

HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use PREGABALIN EXTENDED-RELEASE TABLETS safely and effectively. See full prescribing information for PREGABALIN EXTENDED-RELEASE TABLETS.

PREGABALIN extended-release tablets, for oral use,

Initial U.S. Approval: 2004

RECENT MAJOR CHANGES

Warnings and Precautions, Respiratory Depression (5.4) 4/2020

INDICATIONS AND USAGE

Pregabalin extended-release tablets are indicated for the management of:
• Neuropathic pain associated with diabetic peripheral neuropathy (DPN) (1)
• Postherpetic neuralgia (PHN) (1)
Efficacy of pregabalin extended-release tablets have not been established for the management of fibromyalgia or as adjunctive therapy for adult patients with partial onset seizures.

DOSAGE AND ADMINISTRATION

Pregabalin extended-release tablets should be administered once daily after an evening meal. It should be swallowed whole and should not be split, crushed, or chewed. (2.1)
• Dosing recommendations for Pregabalin extended-release tablets:

| Indication | Dosing Regimen | Initial Dose | Maximum Dose |
|----------------|---------------------|--------------|---|
| DPN Pain (2.2) | Single dose per day | 165 mg/day | 330 mg/day within 1 week |
| PHN (2.3) | Single dose per day | 165 mg/day | 330 mg/day within 1 week Maximum dose of 660 mg/day. |

• Conversion from Pregabalin Capsules or Oral Solution to Pregabalin Extended-Release Tablets: See full prescribing information. (2.4)
• Dose modification recommended in patients with renal impairment. (2.5)

DOSAGE FORMS AND STRENGTHS

Extended-release tablets: 82.5 mg, 165 mg, and 330 mg. (3)

CONTRAINDICATIONS

Known hypersensitivity to pregabalin or any of its components. (4)

FULL PRESCRIBING INFORMATION: CONTENTS*

1 INDICATIONS AND USAGE

2 DOSAGE AND ADMINISTRATION

- Important Dosage and Administration Instructions
- Neuropathic Pain Associated with Diabetic Peripheral Neuropathy
- Postherpetic Neuralgia
- Conversion from Pregabalin Capsules or Oral Solution to Pregabalin Extended-Release Tablets
- Patients with Renal Impairment

3 DOSAGE FORMS AND STRENGTHS

4 CONTRAINDICATIONS

5 WARNINGS AND PRECAUTIONS

- Angioedema
- Hypersensitivity Reactions
- Suicidal Behavior and Ideation
- Respiratory Depression
- Dizziness and Somnolence
- Risks Associated with Abrupt or Rapid Discontinuation
- Peripheral Edema
- Weight Gain
- Tumorigenic Potential
- Ophthalmological Effects
- Creatine Kinase Elevations
- Decreased Platelet Count
- PR Interval Prolongation

6 ADVERSE REACTIONS

- Clinical Trials Experience
- Postmarketing Experience with Pregabalin Capsules or Oral Solution

FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

Pregabalin extended-release tablets are indicated for the management of:
• Neuropathic pain associated with diabetic peripheral neuropathy
• Postherpetic neuralgia
Efficacy of pregabalin extended-release tablets have not been established for the management of fibromyalgia or as adjunctive therapy for adult patients with partial onset seizures.

2 DOSAGE AND ADMINISTRATION

2.1 Important Dosage and Administration Instructions
Pregabalin extended-release tablets should be administered once daily after an evening meal.
Pregabalin extended-release tablets should be swallowed whole and should not be split, crushed, or chewed.

When discontinuing pregabalin extended-release tablets, taper gradually over a minimum of 1 week.
Instruct patients that if they miss taking their dose of pregabalin extended-release tablets after an evening meal, then they should take their usual dose of pregabalin extended-release tablets prior to bedtime following a snack. If they miss taking their dose of pregabalin extended-release tablets prior to bedtime, then they should take their usual dose of pregabalin extended-release tablets following a morning meal. If they miss taking their dose of pregabalin extended-release tablets following the morning meal, then they should take their usual dose of pregabalin extended-release tablets at the usual time that evening following an evening meal [see Patient Counseling Information (7)].

2.2 Neuropathic Pain Associated with Diabetic Peripheral Neuropathy
Begin dosing at 165 mg once daily and increase to 330 mg once daily within 1 week based on individual patient response and tolerability. The maximum recommended dose of pregabalin extended-release tablets is 330 mg once daily. Although pregabalin was studied at 600 mg/day, there was no evidence that this dose conferred additional significant benefit and this dose was less well tolerated. In view of the dose-dependent adverse reactions with pregabalin, treatment with doses above 330 mg/day is not recommended for pregabalin extended-release tablets.

2.3 Postherpetic Neuralgia
Begin dosing at 165 mg once daily and increase to 330 mg once daily within 1 week based on individual patient response and tolerability. Patients who do not experience sufficient pain relief following 2 to 4 weeks of treatment with 330 mg once daily and who are able to tolerate pregabalin extended-release tablets, may be treated with up to 660 mg once daily. In view of the dose-dependent adverse reactions and the higher rate of treatment discontinuation due to adverse reactions, dosing above 330 mg/day should be reserved only for those patients who have on-going pain and are tolerating 330 mg/day. The maximum recommended dose of pregabalin extended-release tablets are 660 mg once daily.

2.4 Conversion from Pregabalin Capsules or Oral Solution to Pregabalin Extended-Release Tablets
When switching from Pregabalin Capsules or Oral Solution to Pregabalin Extended-Release Tablets on the day of the switch, instruct patients to take their morning dose of pregabalin Capsules or Oral Solution as prescribed and initiate pregabalin extended-release tablets therapy after an evening meal.

Table 1. Conversion from Pregabalin Capsules or Oral Solution to Pregabalin Extended-Release Tablets

| Pregabalin Capsules or Oral Solution Total Daily Dose (dosed 2 or 3 times daily) | Pregabalin extended-release tablets Dose (dosed once a day) |
|--|---|
| 75 mg/daily | 82.5 mg/day |
| 150 mg/daily | 165 mg/day |
| 225 mg/daily | 247.5 mg/day ^a |
| 300 mg/daily | 330 mg/day |
| 450 mg/daily | 495 mg/day ^b |
| 600 mg/daily | 660 mg/day ^c |

a. 247.5 mg = 3 times 82.5 mg tablets taken once a day.
b. 495 mg = 3 times 165 mg tablets taken once a day.
c. 660 mg = 2 times 330 mg tablets taken once a day.

2.5 Patients with Renal Impairment
Use of pregabalin extended-release tablets are not recommended for patients with creatinine clearance (CL_{cr}) less than 30 mL/min or who are undergoing hemodialysis. Those patients should receive pregabalin Capsules or Oral Solution. In view of dose-dependent adverse reactions and because pregabalin is eliminated primarily by renal excretion, adjust the dose in patients with reduced renal function. Base the dose adjustment in patients with renal impairment on CL_{cr}, as indicated in Table 2. To use the dosing tables, an estimate of the patient's CL_{cr} in mL/min is needed. CL_{cr} in mL/min may be estimated from serum creatinine (mg/dL) determination using the Cockcroft and Gault equation:

$$CL_{cr} = \frac{[140 - \text{age (years)}] \times \text{weight (kg)}}{72 \times \text{serum creatinine (mg/dL)}} \quad (\times 0.85 \text{ for female patients})$$

Next, refer to the Dosage and Administration section to determine the recommended total daily dose based on indication, for a patient with normal renal function (CL_{cr} greater than or equal to 60 mL/min). Then refer to Table 2 to determine the corresponding renal adjusted dose.

(For example: A patient initiating pregabalin extended-release tablets therapy for postherpetic neuralgia with normal renal function (CL_{cr} greater than or equal to 60 mL/min), receives a single daily dose of 165 mg pregabalin tablet. Therefore, a renal impaired patient with a CL_{cr} of 50 mL/min would receive a single daily dose of 82.5 mg.)

Table 2. Pregabalin extended-release tablets Dosage Adjustment Based on Renal Function

| Creatinine Clearance (CL _{cr}) (mL/min) | Total pregabalin extended-release tablets Daily Dose (mg/day) | Dose Regimen |
|---|---|--------------|
| greater than or equal to 60 | 165 330 495 ^a 660 ^b | Once a day |
| 30 to 60 | 82.5 165 247.5 ^c 330 | Once a day |
| less than 30 ^d or hemodialysis | Dose with pregabalin Capsules or Oral Solution | |

495 mg = 3 times 165 mg tablets taken once a day.
660 mg = 2 times 330 mg tablets taken once a day.
247.5 mg = 3 times 82.5 mg tablets taken once a day.

WARNINGS AND PRECAUTIONS

Angioedema: Angioedema (e.g., swelling of the face, mouth (tongue, lips, and gums) and neck (throat and larynx)) can occur and may be associated with life-threatening respiratory compromise requiring emergency treatment. Discontinue pregabalin immediately in patients with these symptoms. (5.1)

Hypersensitivity reactions: Hypersensitivity reactions (e.g., hives, dyspnea, and wheezing) can occur. Discontinue pregabalin immediately in these patients. (5.2)

Suicidal Behavior and Ideation: Antiepileptic drugs, including pregabalin, the active ingredient in pregabalin extended-release tablets, increase the risk of suicidal thoughts or behavior. (5.3)

Respiratory Depression: May occur with pregabalin extended-release tablets when used with concomitant CNS depressants or in the setting of underlying respiratory impairment. Monitor patients and adjust dosage as appropriate. (5.4)

Dizziness and Somnolence: May cause dizziness and somnolence and impair patients' ability to drive or operate machinery. (5.5)
Increased seizure frequency may occur in patients with seizure disorders if pregabalin is rapidly discontinued. Withdraw pregabalin gradually over a minimum of 1 week. (5.6)

Peripheral Edema: May cause peripheral edema. Monitor patients for the development of edema when co-administering pregabalin and thiazolidinedione anti-diabetic agents. (5.7)

ADVERSE REACTIONS
Most common adverse reactions reported in greater than or equal to 4% of patients treated with pregabalin extended-release tablets are dizziness, somnolence, headache, fatigue, peripheral edema, nausea, blurred vision, dry mouth, and weight gain. (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Sun Pharmaceutical Industries, Inc. at 1-800-466-5555 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

USE IN SPECIFIC POPULATIONS
• Pregnancy: May cause fetal harm. Advise of potential risk to the fetus. (8.1)
• Lactation: Breastfeeding is not recommended. (8.2)

See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.
Revised: 07/2020

7 DRUG INTERACTIONS

8 USE IN SPECIFIC POPULATIONS

- Pregnancy
- Lactation
- Females and Males of Reproductive Potential
- Pediatric Use
- Geriatric Use

9 DRUG ABUSE AND DEPENDENCE

- Controlled Substance
- Abuse
- Dependence

10 OVERDOSAGE

11 DESCRIPTION

12 CLINICAL PHARMACOLOGY

- Mechanism of Action
- Pharmacokinetics

13 NONCLINICAL TOXICOLOGY

- Carcinogenesis, Mutagenesis, Impairment of Fertility
- Animal Toxicology and/or Pharmacology

14 CLINICAL STUDIES

- Management of Postherpetic Neuralgia (Study PHN CR)
- Management of Fibromyalgia (Study FM CR)
- Adjunctive Therapy for Adult Patients with Partial Onset Seizures

16 HOW SUPPLIED/STORAGE AND HANDLING

17 PATIENT COUNSELING INFORMATION

*Sections or subsections omitted from the full prescribing information are not listed.

3 DOSAGE FORMS AND STRENGTHS

Extended-release tablets: 82.5 mg, 165 mg, and 330 mg [see Description (1) and How Supplied/Storage and Handling (16)].

| Pregabalin extended-release tablets | |
|-------------------------------------|---|
| Tablet Strength (mg) | Tablet Description |
| 82.5 mg | White to off white, round, shaped coated tablet, debossed with RK42 on one side and plain on the other side. |
| 165 mg | Pink to dark pink, round-shaped coated tablet, debossed with RK43 on one side and plain on the other side. |
| 330 mg | Pink to dark pink, caplet-shaped coated tablet, debossed with RK44 on one side and plain on the other side. |

4 CONTRAINDICATIONS

Pregabalin extended-release tablets are contraindicated in patients with known hypersensitivity to pregabalin or any of its components. Angioedema and hypersensitivity reactions have occurred in patients receiving pregabalin therapy [see Warnings and Precautions (5.1, 5.2), Adverse Reactions (6)].

5 WARNINGS AND PRECAUTIONS

5.1 Angioedema
There have been postmarketing reports of angioedema in patients during initial and chronic treatment with pregabalin Capsules or Oral solution. Specific symptoms included swelling of the face, mouth (tongue, lips, and gums), and neck (throat and larynx). There were reports of life-threatening angioedema with respiratory compromise requiring emergency treatment. Discontinue pregabalin immediately in patients with these symptoms.

Exercise caution when prescribing pregabalin to patients who have had a previous episode of angioedema. In addition, patients who are taking other drugs associated with angioedema (e.g., angiotensin converting enzyme inhibitors [ACE-inhibitors]) may be at increased risk of developing angioedema.

5.2 Hypersensitivity Reactions
There have been postmarketing reports of hypersensitivity reactions in patients shortly after initiation of treatment with pregabalin Capsules or Oral Solution. Adverse reactions included skin rashes, blisters, hives, rash, dyspnea, and wheezing. Discontinue pregabalin immediately in patients with these symptoms.

5.3 Suicidal Behavior and Ideation
Antiepileptic drugs (AEDs), including pregabalin, the active ingredient in pregabalin extended-release tablets, increase the risk of suicidal thoughts or behavior in patients taking these drugs for any indication. Monitor patients treated with any AED for any indication 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 1.6, 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 behavior or ideation among 27,865 AED-treated patients 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 finding of increased risk with AEDs of varying mechanisms of action 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 3 shows absolute and relative risk by indication for all evaluated AEDs.

Table 3. Risk by Indication for Antiepileptic Drugs in the Pooled Analysis

| Indication | Placebo Patients With Events per 1000 Patients | Drug Patients With Events per 1000 Patients | Relative Risk: Incidence of Events in Drug Patients/Incidence in Placebo Patients | Risk Difference: Additional Drug Patients With Events per 1000 Patients |
|-------------|--|---|---|---|
| Epilepsy | 1.0 | 3.4 | 3.5 | 2.4 |
| Psychiatric | 5.7 | 8.5 | 1.5 | 2.9 |
| Other | 1.0 | 1.8 | 1.9 | 0.9 |
| Total | 2.4 | 4.3 | 1.8 | 1.9 |

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 pregabalin must balance the risk of suicidal thoughts or behavior with the risk of untreated illness. 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.

Inform patients, their caregivers, and families that pregabalin can increase the risk of suicidal thoughts and behavior and advise them of the need to be 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, behavior, or thoughts about self-harm. Report behaviors of concern immediately to healthcare providers.

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

There is more limited evidence from case reports, animal studies, and human studies associating pregabalin with serious respiratory depression, without co-administered CNS depressants or without underlying respiratory impairment.

5.5 Dizziness and Somnolence

Pregabalin may cause dizziness and somnolence. Inform patients that pregabalin-related dizziness and somnolence may impair their ability to perform tasks such as driving or operating machinery. Concomitant use of pregabalin with other central nervous system (CNS) depressants may exacerbate these effects [see Drug Interactions (7)].

In the pregabalin extended-release tablets controlled trials for pain indications, dizziness was experienced by 24% of pregabalin extended-release tablets-treated patients during the single-blind phase; somnolence was experienced by 15.8% of pregabalin extended-release tablets-treated patients. Dizziness and somnolence generally began shortly after the initiation of pregabalin extended-release tablets therapy and occurred more frequently at higher doses. Dizziness and somnolence were the adverse reactions most frequently leading to withdrawal (2.4%, 1.2% each) during the single-blind phase of the controlled studies. In Pregabalin Capsules or Oral Solution-treated patients reporting these adverse reactions in short-term, controlled studies, dizziness persisted until the last dose in 30% and somnolence persisted until the last dose in 42% of patients.

5.6 Risks Associated with Abrupt or Rapid Discontinuation
Following abrupt or rapid discontinuation of pregabalin, some patients reported symptoms including, insomnia, nausea, headache, anxiety, and diarrhea. Increased seizure frequency may occur in patients with seizure disorders taking pregabalin for pain if pregabalin extended-release tablets are rapidly discontinued. Taper pregabalin extended-release tablets gradually over a minimum of 1 week rather than discontinuing the drug abruptly. The efficacy of pregabalin as adjunctive therapy for adult patients with partial onset seizures has not been established.

5.7 Peripheral Edema
Pregabalin treatment may cause peripheral edema. In short-term trials of patients without clinically significant heart or peripheral vascular disease, there was no apparent association between peripheral edema and cardiovascular complications such as hypertension or congestive heart failure. Peripheral edema was not associated with laboratory changes suggestive of deterioration in renal or hepatic function.

In controlled clinical trials for pain indications, the incidence of peripheral edema for patients receiving pregabalin in the single-blind phase was 5.3% of patients. In controlled clinical trials for pain indications, 0.8% of pregabalin patients withdrew due to peripheral edema during the single-blind phase.

Higher frequencies of weight gain and peripheral edema were observed in patients taking both pregabalin and a thiazolidinedione anti-diabetic agent compared to patients taking pregabalin alone. The majority of patients taking thiazolidinedione anti-diabetic agents in the overall safety database were participants in studies of pain associated with diabetic peripheral neuropathy. In this population, peripheral edema was reported in 3% (2/60) of patients who were using thiazolidinedione anti-diabetic agents only, 8% (69/859) of patients who were treated with pregabalin only, and 19% (23/120) of patients who were on both pregabalin and thiazolidinedione anti-diabetic agents. Similarly, weight gain was reported in 0% (0/60) of patients on thiazolidinedione only, 4% (35/859) of patients on pregabalin only, and 7.5% (9/120) of patients on both drugs.

As the thiazolidinedione class of anti-diabetic drugs can cause weight gain and/or fluid retention, possibly exacerbating or leading to heart failure, monitor patients for the development of edema when co-administering pregabalin and these agents. Because there are limited data on congestive heart failure patients with New York Heart Association (NYHA) Class III or IV cardiac status, monitor these patients for possible exacerbation of congestive heart failure symptoms when using pregabalin.

5.8 Weight Gain
Pregabalin treatment may cause weight gain. In pregabalin controlled trials for pain indications, weight gain was experienced by 4% of pregabalin-treated patients during the single-blind phase. Adverse events of weight gain were observed in 3.7% of pregabalin-treated patients and 1% of placebo-treated patients during the double-blind phase.

In pregabalin controlled clinical trials of up to 14 weeks a gain of 7% or more over baseline weight was observed in 9% of pregabalin-treated patients and 2% of placebo-treated patients. Few patients treated with pregabalin (0.3%) withdrew from controlled trials due to weight gain. In studies with pregabalin, associated weight gain was related to pregabalin dose and duration of exposure, but did not appear to be associated with baseline BMI, gender, or age. Weight gain was not limited to patients with edema [see Warnings and Precautions (5.7)].

Although weight gain was not associated with clinically important changes in blood pressure in short-term controlled studies with pregabalin, the long-term cardiovascular effects of pregabalin-associated weight gain are unknown. Among diabetic patients, pregabalin-treated patients gained an average of 1.6 kg (range -16 to 16 kg), compared to an average 0.3 kg (range -10 to 9 kg) weight gain in placebo patients. In a cohort of 333 diabetic patients who received pregabalin for at least 2 years, the average weight gain was 5.2 kg.

While the effects of pregabalin-associated weight gain on glycemic control have not been systematically assessed, in controlled and long-term open-label clinical trials with diabetic patients, pregabalin treatment did not appear to be associated with loss of glycemic control (as measured by HbA1c).

5.9 Tumorigenic Potential

In standard preclinical *in vivo* lifetime carcinogenicity studies of pregabalin, an unexpectedly high incidence of hemangiosarcoma was identified in 2 different strains of mice [see Nonclinical Toxicology (13.1)]. The clinical significance of this finding is unknown. Limited preclinical experience during premarketing development of pregabalin provides no direct means to assess its potential for inducing tumors in humans.

In clinical studies across various patient populations, comprising 6396 patient-years of exposure in patients greater than 12 years of age, new or worsening/pre-existing tumors were reported in 57 patients. Without knowledge of the background incidence and recurrence in similar populations not treated with pregabalin, it is unclear as to know whether the incidence seen in these cohorts is or is not affected by treatment.

5.10 Ophthalmological Effects
In controlled studies for pain indications, 4.8% of patients treated with pregabalin extended-release tablets in the single-blind phase reported blurred vision, which resolved in a majority of cases with continued dosing. Less than 1% of patients discontinued pregabalin extended-release tablets treatment due to vision-related events (primarily blurred vision). Additionally, 0.7% of pregabalin extended-release tablets-treated patients as compared to placebo-treated patients reported blurred vision during the double-blind phase.

Prospectively planned ophthalmologic testing during the premarketing development of pregabalin, including visual acuity testing, formal visual field testing and dilated funduscopic examination, was performed in over 3600 patients. In these patients, visual acuity was reduced in 7% of pregabalin Capsules or Oral Solution-treated patients and 5% of placebo-treated patients. Visual field changes were detected in 13% of pregabalin Capsules or Oral Solution-treated and 12% of placebo-treated patients. Funduscopic changes were observed in 2% of pregabalin Capsules or Oral Solution-treated and 2% of placebo-treated patients.

Although the clinical significance of the ophthalmologic findings is unknown, inform patients to notify their physician if changes in vision occur. If visual disturbance persists, consider further assessment. Consider more frequent assessment for patients who are already routinely monitored for ocular conditions.

5.11 Creatine Kinase Elevations

Pregabalin treatment was associated with creatine kinase elevations. Mean changes in creatine kinase from baseline to the maximum value were 60 U/L for pregabalin Capsules or Oral Solution-treated patients and 28 U/L for the placebo patients. In all controlled trials across multiple patient populations, 1.5% of patients on pregabalin Capsules or Oral Solution and 0.7% of placebo-treated patients had a value of creatine kinase at least 3 times the upper limit of normal. Three pregabalin Capsules or Oral Solution-treated subjects had events reported as rhabdomyolysis in premarketing clinical trials. The relationship between these myopathy events and pregabalin is not completely understood because the cases had documented factors that may have caused or contributed to these events. Instruct patients to promptly report unexplained muscle pain, tenderness, or weakness, particularly if these muscle symptoms are accompanied by malaise or fever.

Discontinue treatment with pregabalin if myopathy is diagnosed or suspected or if markedly elevated creatine kinase levels occur.

5.12 Decreased Platelet Count

Pregabalin treatment was associated with a decrease in platelet count. In the double-blind phase of controlled studies for pain indication, pregabalin extended-release tablets-treated patients experienced a median change from baseline in platelet count of 11 × 10⁹/mm³ (for the PHN population) and 14 × 10⁹/mm³ (for the FM population) as compared to 1 × 10⁹/mm³ in placebo-treated patients (for both populations). Pregabalin Capsules or Oral Solution-treated patients experienced a mean maximal decrease in platelet count of 20 × 10⁹/L, compared to 11 × 10⁹/L in placebo patients. In the overall database of controlled trials, 2% of placebo patients and 3% of pregabalin Capsules or Oral Solution-treated patients experienced a potentially clinically significant decrease in platelets, defined as 20% below baseline value and less than 150 × 10⁹/L. A single pregabalin Capsules or Oral Solution-treated patient experienced thrombocytopenia with a platelet count less than 20 × 10⁹/L. In randomized controlled trials, pregabalin was not associated with an increase in bleeding-related adverse reactions.

5.13 PR Interval Prolongation

Pregabalin Capsules or Oral Solution treatment was associated with PR interval prolongation. In analyses of clinical trial ECG data, the mean PR interval increase was 3 to 6 msec; at pregabalin doses greater than or equal to 300 mg/day. This mean change difference was not associated with an increased risk of PR increase greater than or equal to 25% from baseline, an increased percentage of subjects with on-treatment PR greater than 200 msec, or an increased risk of adverse reactions of second or third degree AV block.

Subgroup analyses did not identify an increased risk of PR prolongation in patients with baseline PR prolongation or in patients taking other PR prolonging medications. However, these analyses cannot be considered definitive because of the limited number of patients in these categories.

6 ADVERSE REACTIONS

The following adverse reactions are described elsewhere in the labeling:
• Angioedema [see Warnings and Precautions (5.1)]
• Hypersensitivity Reactions [see Warnings and Precautions (5.2)]
• Suicidal Behavior and Ideation [see Warnings and Precautions (5.3)]
• Respiratory Depression [see Warnings and Precautions (5.4)]
• Dizziness and Somnolence [see Warnings and Precautions (5.5)]
• Risks Associated with Abrupt or Rapid Discontinuation [see Warnings and Precautions (5.6)]
• Peripheral Edema [see Warnings and Precautions (5.7)]
• Weight Gain [see Warnings and Precautions (5.8)]
• Ophthalmological Effects [see Warnings and Precautions (5.10)]
• Creatine Kinase Elevations [see Warnings and Precautions (5.11)]
• Decreased Platelet Count [see Warnings and Precautions (5.12)]

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. Two randomized placebo-controlled clinical trials were conducted in patients with postherpetic neuralgia and fibromyalgia in which a total of 1242 patients received pregabalin extended-release tablets. Both studies were randomized, double-blind, placebo-controlled, parallel, dose optimization trials and followed by a 13-week double-blind phase. The most common adverse events leading to discontinuation from the single-blind phase of the study occurring in greater than or equal to 0.3% of patients were dizziness, somnolence,

peripheral edema, fatigue, blurred vision, and increased weight. Sixty four percent of patients experienced adverse events during the single-blind phase, with the most common adverse adverse events occurring in greater than or equal to 4% of patients being dizziness, somnolence, headache, fatigue, peripheral edema, nausea, blurred vision, dry mouth, and weight gain.

Controlled Study in Postherpetic Neuralgia
Adverse Reactions Leading to Discontinuation
In a clinical trial in patients with postherpetic neural

Breastfeeding is not recommended while taking pregabalin extended-release tablets.

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins or herbal supplements. Pregabalin extended-release tablets and other medicines may affect each other causing side effects. Especially tell your healthcare provider if you take:

- angiotensin converting enzyme (ACE) inhibitors, which are used to treat many conditions, including high blood pressure. You may have a higher chance for swelling and hives if these medicines are taken with pregabalin extended-release tablets. See "What is the most important information I should know about pregabalin extended-release tablets?"
- Avandia (rosiglitazone), Avandamet (contains rosiglitazone and metformin), or Actos (pioglitazone) for diabetes. You may have a higher chance of weight gain or swelling of your hands or feet if these medicines are taken with pregabalin extended-release tablets. See "What are the possible side effects of pregabalin extended-release tablets."
- any opioid pain medicine (such as oxycodone), or medicines for anxiety (such as lorazepam) or insomnia (such as zolpidem). You may have a higher chance for dizziness, sleepiness or serious breathing problems if these medicines are taken with pregabalin extended-release tablets.
- any medicines that make you sleepy

Know the medicines you take. Keep a list of them with you to show your healthcare provider and pharmacist each time you get a new medicine. Do not start a new medicine without talking with your healthcare provider.

How should I take pregabalin extended-release tablets?

- Take pregabalin extended-release tablets exactly as prescribed. Your healthcare provider will tell you how much pregabalin extended-release tablets to take and when to take it.
- Take pregabalin extended-release tablets at the same time each day.
- Pregabalin extended-release tablets must be taken after your evening meal. Swallow the tablet whole and do not split, crush or chew the tablet.
- Your healthcare provider may change your dose. Do not change your dose without talking to your healthcare provider.

- Do not stop taking pregabalin extended-release tablets without talking to your healthcare provider. If you stop taking pregabalin extended-release tablets suddenly you may have headaches, nausea, diarrhea, trouble sleeping, or you may feel anxious. If you have epilepsy, are taking pregabalin extended-release tablets for pain, and stop taking pregabalin extended-release tablets suddenly, you may have seizures more often. Talk with your healthcare provider about how to stop pregabalin extended-release tablets slowly.
- If you miss a dose after your evening meal, take it prior to bedtime following a snack. If you miss the dose prior to bedtime, then take it following your morning meal. If you do not take the dose the following morning, then take the next dose at your regular time after your evening meal. Do not take 2 doses at the same time.
- If you take too much pregabalin extended-release tablets, call your healthcare provider or poison control center, or go to the nearest emergency room right away.

- **What should I avoid while taking pregabalin extended-release tablets?**
- **Do not drive a car, work with machines, or do other dangerous activities until you know how pregabalin extended-release tablets affect you.**
- **Do not drink alcohol while taking pregabalin extended-release tablets.** Pregabalin extended-release tablets and alcohol can affect each other and increase side effects such as sleepiness and dizziness.

What are the possible side effects of pregabalin extended-release tablets? Pregabalin extended-release tablets may cause serious side effects, including:

- **muscle problems, muscle pain, soreness, or weakness.** If you have these symptoms, especially if you feel sick and have a fever, tell your healthcare provider right away.
- **problems with your eyesight, including blurry vision.** Call your healthcare provider if you have any changes in your eyesight.
- **weight gain.** If you have diabetes, weight gain may affect the management of your diabetes. Weight gain can also be a serious problem for people with heart problems.
- **Feeling "high"**

- The most common side effects of pregabalin extended-release tablets are:**
- dizziness
 - blurry vision
 - weight gain
 - sleepiness
 - fatigue (tiredness)
 - swelling of hands and feet
 - dry mouth
 - nausea

What are the ingredients in pregabalin extended-release tablets?

Active ingredient: pregabalin

Inactive ingredients: carbomer homopolymer, crospovidone, FD&C blue no. 2, FD & C red no. 40, FD&C yellow no. 6, hypromellose, magnesium stearate, methacrylic acid copolymer type C, polyethylene glycol, polyvinyl alcohol (part hydrolysed), sodium bicarbonate and talc.

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- **muscle problems, muscle pain, soreness, or weakness.** If you have these symptoms, especially if you feel sick and have a fever, tell your healthcare provider right away.
- **problems with your eyesight, including blurry vision.** Call your healthcare provider if you have any changes in your eyesight.
- **weight gain.** If you have diabetes, weight gain may affect the management of your diabetes. Weight gain can also be a serious problem for people with heart problems.
- **Feeling "high"**

The most common side effects of pregabalin extended-release tablets are:

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done by patients themselves. Information on the registry can also be found at the website <http://www.aedpregnancyregistry.org/>.

Risk Summary

There are no adequate and well-controlled studies with pregabalin in pregnant women.

However, in animal reproduction studies, increased incidences of fetal structural abnormalities and other manifestations of developmental toxicity, including skeletal malformations, retarded ossification, and decreased fetal body weight were observed in the offspring of rats and rabbits given pregabalin orally during organogenesis, at doses that produced plasma pregabalin exposures (AUC) greater than or equal to 18 times human exposure at the maximum recommended dose (MRD) of 660 mg/day [see Data]. In an animal development study, lethality, growth retardation, and nervous and reproductive system functional impairment were observed in the offspring of rats given pregabalin during gestation and lactation. The no-effect dose for developmental toxicity was approximately twice the human exposure at MRD. The background risk of major birth defects and miscarriage is 15 to 20% of clinically recognized pregnancies. Advise pregnant women of the potential risk to a fetus.

Data

Animal Data

When pregnant rats were given pregabalin (500, 1250, or 2500 mg/kg) orally throughout the period of organogenesis, incidences of specific skull alterations attributed to abnormally advanced ossification (premature fusion of the jugal and nasal sutures) were increased at greater than or equal to 1250 mg/kg, and incidences of skeletal variations and retarded ossification were increased at all doses. Fetal body weights were decreased at the highest dose. The low dose in this study was associated with a plasma exposure (AUC) approximately 18 times human exposure at the MRD of 660 mg/day. A no-effect dose for rat embryofetal developmental toxicity was not established.

When pregnant rabbits were given pregabalin (250, 500, or 1250 mg/kg) orally throughout the period of organogenesis, decreased fetal body weight and increased incidences of skeletal malformations, visceral variations, and retarded ossification were observed at the highest dose. The no-effect dose for developmental toxicity in rabbits (500 mg/kg) was associated with a plasma exposure approximately 17 times human exposure at the MRD.

In a study in which female rats were dosed with pregabalin (50, 100, 250, 1250, or 2500 mg/kg) throughout gestation and lactation, offspring growth was reduced at greater than or equal to 100 mg/kg and offspring survival was decreased at greater than or equal to 250 mg/kg. The effect on offspring survival was pronounced at doses greater than or equal to 1250 mg/kg, with 100% mortality in high-dose litters. When offspring were tested as adults, neurobehavioral abnormalities (decreased auditory startle responding) were observed at greater than or equal to 250 mg/kg and reproductive impairment (decreased fertility and litter size) was seen at 1250 mg/kg. The no-effect dose for pre- and postnatal developmental toxicity in rats (50 mg/kg) produced a plasma exposure approximately 2 times human exposure at the MRD.

In the prenatal-postnatal study in rats, pregabalin prolonged gestation and induced dystocia at exposures greater than or equal to 50 times the mean human exposure (AUC 0 to 24) of 123 mcg·hr/mL) at the MRD.

8.2 Lactation

Risk Summary

Small amounts of pregabalin have been detected in the milk of lactating women. A pharmacokinetic study in lactating women detected pregabalin in breast milk at average steady state concentrations approximately 76% of those in maternal plasma. The estimated average daily infant dose of pregabalin from breast milk (assuming mean milk consumption of 150 mL/kg/day) was 0.31 mg/kg/day, which on a mg/kg basis would be approximately 7% of the maternal dose [see Data]. The study did not evaluate the effects of pregabalin on milk production or the effects of pregabalin on the breastfed infant.

Based on animal studies, there is a potential risk of tumorigenicity with pregabalin exposure via breast milk to the breastfed infant [see *Nonclinical Toxicology* (13.1)]. Available clinical study data in patients greater than 12 years of age do not provide a clear conclusion about the potential risk of tumorigenicity with pregabalin [see *Warnings and Precautions* (5.9)]. Because of the potential risk of tumorigenicity, breastfeeding is not recommended during treatment with pregabalin.

Data

A pharmacokinetic study in ten lactating women, who were at least 12 weeks postpartum, evaluated the concentrations of pregabalin in plasma and breast milk. Pregabalin 150 mg oral capsule was given every 12 hours (300 mg/day dose) for a total of 4 doses. Pregabalin was detected in breast milk at average steady-state concentrations approximately 76% of those in maternal plasma. The estimated average daily infant dose of pregabalin from breast milk (assuming mean milk consumption of 150 mL/kg/day) was 0.31 mg/kg/day, which on a mg/kg basis would be approximately 7% of the maternal dose. The study did not evaluate the effects of pregabalin on milk production. Infant and toddler breast milk obtained during the dosing period, therefore, the effects of pregabalin on the breastfed infant were not evaluated.

8.3 Females and Males of Reproductive Potential

Infertility

Males

Effects on Spermatogenesis

In a randomized, double-blind, placebo-controlled non-inferiority study to assess the effect of pregabalin on sperm characteristics, healthy male subjects received pregabalin at a daily dose up to 600 mg (N=111) or placebo (N = 109) for 13 weeks (1 complete sperm cycle) followed by a 13 week washout period (off-drug). A total of 65 subjects in the pregabalin group (59%) and 62 subjects in the placebo group (57%) were included in the per protocol (PP) population. These subjects took study drug for at least 8 weeks, had appropriate timing of semen collections and did not have any significant protocol violations. Among these subjects, approximately 9% of the pregabalin group (6/65) vs. 3% in the placebo group (2/62) had greater than or equal to 50% reduction in mean sperm concentrations from baseline at Week 26 (the primary endpoint). The difference between pregabalin and placebo was within the pre-specified non-inferiority margin of 20%. There were no adverse effects of pregabalin on sperm morphology, sperm motility, serum FSH or serum testosterone levels as compared to placebo. In subjects in the PP population with greater than or equal to 50% reduction in sperm concentration from baseline, sperm concentrations were no longer reduced by greater than or equal to 50% in any affected subject after an additional 3 months off-drug. In 1 subject, however, subsequent semen analyses demonstrated reductions from baseline of greater than or equal to 50% at 9 and 12 months off-drug. The clinical relevance of these data is unknown.

In the animal fertility study with pregabalin in male rats, adverse reproductive and developmental effects were observed [see *Nonclinical Toxicology* (13.1)].

8.4 Pediatric Use

The safety and effectiveness of pregabalin in pediatric patients have not been established.

Juvenile Animal Toxicity Data

In studies in which pregabalin (50 to 500 mg/kg) was orally administered to young rats from early in the postnatal period (Postnatal Day 7) through sexual maturity, neurobehavioral abnormalities (deficits in learning and memory, altered locomotor activity, decreased auditory startle responding and habituation) and reproductive impairment (delayed sexual maturation and decreased fertility in males and females) were observed at doses greater than or equal to 50 mg/kg. The neurobehavioral changes of acoustic startle persisted at greater than or equal to 250 mg/kg and locomotor activity and water maze performance at greater than or equal to 500 mg/kg in animals tested after cessation of dosing and, thus, were considered to represent long-term effects. The low effect dose for developmental neurotoxicity and reproductive impairment in juvenile rats (50 mg/kg) was associated with a plasma pregabalin exposure (AUC) approximately equal to human exposure at the maximum recommended dose of 660 mg/day. A no-effect dose was not established.

8.5 Geriatric Use

In controlled clinical studies of pregabalin Capsules or Oral Solution in neuroathletic pain associated with diabetic peripheral neuropathy, 246 patients were 65 to 74 years of age, and 73 patients were 75 years of age or older. In controlled clinical studies of pregabalin Capsules or Oral Solution in neuroathletic pain associated with postherpetic neuralgia, 282 patients were 65 to 74 years of age, and 379 patients were 75 years of age or older.

In the pregabalin extended-release tablets neuroathletic pain associated with postherpetic neuralgia study, 422 patients 65 years of age and older received pregabalin. No overall differences in safety and effectiveness were observed between these patients and younger patients, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

Pregabalin is known to be substantially excreted by the kidney, and the risk of adverse reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and it may be useful to monitor renal function. See *Dosage and Administration* (2.5) for recommendations for dosing in patients with renal impairment.

9 DRUG ABUSE AND DEPENDENCE

9.1 Controlled Substance

Pregabalin extended-release tablets contain pregabalin, a Schedule V controlled substance.

9.2 Abuse

In a study of recreational users (N = 15) of sedative/hypnotic drugs, including alcohol, pregabalin Capsules or Oral Solution (450 mg, single dose) received subjective ratings of "good drug effect," "high" and "liking" to a degree that was similar to diazepam (30 mg, single dose). In controlled clinical studies in over 5500 patients, 4% of pregabalin Capsules or Oral Solution-treated patients and 1% of placebo-treated patients reported euphoric or adverse reactions, though in some patient populations studied, this reporting rate was higher and ranged from 1 to 12%.

Carefully evaluate all patients treated with pregabalin for history of drug abuse and observe them for signs of pregabalin misuse or abuse (e.g., development of tolerance, dose escalation, drug-seeking behavior).

9.3 Dependence

In clinical studies, following abrupt or rapid discontinuation of pregabalin extended-release tablets, some patients reported symptoms including insomnia, nausea, headache, diarrhea, or anxiety [see *Warnings and Precautions* (5.9)], consistent with physical dependence. In the postmarketing experience with pregabalin Capsules or Oral Solution, in addition to these reported symptoms there have also been reported cases of hyperreflexia.

10 OVERDOSSAGE

Signs, Symptoms and Laboratory Findings of Acute Overdose in Humans

In the postmarketing experience, the most commonly reported adverse events observed with pregabalin when taken in overdose include reduced consciousness, depression/anxiety, confusional state, agitation, and restlessness. Seizures and heart block have also been reported. Deaths have been reported in the setting of lone pregabalin overdose and in combination with other CNS depressants.

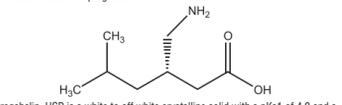
Treatment or Management of Overdose

There is no specific antidote for overdose with pregabalin. If indicated, elimination of unabsorbed drug may be attempted by emesis or gastric lavage. Observe usual precautions to maintain the airway. General supportive care of the patient is indicated including monitoring of vital signs and observation of the clinical status of the patient. Contact a Certified Poison Control Center for up-to-date information on the management of overdose with pregabalin.

Pregabalin can be removed by hemodialysis. Standard hemodialysis procedures result in significant clearance of pregabalin (approximately 50% in 4 hours).

11 DESCRIPTION

Pregabalin extended-release tablets are for oral use and contain pregabalin. Pregabalin is described chemically as (S)-3-(aminomethyl)-5-methylhexanoic acid. The molecular formula is C₁₁H₁₉NO₂ and the molecular weight is 159.23. The chemical structure of pregabalin is:



Pregabalin USP is a white to off white crystalline solid with a pKa1 of 4.2 and a pKa2 of 10.6. It is freely soluble in both basic (1N Sodium Hydroxide) and acidic (1N Hydrochloric acid) aqueous solutions. Sparingly soluble in water. The log of the partition coefficient (n-octanol/0.05M phosphate buffer) at pH 7.4 is -1.35. Pregabalin extended-release tablets are administered orally and contain 82.5 mg, 165 mg, or 330 mg of pregabalin, along with carbomer homopolymer, crospovidone, FD&C blue no. 2, FD & C red no. 40, FD&C yellow no. 6, hypromellose, magnesium stearate, methacrylic acid copolymer type C, polyethylene glycol, polyvinyl alcohol (part hydrolysed), sodium bicarbonate and talc as inactive ingredients.

12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

Pregabalin binds with high affinity to the alpha2-delta site (an auxiliary subunit of voltage-gated calcium channels) in central nervous system tissues. Although the mechanism of action of pregabalin has not been fully elucidated, results with genetically modified mice and with compounds structurally related to pregabalin (such as gabapentin) suggest that binding to the alpha2-delta subunit may be involved in pregabalin's anti-nociceptive and antiseizure effects in animals. In animal models of nerve damage, pregabalin has been shown to reduce calcium-mediated release of pro-nociceptive neurotransmitters in the spinal cord, possibly by disrupting alpha2-delta containing-calcium channel trafficking and/or reducing calcium currents. Evidence from other animal models of nerve damage and persistent pain suggest the anti-nociceptive activities of pregabalin may also be mediated through interactions with descending noradrenergic and serotonergic pathways originating from the brainstem that modulate pain transmission in the spinal cord.

While pregabalin is a structural derivative of the inhibitory neurotransmitter gamma-aminobutyric acid (GABA), it does not bind directly to GABA_A, GABA_B, or benzodiazepine receptors, does not augment GABA_A responses in cultured and genetically modified mice and with compounds structurally related to pregabalin (such as gabapentin) or degradation. However, in cultured neurons prolonged application of pregabalin increases the density of GABA transporter protein and increases the rate of functional GABA transport. Pregabalin does not block sodium channels, is not active at opiate receptors, and does not alter cyclooxygenase enzyme activity. It is inactive at serotonin and dopamine receptors and does not inhibit dopamine, serotonin, or noradrenaline reuptake.

12.3 Pharmacokinetics

Pregabalin extended-release tablets have linear pharmacokinetics with dose-proportional increases in maximum plasma concentration (C_{max}) and area under the plasma concentration-time curve (AUC) from 82.5 to 660 mg/day. Following repeated administration, steady state is achieved within approximately 48 to 72 hours.

Pregabalin extended-release tablets administered once daily following an evening meal has equivalent AUC and lower C_{max} relative to a comparative dose of pregabalin Capsules or Oral Solution administered without food twice daily (Table 5). Variability in C_{max} and AUC for pregabalin extended-release tablets are less than or equal to 25%.

Table 5. Steady-State Pharmacokinetics for Pregabalin Extended-Release Tablets 165 mg Once Daily and Pregabalin Capsules or Oral Solution 75 mg Twice Daily

| | Pregabalin extended-release tablets Once Daily | Pregabalin Capsules or Oral Solution BID |
|--------------------------------|--|--|
| N | 24 | 24 |
| C _{max} (mcg/mL) | 2.0 (17) | 3.2 (21) |
| T _{max} (h) | 8.0 (5.0 to 12.0) | 0.7 (0.7 to 1.5) |
| AUC ₀₋₂₄ (mcg·h/mL) | 29.4 (17) | 31.5 (18) |
| C _{min} (mcg/mL) | 0.44 (24) | 0.59 (25) |

Note: Geometric mean (% CV) for AUC₀₋₂₄, C_{max}, C_{min}, median (range) for T_{max}. Abbreviations: AUC₀₋₂₄ = area under the curve over 24 hours; BID = every 12 hours; C_{max} = peak concentration; C_{min} = minimum concentration; N = Number of subjects; T_{max} = time to peak concentrations.

Absorption

Pregabalin is absorbed from the small intestine and proximal colon. Pregabalin extended-release tablets absorption is linear and dose proportional. The bioavailability of pregabalin extended-release tablets are reduced if taken on an empty stomach. The AUC is approximately 30% lower when pregabalin extended-release tablets are administered fasted relative to following an evening meal.

When pregabalin extended-release tablets are administered following a 600 to 750 calorie (50% carbohydrates, 20% protein, 30% fat) evening meal, peak plasma concentrations occur within approximately 8 to 10 hours and AUC is approximately 93% to 97% relative to a comparative dose of pregabalin Capsules or Oral Solution. The rate and extent of pregabalin extended-release tablets absorption is similar when administered following a 400 to 500 calorie, 30% fat or 800 to 1000 calorie, 15%, 30%, or 50% fat evening meal.

When pregabalin extended-release tablets are administered following an 800 to 1000 calorie (50% carbohydrates, 20% protein, 30% fat) morning meal, peak plasma concentrations occur within approximately 12 hours and AUC is 99% relative to a comparative dose of pregabalin Capsules or Oral Solution. AUC decreases approximately 13% to 25% when pregabalin extended-release tablets are administered following a 400 to 500 calorie or 600 to 750 calorie (50% carbohydrates, 20% protein, 30% fat) morning meal relative to the 800 to 1000 calorie meal, while C_{min} remains the same.

Distribution

Pregabalin does not bind to plasma proteins. The apparent volume of distribution of pregabalin following oral administration is approximately 0.5 L/kg. Pregabalin is a substrate for system L transporter which is responsible for the transport of large amino acids across the blood brain barrier. Although there are no data in humans, pregabalin has been shown to cross the blood brain barrier in mice, rats, and monkeys. In addition, pregabalin has been shown to cross the placenta intact and is present in the milk of lactating rats.

Elimination

Metabolism

Pregabalin undergoes negligible metabolism in humans. Following a dose of radiolabeled pregabalin, approximately 90% of the administered dose was recovered in the urine as unchanged pregabalin. The N-methylated derivative of pregabalin, the major metabolite of pregabalin found in urine, accounted for 0.9% of the dose. In preclinical studies, pregabalin (S-enantiomer) did not undergo racemization to the R-enantiomer in mice, rats, rabbits, or monkeys.

Excretion

Pregabalin is eliminated from the systemic circulation primarily by renal excretion as unchanged drug with a mean elimination half-life of 6.3 hours in subjects with normal renal function. Mean renal clearance was estimated to be 67.0 to 80.9 mL/min in young healthy subjects. Because pregabalin is not bound to plasma proteins this clearance rate indicates that renal tubular reabsorption is involved. Pregabalin elimination is nearly proportional to Cl_{cr} [see *Dosage and Administration* (2.5)].

Specific Populations

Age: Geriatric Patients

Pregabalin oral clearance tended to decrease with increasing age. This decrease in pregabalin oral clearance is consistent with age-related decreases in Cl_{cr}. Reduction of pregabalin dose may be required in patients who have age-related compromised renal function [see *Dosage and Administration* (2.5)].

Sex

Population pharmacokinetic analyses of the clinical studies showed that the relationship between daily dose and pregabalin drug exposure is similar between genders.

Race/Ethnicity

In population pharmacokinetic analyses of the clinical studies of pregabalin, the pharmacokinetics of pregabalin were not significantly affected by race (Caucasians, Blacks, and Hispanics).

Renal Impairment

Pregabalin clearance is nearly proportional to Cl_{cr}. Dosage reduction in patients with reduced renal function is necessary. Pregabalin is effectively removed from plasma by hemodialysis. Following a 4 hour hemodialysis treatment, plasma pregabalin concentrations are reduced by approximately 50%. For patients on hemodialysis, treatment with pregabalin extended-release tablets are not recommended [see *Dosage and Administration* (2.5)].

Drug Interaction Studies

In Vitro Studies

In vitro studies showed that pregabalin is unlikely to be involved in significant pharmacokinetic drug interactions. Pregabalin, at concentrations that were, in general, 10 times those attained in clinical trials, does not inhibit human CYP1A2, CYP2A6, CYP2C9, CYP2C19, CYP2D6, CYP2E1, and CYP3A4 enzyme systems. In vitro drug interaction studies demonstrate that pregabalin does not induce CYP1A2 or CYP3A4 activity. Therefore, an increase in the metabolism of co-administered CYP1A2 substrates (e.g., theophylline, caffeine) or CYP3A4 substrates (e.g., midazolam, testosterone) is not anticipated.

In Vivo Studies

With the exception of erythromycin, the interactions of pregabalin extended-release tablets with co-administration of other drugs have not been systematically evaluated. Additional studies have been performed with pregabalin Capsules or Oral Solution [see *Drug Interactions* (7)]. No pharmacokinetic interactions were observed between pregabalin Capsules or Oral Solution and carbamazepine, ethanol, gabapentin, lamotrigine, lorazepam, oral contraceptive, oxycodone, phenobarbital, phenytoin, topiramate, and valproic acid. A similar lack of pharmacokinetic interactions would be expected to occur with pregabalin extended-release tablets.

The drug interaction studies described in this section were conducted in healthy adults, and across various patient populations.

Erythromycin

Multiple-dose administration of erythromycin (500 mg every 6 hours for 18 hours) in healthy subjects resulted in a 17% decrease in AUC of pregabalin extended-release tablets (330 mg single dose).

Ethanol

Multiple-dose administration of pregabalin (300 mg twice a day) in healthy subjects had no effect on the rate and extent of ethanol single-dose pharmacokinetics and single-dose administration of ethanol (0.7 g/kg) had no effect on the steady-state pharmacokinetics of pregabalin. Additive effects on cognitive and gross motor functioning were seen when pregabalin Capsules or Oral Solution was co-administered with ethanol. No clinically important effects on respiration were seen [see *Drug Interactions* (7)].

Gabapentin

The pharmacokinetic interactions of pregabalin and gabapentin were investigated in 12 healthy subjects following concomitant single-dose administration of 100 mg pregabalin and 300 mg gabapentin and in 18 healthy subjects following concomitant multiple-dose administration of 200 mg pregabalin every 8 hours and 400 mg gabapentin every 8 hours. Gabapentin pharmacokinetics following single- and multiple-dose administration were unaffected by pregabalin co-administration. The extent of pregabalin absorption was unaffected by gabapentin co-administration, although there was a small reduction in rate of absorption.

Lorazepam

Multiple-dose administration of pregabalin (300 mg twice a day) in healthy subjects had no effect on the rate and extent of lorazepam single-dose pharmacokinetics and single-dose administration of lorazepam (1 mg) had no effect on the steady-state pharmacokinetics of pregabalin. Additive effects on cognitive and gross motor functioning were seen when pregabalin Capsules or Oral Solution was co-administered with lorazepam. No clinically important effects on respiration were seen [see *Drug Interactions* (7)].

Oral Contraceptives

Pregabalin co-administration (200 mg 3 times a day) had no effect on the steady-state pharmacokinetics of norethindrone and ethinyl estradiol (1 mg/35 mcg, respectively) in healthy subjects.

Oxycodone

Multiple-dose administration of pregabalin (300 mg twice a day) in healthy subjects had no effect on the rate and extent of oxycodone single-dose pharmacokinetics. Single-dose administration of oxycodone (10 mg) had no effect on the steady-state pharmacokinetics of pregabalin. Additive effects on cognitive and gross motor functioning were seen when pregabalin Capsules or Oral Solution was co-administered with oxycodone. No clinically important effects on respiration were seen [see *Drug Interactions* (7)].

Carbamazepine, Lamotrigine, Phenytoin, Topiramate and Valproic Acid

Steady-state through plasma concentrations of phenytoin, carbamazepine, and carbamazepine 10,11 epoxide, valproic acid, and lamotrigine were not affected by concomitant pregabalin (200 mg 3 times a day) administration. Population pharmacokinetic analyses in patients treated with pregabalin and various concomitant medications suggest the following:

| Therapeutic class | Specific concomitant drug studied |
|---|---|
| Concomitant drug has no effect on the pharmacokinetics of pregabalin | |
| Hypolycemics | Glucobid, insulin, metformin |
| Diuretics | Furosemide |
| Antiepileptic Drugs | Topiramate |
| Concomitant drug has no effect on the pharmacokinetics of pregabalin and pregabalin has no effect on the pharmacokinetics of concomitant drug | |
| Antiepileptic Drugs | Carbamazepine, lamotrigine, phenobarbital, phenytoin, topiramate, valproic acid |

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Carcinogenesis

A dose-dependent increase in the incidence of malignant vascular tumors (hemangiosarcomas) was observed in 2 strains of mice (B6C3F1 and CD-1) given pregabalin (200, 1,000, or 5000 mg/kg) in the diet for 2 years. Plasma pregabalin exposure (AUC) in mice receiving the lowest dose that increased hemangiosarcomas was approximately equal to the human exposure at the maximum recommended human dose (MRD) of 660 mg/day. A no-effect dose for induction of hemangiosarcomas in mice was not established. No evidence of carcinogenicity was seen in 2 studies in Wistar rats following dietary administration of pregabalin for 2 years at doses (50, 150, or 450 mg) in males (10, 30, or 90 mg in females) that were associated with plasma exposures in males and females up to approximately 15 and 26 times, respectively, human exposure at the MRD.

Mutagenesis

Pregabalin was not mutagenic in bacteria or in mammalian cells *in vitro*, was not clastogenic in mammalian systems *in vitro* and *in vivo*, and did not induce unscheduled DNA synthesis in mouse or rat hepatocytes.

Impairment of Fertility

In fertility studies in which male rats were orally administered pregabalin (50 to 2500 mg/kg) prior to and during mating with untreated females, a number of adverse reproductive and developmental effects were observed. These included decreased sperm counts and sperm motility, increased dead sperm abnormalities, reduced fertility, increased preimplantation embryo loss, decreased litter size, decreased fetal body weights, and an increased incidence of fetal abnormalities. Effects on sperm and fertility parameters were reversible in studies of this duration (3 to 4 months). The no-effect dose for male reproductive toxicity in these studies (100 mg/kg) was associated with a plasma pregabalin exposure (AUC) approximately 4 times human exposure at the MRD of 660 mg/day.

In addition, adverse reactions on reproductive organ (testes, epididymides) histopathology were observed in male rats exposed to pregabalin (500 to 1250 mg/kg) in general toxicology studies of 4 weeks or greater duration. The no-effect dose for male reproductive organ histopathology in rats (250 mg/kg) was associated with a plasma exposure approximately 10 times human exposure at the MRD.

In a fertility study in which female rats were given pregabalin (500, 1250, or 2500 mg/kg) orally prior to and during mating and early gestation, disrupted estrous cyclicity by an increased number of days to mating were seen at all doses, and embryolethality occurred at the highest dose. The low dose in this study produced a sperm exposure approximately 10 times that in humans receiving the MRD. A no-effect dose for female reproductive toxicity in rats was not established.

13.2 Animal Toxicology and/or Pharmacology

Dermatopathy

Skin lesions ranging from erythema to necrosis were seen in repeated-dose toxicology studies in both rats and monkeys. The etiology of these skin lesions is unknown. At the MRD of 660 mg/day, there is a 2 fold safety margin for the dermatological lesions. The more severe dermatopathies involving necrosis were associated with pregabalin exposures (as expressed by plasma AUCs) of approximately 3 to 8 times those achieved in humans given the MRD. No increase in incidence of skin lesions was observed in clinical studies.

Ocular Lesions

Ocular lesions (characterized by retinal atrophy [including loss of photoreceptor cells] and/or corneal inflammation/mineralization) were observed in 2 lifetime carcinogenicity studies in Wistar rats. These findings were observed at plasma pregabalin exposures (AUC) greater than or equal to 2 times those achieved in humans given the maximum recommended dose of 660 mg/day. A no-effect dose for ocular lesions was not established. Similar lesions were not observed in lifetime carcinogenicity studies in 2 strains of mice or in monkeys treated for 1 year.

14 CLINICAL STUDIES

14.1 Efficacy of Postherpetic Neuralgia (Study PHN CR)

Support for efficacy of pregabalin extended-release tablets for the management of PHN and diabetic peripheral neuropathy (DPN) was based