patient (0.4%) withdrew due to emotional lability.

## 5.9 Tumorigenic Potential

In an oral carcinogenicity study, gabapentin increased the incidence of pancreatic acinar cell tumors in rats [see *Nonclinical Toxicology (13.1)*]. The clinical significance of this finding is unclear. Clinical experience during gabapentin's premarketing development provides no direct means to assess its potential for inducing tumors in humans. In exposure studies in adjunctive therapy in epilepsy comprising 2,085 patient-years of experience in patients >12 years of age, new tumors were reported in 10 patients (2 breast, 3 brain, 2 lung, 1 adrenal, 1 non-Hodgkin's lymphoma, 1 endometrial carcinoma in situ, and prostatic adenoma) in 11 patients (2 breast, 1 breast, 1 prostate) during or up to 2 years following discontinuation of gabapentin. Without knowledge of the background incidence and recurrence in a similar population not treated with gabapentin, it is impossible to know whether the incidence seen in this cohort is or is not affected by treatment.

**5.10 Sudden and Unexplained Death in Patients with Epilepsy**  
During the course of premarketing development of gabapentin, 8 sudden and unexplained deaths were recorded among a cohort of 2,203 epilepsy patients treated (2,103 patient-years of exposure) with gabapentin.

Some of these could represent seizure-related deaths in which the seizure was not observed, e.g., at night. This represents an incidence of 0.0038 deaths per patient-year. Although this rate exceeds that expected in a healthy population matched for age and sex, it is within the range of estimates for the incidence of sudden unexplained deaths in patients with epilepsy not receiving gabapentin (ranging from 0.0005 for the general population of epileptics to 0.003 for a clinical trial population similar to that in the gabapentin program to 0.005 for patients with refractory epilepsy). Consequently, whether these figures are reassuring or raise further concern depends on comparability of the populations reported upon to the gabapentin cohort and the accuracy of the estimates provided.

## 6 ADVERSE REACTIONS

The following serious adverse reactions are discussed in greater detail in other sections:

- Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)/ Multigorgan Hypersensitivity [see Warnings and Precautions (5.1)]
- Anaphylaxis and Angioedema [see Warnings and Precautions (5.2)]
- Somnolence/Sedation and Dizziness [see Warnings and Precautions (5.4)]
- Withdrawal Precipitated Seizure, Status Epilepticus [see Warnings and Precautions (5.5)]
- Suicidal Behavior and Ideation [see Warnings and Precautions (5.6)]
- Respiratory Depression [see Warnings and Precautions (5.7)]
- Neuropsychiatric Adverse Reactions (Pediatric Patients 3 to 12 Years of Age) [see Warnings and Precautions (5.8)]
- Sudden and Unexplained Death in Patients with Epilepsy [see Warnings and Precautions (5.10)]

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## 6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

### Postherpetic Neuralgia

The most common adverse reactions associated with the use of gabapentin in adults, not seen at an equivalent frequency among placebo-treated patients, were dizziness, somnolence, and peripheral edema.

In the 2 controlled trials in postherpetic neuralgia, 16% of the 336 patients who received gabapentin and 9% of the 227 patients who received placebo discontinued treatment because of an adverse reaction. The adverse reactions that most frequently led to withdrawal in gabapentin-treated patients were dizziness, somnolence, and nausea.

Table 3 lists adverse reactions that occurred in at least 1% of gabapentin-treated patients with postherpetic neuralgia participating in placebo-controlled trials and that were numerically more frequent in the gabapentin group than in the placebo group.

**TABLE 3 Adverse Reactions in Pooled Placebo-Controlled Trials in Postherpetic Neuralgia**

	Gabapentin <sup>a</sup> N=336	Placebo <sup>b</sup> N=227
<b>Body as a Whole</b>		
Asthenia	6	5
Infection	5	4
Accidental injury	3	1
Digestive System		
Diarrhea	6	3
Dry mouth	5	1
Constipation	4	2
Vomiting	3	2
<b>Metabolic and Nutritional Disorders</b>		
Peripheral edema	8	2
Weight gain	2	1
Hypertension	1	0
<b>Nervous System</b>		
Dizziness	28	8
Somnolence	21	8
Ataxia	3	0
Abnormal thinking	3	0
Abnormal gait	2	0
Incoordination	2	0
<b>Respiratory System</b>		
Pharyngitis	1	0
<b>Special Senses</b>		
Amblyopia	3	1
Conjunctivitis	1	0
Diplopia	1	0
Otitis media	1	0

<sup>a</sup> Reported as blurred vision

Other reactions in more than 1% of patients but equally or more frequent in the placebo group included pain, tremor, neuralgia, back pain, dyspepsia, dyspnea, and flu syndrome.

There were no clinically important differences between men and women in the types and incidence of adverse reactions. Because there were few patients whose race was reported as other than white, there are insufficient data to support a statement regarding the distribution of adverse reactions by race.

### Epilepsy with Partial Onset Seizures (Adjunctive Therapy)

The most common adverse reactions with gabapentin in combination with other antiepileptic drugs in patients >12 years of age, not seen at an equivalent frequency among placebo-treated patients, were somnolence, dizziness, ataxia, fatigue, and nystagmus.

The most common adverse reactions with gabapentin in combination with other antiepileptic drugs in pediatric patients 3 to 12 years of age, not seen at an equal frequency among placebo-treated patients, were viral infection, fever, nausea and/or vomiting, somnolence, and hostility [see Warnings and Precautions (5.8)].

Approximately 7% of the 2,074 patients >12 years of age and approximately 7% of the 449 pediatric patients 3 to 12 years of age who received gabapentin in premarketing clinical trials discontinued treatment because of an adverse reaction. The adverse reactions most commonly associated with withdrawal in patients >12 years of age were somnolence (1.2%), ataxia (0.8%), fatigue (0.6%), nausea and/or vomiting (0.6%), and dizziness (0.6%). The adverse reactions most commonly associated with withdrawal in pediatric patients were emotional lability (1.6%), hostility (1.3%), and hyperkinesia (1.1%).

Table 4 lists adverse reactions that occurred in at least 1% of gabapentin-treated patients >12 years of age with epilepsy participating in placebo-controlled trials and were numerically more common in the gabapentin group. In these studies, either gabapentin or placebo was added to the patient's current antiepileptic drug therapy.

**TABLE 4 Adverse Reactions in Pooled Placebo-Controlled Add-On Trials in Epilepsy Patients >12 years of age**

	Gabapentin <sup>a</sup> N=43	Placebo <sup>b</sup> N=378
<b>Body As A Whole</b>		
Fatigue	11	5
Increased Weight	2	1
Back Pain	2	1
Peripheral Edema	2	1
Cardiovascular		
Vasodilation	1	0
<b>Digest</b>		

Dosage adjustment in patients undergoing hemodialysis is necessary [see Dosage and Administration (2.3) and Clinical Pharmacology (12.3)].

## 9 DRUG ABUSE AND DEPENDENCE

### 9.1 Controlled Substance

Gabapentin is not a scheduled drug.

### 9.2 Abuse

Abuse is the intentional, non-therapeutic use of a drug, even once, for its desirable psychological or physiological effects. Misuse is the intentional use, for therapeutic purposes, of a drug by an individual in a way other than prescribed by a health care provider or for whom it was not prescribed.

Gabapentin does not exhibit affinity for benzodiazepine, opioid ( $\mu$ ,  $\delta$ , or  $\kappa$ ), or cannabinoid 1 receptor sites. Gabapentin misuse and abuse have been reported in the postmarketing setting and published literature. Most of the individuals described in these reports had a history of polysubstance abuse. Some of these individuals were taking higher than recommended doses of gabapentin for unapproved uses. When prescribing gabapentin, carefully evaluate patients for a history of drug abuse and observe them for signs and symptoms of gabapentin misuse or abuse (e.g., self-dose escalation and drug-seeking behavior). The abuse potential of gabapentin has not been evaluated in human studies.

### 9.3 Dependence

Physical dependence is a state that develops as a result of physiological adaptation in response to repeated drug use, manifested by withdrawal signs and symptoms after abrupt discontinuation or a significant dose reduction of a drug. There are no postmarketing reports of individuals experiencing withdrawal symptoms shortly after discontinuing higher than recommended doses of gabapentin used to treat seizures for which the drug is not approved. Such symptoms included agitation, disorientation and confusion after suddenly discontinuing gabapentin that resolved after restarting gabapentin. The dependence potential of gabapentin has not been evaluated in human studies.

## 10 OVERDOSSAGE

Signs of acute toxicity in animals included ataxia, labored breathing, ptosis, sedation, hypocoactivity, or exaltation.

Acute oral overdoses of gabapentin have been reported. Symptoms have included double vision, tremor, slurred speech, drowsiness, altered mental status, dizziness, lethargy, and diarrhea. Fatal respiratory depression has been reported with gabapentin overdose, alone and in combination with other CNS depressants.

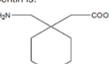
Gabapentin can be removed by hemodialysis.

If overdose occurs, call your poison control center at 1-800-222-1222.

## 11 DESCRIPTION

The active ingredient in gabapentin capsules, USP is gabapentin USP, which has the chemical name 1-(Amino methyl)-cyclohexane acetic acid.

The molecular formula of gabapentin is  $C_8H_{15}NO_2$  and the molecular weight is 171.24. The structural formula of gabapentin is:



Gabapentin USP is a white to off-white powder. It is freely soluble in water, 0.1 N sodium hydroxide and glacial acetic acid, slightly soluble in ethanol and insoluble in toluene. The log of the partition coefficient (n-octanol/0.05M phosphate buffer) at pH 7.4 is -1.25. Each gabapentin capsule, USP contains 100 mg, 300 mg, or 400 mg of gabapentin USP and the following inactive ingredients: mannitol, pregelatinized starch and talc.

The empty hard gelatin capsule shell contains gelatin, sodium lauryl sulfate, and titanium dioxide. In addition 300 mg also contains yellow iron oxide and 400 mg also contains yellow iron oxide and red iron oxide. The capsules are printed with edible ink containing FD&C Blue No. 2 and shellac.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

The precise mechanisms by which gabapentin produces its analgesic and antiepileptic actions are unknown. Gabapentin is structurally related to the neurotransmitter gamma-aminobutyric acid (GABA) but has no effect on GABA binding, uptake, or degradation. In *in vitro* studies have shown that gabapentin binds with high-affinity to the  $\alpha 2\delta$  subunit of voltage-activated calcium channels; however, the relationship of this binding to the therapeutic effects of gabapentin is unknown.

### 12.3 Pharmacokinetics

All pharmacological actions following gabapentin administration are due to the activity of the parent compound; gabapentin is not appreciably metabolized in humans.

### Oral Bioavailability

Gabapentin bioavailability is not dose proportional; i.e., as dose is increased, bioavailability decreases. Bioavailability of gabapentin is approximately 60%, 47%, 33%, 33%, and 27% following oral doses of 100, 200, 400, 600, and 1,200 mg/day given in 3 divided doses, respectively. Food has only a slight effect on the rate and extent of absorption of gabapentin (14% increase in AUC and  $C_{max}$ ).

### Distribution

Less than 3% of gabapentin circulates bound to plasma protein. The apparent volume of distribution of gabapentin after 150 mg intravenous administration is 58.6 L (mean  $\pm$  SD). In patients with epilepsy, steady-state plasma concentrations of gabapentin in the cerebrospinal fluid were approximately 20% of the corresponding plasma concentrations.

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### Special Populations

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not different and neither were gabapentin pharmacokinetic parameters affected by valproic acid.

### Phenobarbital

Estimates of steady-state pharmacokinetic parameters for phenobarbital or gabapentin (300 mg three times a day; N=12) are identical whether the drugs are administered alone or together.

### Naproxen

Coadministration (N=18) of naproxen sodium capsules (250 mg) with gabapentin (125 mg) appears to increase the amount of gabapentin absorbed by 12% to 15%. Gabapentin had no effect on naproxen pharmacokinetic parameters. These doses are lower than the therapeutic doses for both drugs. The magnitude of interaction within the recommended dose ranges of either drug is not known.

### Hydrocodone

Coadministration of gabapentin (125 to 500 mg; N=8) decreases hydrocodone (10 mg; N=50)  $C_{max}$  and AUC values in a dose-dependent manner relative to administration of hydrocodone alone;  $C_{max}$  and AUC values are 3% to 4% lower, respectively, after administration of 125 mg gabapentin and 21% to 22% lower, respectively, after administration of 500 mg gabapentin. The mechanism for this interaction is unknown. Hydrocodone increases gabapentin AUC values by 14%. The magnitude of interaction at other doses is not known.

### Morphine

A literature article reported that when a 60 mg controlled-release morphine capsule was administered 2 hours prior to a 600 mg gabapentin capsule (N=12), mean gabapentin AUC increased by 44% compared to gabapentin administered without morphine. Morphine pharmacokinetic parameter values were not affected by administration of gabapentin 2 hours after morphine. The magnitude of interaction at other doses is not known.

### Cimetidine

In the presence of cimetidine at 300 mg four times a day (N=12), the mean apparent oral clearance of gabapentin fell by 14% and creatinine clearance fell by 10%. Thus, cimetidine appeared to alter the renal excretion of both gabapentin and creatinine, an endogenous marker of renal function. This small decrease in excretion of gabapentin by cimetidine is not expected to be of clinical importance. The effect of gabapentin on cimetidine was not evaluated.

### Oral Contraceptive

Based on AUC and half-life, multiple-dose pharmacokinetic profiles of norethindrone and ethinyl estradiol following administration of tablets containing 2.5 mg of norethindrone acetate and 50 mcg of ethinyl estradiol were similar with and without coadministration of gabapentin (400 mg three times a day; N=13). The  $C_{max}$  of norethindrone was 13% higher when it was coadministered with gabapentin; this interaction is not expected to be of clinical importance.

### Antacid (Maalox<sup>®</sup>)

Antacid (Maalox<sup>®</sup>) containing magnesium and aluminum hydroxides reduced the mean bioavailability of gabapentin (N=16) by about 20%. This decrease in bioavailability was about 10% when gabapentin was administered 2 hours after Maalox.

### Probenecid

Probenecid is a blocker of renal tubular secretion. Gabapentin pharmacokinetic parameters without and with probenecid were comparable. This indicates that gabapentin does not undergo renal tubular secretion by the pathway that is blocked by probenecid.

## 13 NONCLINICAL TOXICOLOGY

### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Carcinogenesis was administered orally to mice and rats in 2-year carcinogenicity studies. No evidence of drug-related carcinogenicity was observed in mice treated at doses up to 2,000 mg/kg/day. At 2,000 mg/kg, the plasma gabapentin exposure (AUC) in mice was approximately 2 times that in humans at the MFRD of 3,600 mg/day. In rats, increases in the incidence of pancreatic acinar cell adenoma and carcinoma were found in male rats receiving the highest dose (2,000 mg/kg), but not at doses of 250 or 1,000 mg/kg/day. At 1,000 mg/kg, the plasma gabapentin exposure (AUC) in rats was approximately 5 times that in humans at the MFRD.

Studies designed to investigate the mechanism of gabapentin-induced pancreatic carcinogenesis in rats indicate that gabapentin stimulates DNA synthesis

PRODUCT DETAILS	
TYPE OF REQUEST	New
PRODUCT NAME	Gabapentin Capsules 400mg
BRAND NAME	NA
GENERIC NAME	Gabapentin Capsules
STRENGTH	400 mg
DOSAGE FORM	Capsules
PACK SIZE	1000's
PACK STYLE	Bottle Pack
MARKETS	US
COUNTRY	United States of America
LANGUAGE	English
CUSTOMER APPROVAL REQUIRED	No
PRODUCT TYPE	Own Product
CUSTOMER	Not entered
WORKFLOW	Laurus - AMS - Owned Product Process
TYPE OF PRODUCT	First release
FG CODE	7001167
FG CODE DESCRIPTION	Gabapentin Capsules 400mg
SPECIAL INSTRUCTIONS	Not entered
REMARKS	NA

MATERIAL DETAILS	
PHARMA CODE	Refer Artwork
BARCODE	NA
COMPONENT DETAILS	Printed Leaflet
NEW MATERIAL CODE	2001986
OLD MATERIAL CODE	Not entered

CHANGE REQUEST DETAILS	
APPROVED DATE	Not entered
REASON FOR CHANGE/INITIATION	Not entered
CHANGE CONTROL NUMBER	Not entered
REMARKS	NA

**Finalization Summary**

ACTION BY	DEPARTMENT	ACTION	ACTION ON	COMMENTS
9045-Sirisha M	Business Development	Initiate	06-05-2023 16:04:30	Yes
8274-Nalini Rama Yedhupati	Regulatory Affairs	Review	06-05-2023 18:00:57	Material code need to be updated
11754-Swathi Kasireddy	PKD-Designer	Component initiation	09-05-2023 13:51:45	YES
11754-Swathi Kasireddy	PKD-Designer	Upload Artwork	10-05-2023 10:42:30	Yes
4406-Vijaya Krishna Pentapati	Packaging Development	Checklist Review	10-05-2023 11:36:23	Artwork is approved
8274-Nalini Rama Yedhupati	Regulatory Affairs	Checklist Review	10-05-2023 12:16:33	Artwork is approved. Manufacturing License need to be applied. This product is still under FDA Review. Please make commercial labels based on requirement.
11971-Ravi Kumar Kapa	Packaging Development	Checklist Review	10-05-2023 16:22:03	Artwork is approved
6274-Subharanjan Sahoo	Manufacturing Department	Checklist Review	11-05-2023 11:26:31	Artwork is approved
9354-Sai Keerthi Bammidi	Quality Assurance	Checklist Review	12-05-2023 15:31:59	Artwork is approved
7882-Santosh Kumar Gouda	Quality Assurance	Checklist Approval	13-05-2023 11:00:16	Artwork is approved. However License yet to be received and Revision Date modified as per RA mail communication dated on 08/05/2023.

Approved