## ZIPRASIDONE - ziprasidone hydrochloride capsule REMEDYREPACK INC.

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#### HIGHLIGHTS OF PRESCRIBING INFORMATION

HIGHLIGHTS OF PRESCRIBING INFORMATION These highlights do not include all the information needed to use Ziprasidone safely and effectively. See full prescribing information for ziprasidone. Ziprasidone HCl capsules Initial U.S. Approval: 2001

## WARNING: INCREASED MORTALITY IN ELDERLY PATIENTS WITH DEMENTIA-RELATED PSYCHOSIS

See full prescribing information for complete boxed warning

- Elderly patients with dementia-related psychosis treated with antipsychotic drugs are at an increased risk of death compared to placebo treatment (5.1)
- Ziprasidone is not approved for elderly patients with dementia-related psychosis (5.1)

## ------ INDICATIONS AND USAGE

#### INDICATIONS AND USAGE (2)

Ziprasidone is an atypical antipsychotic. In choosing among treatments, prescribers should be aware of the capacity of ziprasidone to prolong the QT interval and may consider the use of other drugs first. (5.2) (2) Ziprasidone is indicated as an oral formulation for the: (2)

Treatment of schizophrenia. (1.1) (2)

• Adults: Efficacy was established in four 4-6 week trials and one maintenance trial in adults patients with schizophrenia. (14.1)

Acute treatment as monotherapy of manic or mixed episodes associated with bipolar I disorder. (1.2)

• Adults: Efficacy was established in two 3-week trials in adult patients with manic or mixed episodes. (14.2)

Maintenance treatment of bipolar I disorder as an adjunct to lithium or valproate. (1.2)

• Adults: Efficacy was established in one maintenance trial in adult patients. (14.2)

## ------DOSAGE AND ADMINISTRATION ------

#### **DOSAGE AND ADMINISTRATION (3)**

Give oral doses with food. (3)

- Schizophrenia: Initiate at 20 mg twice daily. Daily dosage may be adjusted up to 80 mg twice daily. Dose adjustments should occur at intervals of not less than 2 days. Safety and efficacy has been demonstrated in doses up to 100 mg twice daily. The lowest effective dose should be used. (2.1)
- Acute treatment of manic/mixed episodes of bipolar I disorder: Initiate at 40 mg twice daily. Increase to 60 mg or 80 mg twice daily on day 2 of treatment. Subsequent dose adjustments should be based on tolerability and efficacy within the range of 40-80 mg twice daily. (2.2)
- Maintenance treatment of bipolar I disorder as an adjunct to lithium or valproate. Continue treatment at the same dose on which the patient was initially stabilized, within the range of 40-80 mg twice daily. (2.2)

#### ----- DOSAGE FORMS AND STRENGTHS ------

#### DOSAGE FORMS AND STRENGTHS (4)

• Capsules: 20 mg, 40 mg, 60 mg, and 80 mg (3)

## ------CONTRAINDICATIONS -----

#### **CONTRAINDICATIONS** (5)

- Do not use in patients with a known history of QT prolongation. (4.1)
- Do not use in patients with recent acute myocardial infarction. (4.1)
- Do not use in patients with uncompensated heart failure. (4.1)
- Do not use in combination with other drugs that have demonstrated QT prolongation. (4.1)
- Do not use in patients with known hypersensitivity to ziprasidone. (4.2)

#### ------WARNINGS AND PRECAUTIONS ------

#### **WARNINGS AND PRECAUTIONS (6)**

• QT Interval Prolongation: Ziprasidone use should be avoided in patients with bradycardia, hypokalemia or hypomagnesemia, congenital prolongation of the QT interval, or in combination with other drugs that have

demonstrated QT prolongation. (5.2)

- Neuroleptic Malignant Syndrome (NMS): Potentially fatal symptom complex has been reported with antipsychotic drugs. Manage with immediate discontinuation of drug and close monitoring. (5.3)
- Tardive Dyskinesia: May develop acutely or chronically. (5.4)
- Hyperglycemia and Diabetes Mellitus (DM): Any patient treated with atypical antipsychotics should be monitored for symptoms of hyperglycemia including polydipsia, polyuria, polyhagia, and weakness. When starting treatment, patients with DM risk factors should undergo blood glucose testing before and during treatment. (5.5)
- Rash: Discontinue in patients who develop a rash without an identified cause. (5.6)
- Orthostatic Hypotension: Use with caution in patients with known cardiovascular or cerebrovascular disease. (5.7)
- Leukopenia, Neutropenia, and Agranulocytosis has been reported with antipsychotics. Patients with a pre-existing low white blood cell count (WBC) or a history of leukopenia/neutropenia should have their complete blood count (CBC) monitored frequently during the first few months of therapy and should discontinue ziprasidone at the first sign of a decline in WBC in the absence of other causative factors. (5.8)
- Seizures: Use cautiously in patients with a history of seizures or with conditions that lower seizure threshold. (5.9)
- Potential for Cognitive and Motor impairment: Patients should use caution when operating machinery. (5.12)
- Suicide: Closely supervise high-risk patients. (5.15)

## ------ ADVERSE REACTIONS ------

#### **ADVERSE REACTIONS (7)**

Commonly observed adverse reactions (incidence greater than or equal to 5% and at least twice the incidence for placebo) were: (7)

- Schizophrenia: Somnolence, respiratory tract infection. (6.1)
- Manic and Mixed Episodes Associated with Bipolar Disorder: Somnolence, extrapyramidal symptoms, dizziness, akathisia, abnormal vision, asthenia, vomiting. (6.1)

To report SUSPECTED ADVERSE REACTIONS, call 1-800-438-1985 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

## ------ DRUG INTERACTIONS

#### **DRUG INTERACTIONS (8)**

- Ziprasidone should be used in combination with other drugs that have demonstrated QT prolongation. (4.1, 7.3)
- The absorption of ziprasidone is increased up to two-fold in the presence of food. (7.9)
- The full prescribing information contains additional drug interactions. (7)

## ------USE IN SPECIFIC POPULATIONS ------

#### **USE IN SPECIFIC POPULATIONS (9)**

- Pregnancy: Ziprasidone should be used during pregnancy only if the potential benefit justifies the potential risk. (8.1).
- Nursing Mothers: Breast feeding is not recommended. (8.3)
- Pediatric Use: Safety and effectiveness for pediatric patients has not been established. (8.4)

See 17 for PATIENT COUNSELING INFORMATION, PATIENT COUNSELING INFORMATION and Medication Guide.

Revised: 1/2013

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<sup>\*</sup> Sections or subsections omitted from the full prescribing information are not listed.

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#### **WARNING**

## INCREASED MORTALITY IN ELDERLY PATIENTS WITH DEMENTIA-RELATED PSYCHOSIS

Elderly patients with dementia-related psychosis treated with antipsychotic drugs are at an increased risk of death. Analyses of seventeen placebo-controlled trials (modal duration of 10 weeks), largely in patients taking atypical antipsychotic drugs, revealed a risk of death in drug-treated patients of between 1.6 to 1.7 times the risk of death in placebo-treated patients. Over the course of a typical 10-week controlled trial, the rate of death in drug-treated patients was about 4.5%, compared to a rate of about 2.6% in the placebo group. Although the causes of death were varied, most of the deaths appeared to be either cardiovascular (e.g., heart failure, sudden death) or infectious (e.g., pneumonia) in nature. Observational studies suggest that, similar to atypical antipsychotic drugs, treatment with conventional antipsychotic drugs may increase mortality. The extent to which the findings of increased mortality in observational studies may be attributed to the antipsychotic drug as opposed to some characteristic(s) of the patients is not clear. Ziprasidone is not approved for the treatment of patients with Dementia-Related Psychosis [seeWarnings and Precautions (5.1)]).

#### **INDICATIONS & USAGE**

Ziprasidone is indicated for the treatment of schizophrenia, as monotherapy for the acute treatment of bipolar manic or mixed episodes, and as an adjunct to lithium or valproate for the maintenance treatment of bipolar disorder. When deciding among the alternative treatments available for the condition needing

treatment, the prescriber should consider the finding of ziprasidone's greater capacity to prolong the QT/QTc interval compared to several other antipsychotic drugs [seeWarnings and Precautions (5.2)]. Prolongation of the QTc interval is associated in some other drugs with the ability to cause torsade de pointes-type arrhythmia, a potentially fatal polymorphic ventricular tachycardia, and sudden death. In many cases this would lead to the conclusion that other drugs should be tried first. Whether ziprasidone will cause torsade de pointes or increase the rate of sudden death is not yet known [seeWarnings and Precautions (5.2)]

## 1.1 Schizophrenia

Ziprasidone is indicated for the treatment of schizophrenia. The efficacy of oral ziprasidone was established in four short-term (4- and 6-week) controlled trials of adult schizophrenic inpatients and in one maintenance trial of stable adult schizophrenic inpatients [see<u>Clinical Studies (14.1)].</u>

## 1.2 Bipolar I Disorder (Acute Mixed or Manic Episodes and Maintenance Treatment as an Adjunct to Lithium or Valproate)

Ziprasidone is indicated as monotherapy for the acute treatment of manic or mixed episodes associated with bipolar I disorder. Efficacy was established in two 3-week monotherapy studies in adult patients. [seeClinical Studies (14.2)].

ziprasidone is indicated as an adjunct to lithium or valproate for the maintenance treatment of bipolar I disorder. Efficacy was established in a maintenance trial in adult patients. The efficacy of ziprasidone as monotherapy for the maintenance treatment of bipolar I disorder has not been systematically evaluated in controlled clinical trials. [see<u>Clinical Studies (14.2)</u>].

# DOSAGE & ADMINISTRATION 2.1 Schizophrenia

#### Dose Selection

Ziprasidone capsules should be administered at an initial daily dose of 20 mg twice daily with food. In some patients, daily dosage may subsequently be adjusted on the basis of individual clinical status up to 80 mg twice daily. Dosage adjustments, if indicated, should generally occur at intervals of not less than 2 days, as steady-state is achieved within 1 to 3 days. In order to ensure use of the lowest effective dose, patients should ordinarily be observed for improvement for several weeks before upward dosage adjustment.

Efficacy in schizophrenia was demonstrated in a dose range of 20 mg to 100 mg twice daily in short-term, placebo-controlled clinical trials. There were trends toward dose response within the range of 20 mg to 80 mg twice daily, but results were not consistent. An increase to a dose greater than 80 mg twice daily is not generally recommended. The safety of doses above 100 mg twice daily has not been systematically evaluated in clinical trials [see<u>Clinical Studies (14.1)].</u>

#### Maintenance Treatment

While there is no body of evidence available to answer the question of how long a patient treated with ziprasidone should remain on it, a maintenance study in patients who had been symptomatically stable and then randomized to continue ziprasidone or switch to placebo demonstrated a delay in time to relapse for patients receiving ziprasidone. [see Clinical Studies (14.1)]. No additional benefit was demonstrated for doses above 20 mg twice daily. Patients should be periodically reassessed to determine the need for maintenance treatment.

## 2.2 Bipolar I Disorder (Acute Mixed or Manic Episodes and Maintenance Treatment as an Adjunct to Lithium or Valproate)

## Acute Treatment of Manic or Mixed Episodes

Dose Selection-Oral ziprasidone should be administered at an initial daily dose of 40 mg twice daily

with food. The dose may then be increased to 60 mg or 80 mg twice daily on the second day of treatment and subsequently adjusted on the basis of tolerance and efficacy within the range 40 mg-80 mg twice daily. In the flexible-dose clinical trials, the mean daily dose administered was approximately 120 mg [seeClinical Studies (14.2)].

## Maintenance Treatment (as an adjunct to lithium or valproate)

Continue treatment at the same dose on which the patient was initially stabilized, within the range of 40 mgmg twice daily with food. Patients should be periodically reassessed to determine the need for maintenance treatment. [see<u>Clinical Studies (14.2)</u>]

## 2.3 Dosing in Special Populations

Oral: Dosage adjustments are generally not required on the basis of age, gender, race, or renal or hepatic impairment. Ziprasidone is not approved for use in children or adolescents.

#### **DOSAGE FORMS & STRENGTHS**

Ziprasidone capsules are differentiated by capsule color/size and are imprinted in black ink with "G" and a unique number. Ziprasidone capsules are supplied for oral administration in 20 mg (blue/white), 40 mg (blue/blue), 60 mg (white/white), and 80 mg (blue/white) capsules. They are supplied in the following strengths and package configurations:

Ziprasidone Capsules

Capsule Strength (mg)Imprint202001402002602003802004

#### **CONTRAINDICATIONS**

## 4.1 QT Prolongation

Because of ziprasidone's dose-related prolongation of the QT interval and the known association of fatal arrhythmias with QT prolongation by some other drugs, ziprasidone is contraindicated:

in patients with a known history of QT prolongation (including congenital long QT syndrome)

in patients with recent acute myocardial infarction

in patients with uncompensated heart failure

Pharmacokinetic/pharmacodynamic studies between ziprasidone and other drugs that prolong the QT interval have not been performed. An additive effect of ziprasidone and other drugs that prolong the QT interval cannot be excluded. Therefore, ziprasidone should not be given with:

dofetilide, sotalol, quinidine, other Class Ia and III anti-arrhythmics, mesoridazine, thioridazine, chlorpromazine, droperidol, pimozide, sparfloxacin, gatifloxacin, moxifloxacin, halofantrine, mefloquine, pentamidine, arsenic trioxide, levomethadyl acetate, dolasetron mesylate, probucol or tacrolimus.

other drugs that have demonstrated QT prolongation as one of their pharmacodynamic effects and have this effect described in the full prescribing information as a contraindication or a boxed or bolded warning [see Warnings and Precautions (5.2)].

## 4.2 Hypersensitivity

Ziprasidone is contraindicated in individuals with a known hypersensitivity to the product.

#### WARNINGS AND PRECAUTIONS

5.1 Increased Mortality in Elderly Patients with Dementia-Related Psychosis Elderly patients with dementia-related psychosis treated with antipsychotic drugs are at an increased risk of death. Ziprasidone is not approved for the treatment of dementia-related psychosis. [seeBoxed Warning]

## 5.2 QT Prolongation and Risk of Sudden Death

Ziprasidone use should be avoided in combination with other drugs that are known to prolong the QTc interval [see Contraindications (4.1), Drug Interactions (7.4)]. Additionally, clinicians should be alert to the identification of other drugs that have been consistently observed to prolong the QTc interval. Such drugs should not be prescribed with ziprasidone. Ziprasidone should also be avoided in patients with congenital long QT syndrome and in patients with a history of cardiac arrhythmias [see Contraindications (4)].

A study directly comparing the QT/QTc prolonging effect of oral ziprasidone with several other drugs effective in the treatment of schizophrenia was conducted in patient volunteers. In the first phase of the trial, ECGs were obtained at the time of maximum plasma concentration when the drug was administered alone. In the second phase of the trial, ECGs were obtained at the time of maximum plasma concentration while the drug was co-administered with an inhibitor of the CYP4503A4 metabolism of the drug. In the first phase of the study, the mean change in QTc from baseline was calculated for each drug, using a sample-based correction that removes the effect of heart rate on the QT interval. The mean increase in QTc from baseline for ziprasidone ranged from approximately 9 to 14 msec greater than for four of the comparator drugs (risperidone, olanzapine, quetiapine, and haloperidol), but was approximately 14 msec less than the prolongation observed for thioridazine.

In the second phase of the study, the effect of ziprasidone on QTc length was not augmented by the presence of a metabolic inhibitor (ketoconazole 200 mg twice daily).

In placebo-controlled trials, oral ziprasidone increased the QTc interval compared to placebo by approximately 10 msec at the highest recommended daily dose of 160 mg. In clinical trials with oral ziprasidone, the electrocardiograms of 2/2988 (0.06%) patients who received ziprasidone and 1/440 (0.23%) patients who received placebo revealed QTc intervals exceeding the potentially clinically relevant threshold of 500 msec. In the ziprasidone-treated patients, neither case suggested a role of ziprasidone. One patient had a history of prolonged QTc and a screening measurement of 489 msec; QTc was 503 msec during ziprasidone treatment. The other patient had a QTc of 391 msec at the end of treatment with ziprasidone and upon switching to thioridazine experienced QTc measurements of 518 and 593 msec.

Some drugs that prolong the QT/QTc interval have been associated with the occurrence of torsade de pointes and with sudden unexplained death. The relationship of QT prolongation to torsade de pointes is clearest for larger increases (20 msec and greater) but it is possible that smaller QT/QTc prolongations may also increase risk, or increase it in susceptible individuals. Although torsade de pointes has not been observed in association with the use of ziprasidone in premarketing studies and experience is too limited to rule out an increased risk, there have been rare post-marketing reports (in the presence of multiple confounding factors) [seeAdverse Reactions (6.2)].

A study evaluating the QT/QTc prolonging effect of intramuscular ziprasidone, with intramuscular haloperidol as a control, was conducted in patient volunteers. In the trial, ECGs were obtained at the time of maximum plasma concentration following two injections of ziprasidone (20 mg then 30 mg) or haloperidol (7.5 mg then 10 mg) given four hours apart. Note that a 30 mg dose of intramuscular ziprasidone is 50% higher than the recommended therapeutic dose. The mean change in QTc from baseline was calculated for each drug, using a sample-based correction that removes the effect of heart rate on the QT interval. The mean increase in QTc from baseline for ziprasidone was 4.6 msec following the first injection and 12.8 msec following the second injection. The mean increase in QTc from baseline for haloperidol was 6.0 msec following the first injection and 14.7 msec following the second injection. In this study, no patients had a QTc interval exceeding 500 msec.

As with other antipsychotic drugs and placebo, sudden unexplained deaths have been reported in patients taking ziprasidone at recommended doses. The premarketing experience for ziprasidone did not reveal an excess risk of mortality for ziprasidone compared to other antipsychotic drugs or placebo, but the extent of exposure was limited, especially for the drugs used as active controls and placebo. Nevertheless, ziprasidone's larger prolongation of QTc length compared to several other antipsychotic drugs raises the possibility that the risk of sudden death may be greater for ziprasidone than for other available drugs for treating schizophrenia. This possibility needs to be considered in deciding among alternative drug products [see<u>Indications and Usage (1)].</u>

Certain circumstances may increase the risk of the occurrence of torsade de pointes and/or sudden death

in associatio with the use of drugs that prolong the QTc interval, including (1) bradycardia; (2) hypokalemia or hypomagnesemia; (3) concomitant use of other drugs that prolong the QTc interval; and (4) presence of congenital prolongation of the QT interval.

It is recommended that patients being considered for ziprasidone treatment who are at risk for significant electrolyte disturbances, hypokalemia in particular, have baseline serum potassium and magnesium measurements. Hypokalemia (and/or hypomagnesemia) may increase the risk of QT prolongation and arrhythmia. Hypokalemia may result from diuretic therapy, diarrhea, and other causes. Patients with low serum potassium and/or magnesium should be repleted with those electrolytes before proceeding with treatment. It is essential to periodically monitor serum electrolytes in patients for whom diuretic therapy is introduced during ziprasidone treatment. Persistently prolonged QTc intervals may also increase the risk of further prolongation and arrhythmia, but it is not clear that routine screening ECG measures are effective in detecting such patients. Rather, ziprasidone should be avoided in patients with histories of significant cardiovascular illness, e.g., QT prolongation, recent acute myocardial infarction, uncompensated heart failure, or cardiac arrhythmia. Ziprasidone should be discontinued in patients who are found to have persistent QTc measurements >500 msec.

For patients taking ziprasidone who experience symptoms that could indicate the occurrence of torsade de pointes, e.g., dizziness, palpitations, or syncope, the prescriber should initiate further evaluation, e.g., Holter monitoring may be useful.

## 5.3 Neuroleptic Malignant Syndrome (NMS)

A potentially fatal symptom complex sometimes referred to as Neuroleptic Malignant Syndrome (NMS) has been reported in association with administration of antipsychotic drugs. Clinical manifestations of NMS are hyperpyrexia, muscle rigidity, altered mental status, and evidence of autonomic instability (irregular pulse or blood pressure, tachycardia, diaphoresis, and cardiac dysrhythmia). Additional signs may include elevated creatinine phosphokinase, myoglobinuria (rhabdomyolysis), and acute renal failure.

The diagnostic evaluation of patients with this syndrome is complicated. In arriving at a diagnosis, it is important to exclude cases where the clinical presentation includes both serious medical illness (e.g., pneumonia, systemic infection, etc.) and untreated or inadequately treated extrapyramidal signs and symptoms (EPS). Other important considerations in the differential diagnosis include central anticholinergic toxicity, heat stroke, drug fever, and primary central nervous system (CNS) pathology. The management of NMS should include: (1) immediate discontinuation of antipsychotic drugs and other drugs not essential to concurrent therapy; (2) intensive symptomatic treatment and medical monitoring; and (3) treatment of any concomitant serious medical problems for which specific treatments are available. There is no general agreement about specific pharmacological treatment regimens for NMS. If a patient requires antipsychotic drug treatment after recovery from NMS, the potential reintroduction of drug therapy should be carefully considered. The patient should be carefully monitored, since recurrences of NMS have been reported.

### 5.4 Tardive Dyskinesia

A syndrome of potentially irreversible, involuntary, dyskinetic movements may develop in patients undergoing treatment with antipsychotic drugs. Although the prevalence of the syndrome appears to be highest among the elderly, especially elderly women, it is impossible to rely upon prevalence estimates to predict, at the inception of antipsychotic treatment, which patients are likely to develop the syndrome. Whether antipsychotic drug products differ in their potential to cause tardive dyskinesia is unknown. The risk of developing tardive dyskinesia and the likelihood that it will become irreversible are believed to increase as the duration of treatment and the total cumulative dose of antipsychotic drugs administered to the patient increase. However, the syndrome can develop, although much less commonly, after relatively brief treatment periods at low doses.

There is no known treatment for established cases of tardive dyskinesia, although the syndrome may remit, partially or completely, if antipsychotic treatment is withdrawn. Antipsychotic treatment itself, however, may suppress (or partially suppress) the signs and symptoms of the syndrome, and thereby may possibly mask the underlying process. The effect that symptomatic suppression has upon the long-term

course of the syndrome is unknown.

Given these considerations, ziprasidone should be prescribed in a manner that is most likely to minimize the occurrence of tardive dyskinesia. Chronic antipsychotic treatment should generally be reserved for patients who suffer from a chronic illness that (1) is known to respond to antipsychotic drugs, and (2) for whom alternative, equally effective, but potentially less harmful treatments are not available or appropriate. In patients who do require chronic treatment, the smallest dose and the shortest duration of treatment producing a satisfactory clinical response should be sought. The need for continued treatment should be reassessed periodically.

If signs and symptoms of tardive dyskinesia appear in a patient on ziprasidone, drug discontinuation should be considered. However, some patients may require treatment with ziprasidone despite the presence of the syndrome.

## 5.5 Hyperglycemia and Diabetes Mellitus

Hyperglycemia, in some cases extreme and associated with ketoacidosis or hyperosmolar coma or death, has been reported in patients treated with atypical antipsychotics. There have been few reports of hyperglycemia or diabetes in patients treated with ziprasidone. Although fewer patients have been treated with ziprasidone, it is not known if this more limited experience is the sole reason for the paucity of such reports. Assessment of the relationship between atypical antipsychotic use and glucose abnormalities is complicated by the possibility of an increased background risk of diabetes mellitus in patients with schizophrenia and the increasing incidence of diabetes mellitus in the general population. Given these confounders, the relationship between atypical antipsychotic use and hyperglycemiarelated adverse reactions is not completely understood. However, epidemiological studies, which did not include ziprasidone, suggest an increased risk of treatment-emergent hyperglycemia-related adverse reactions in patients treated with the atypical antipsychotics included in these studies. Because ziprasidone was not marketed at the time these studies were performed, it is not known if ziprasidone is associated with this increased risk. Precise risk estimates for hyperglycemia-related adverse reactions in patients treated with atypical antipsychotics are not available.

Patients with an established diagnosis of diabetes mellitus who are started on atypical antipsychotics should be monitored regularly for worsening of glucose control. Patients with risk factors for diabetes mellitus (e.g., obesity, family history of diabetes) who are starting treatment with atypical antipsychotics should undergo fasting blood glucose testing at the beginning of treatment and periodically during treatment. Any patient treated with atypical antipsychotics should be monitored for symptoms of hyperglycemia including polydipsia, polyuria, polyhagia, and weakness. Patients who develop symptoms of hyperglycemia during treatment with atypical antipsychotic was discontinued; however, some patients required continuation of antidiabetic treatment despite discontinuation of the suspect drug.

#### 5.6 Rash

In premarketing trials with ziprasidone, about 5% of patients developed rash and/or urticaria, with discontinuation of treatment in about one-sixth of these cases. The occurrence of rash was related to dose of ziprasidone, although the finding might also be explained by the longer exposure time in the higher dose patients. Several patients with rash had signs and symptoms of associated systemic illness, e.g., elevated WBCs. Most patients improved promptly with adjunctive treatment with antihistamines or steroids and/or upon discontinuation of ziprasidone, and all patients experiencing these reactions were reported to recover completely. Upon appearance of rash for which an alternative etiology cannot be identified, ziprasidone should be discontinued.

#### 5.7 Orthostatic Hypotension

Ziprasidone may induce orthostatic hypotension associated with dizziness, tachycardia, and, in some patients, syncope, especially during the initial dose-titration period, probably reflecting itsantagonist properties. Syncope was reported in 0.6% of the patients treated with ziprasidone. Ziprasidone should be used with particular caution in patients with known cardiovascular disease

(history of myocardial infarction or ischemic heart disease, heart failure or conduction abnormalities), cerebrovascular disease, or conditions which would predispose patients to hypotension (dehydration,

hypovolemia, and treatment with antihypertensive medications).

### 5.8 Leukopenia, Neutropenia, and Agranulocytosis

In clinical trial and postmarketing experience, events of leukopenia/neutropenia have been reported temporally related to antipsychotic age-nts. Agranulocytosis (including fatal cases) has also been reported.

Possible risk factors for leukopenia/neutropenia include pre-existing low white blood cell count (WBC) and history of drug induced leukopenia/neutropenia. Patients with a pre-existing low WBC or a history of drug induced leukopenia/neutropenia should have their complete blood count (CBC) monitored frequently during the first few months of therapy and should discontinue ziprasidone at the first sign of decline in WBC in the absence of other causative factors.

Patients with neutropenia should be carefully monitored for fever or other symptoms or signs of infection and treated promptly if such symptoms or signs occur. Patients with severe neutropenia (absolute neutrophil count <1000/mm3) should discontinue ziprasidone and have their WBC followed until recovery.

#### 5.9 Seizures

During clinical trials, seizures occurred in 0.4% of patients treated with ziprasidone. There were confounding factors that may have contributed to the occurrence of seizures in many of these cases. As with other antipsychotic drugs, ziprasidone should be used cautiously in patients with a history of seizures or with conditions that potentially lower the seizure threshold, e.g., Alzheimer's dementia. Conditions that lower the seizure threshold may be more prevalent in a population of 65 years or older.

## 5.10 Dysphagia

Esophageal dysmotility and aspiration have been associated with antipsychotic drug use. Aspiration pneumonia is a common cause of morbidity and mortality in elderly patients, in particular those with advanced Alzheimer's dementia. Ziprasidone and other antipsychotic drugs should be used cautiously in patients at risk for aspiration pneumonia [see<u>Boxed Warning</u>].

#### 5.11 Hyperprolactinemia

As with other drugs that antagonize dopamine D2 receptors, ziprasidone elevates prolactin levels in humans. Increased prolactin levels were also observed in animal studies with this compound, and were associated with an increase in mammary gland neoplasia in mice; a similar effect was not observed in rats [seeNonclinical Toxicology (13.1)]. Tissue culture experiments indicate that approximately one-third of human breast cancers are prolactin-dependent in vitro, a factor of potential importance if the prescription of these drugs is contemplated in patient with previously detected breast cancer. Although disturbances such as galactorrhea, amenorrhea, gynecomastia, and impotence have been reported with prolactin-elevating compounds, the clinical significance of elevated serum prolactin levels is unknown for most patients. Neither clinical studies nor epidemiologic studies conducted to date have shown an association between chronic administration of this class of drugs and tumorigenesis in humans; the available evidence is considered too limited to be conclusive at this time.

#### 5.12 Potential for Cognitive and Motor Impairment

Somnolence was a commonly reported adverse reaction in patients treated with ziprasidone. In the 4- and 6-week placebo-controlled trials, somnolence was reported in 14% of patients on ziprasidone compared to 7% of placebo patients. Somnolence led to discontinuation in 0.3% of patients in short-term clinical trials. Since ziprasidone has the potential to impair judgment, thinking, or motor skills, patients should be cautioned about performing activities requiring mental alertness, such as operating a motor vehicle (including automobiles) or operating hazardous machinery until they are reasonably certain that ziprasidone therapy does not affect them adversely.

## 5.13 Priapis m

One case of priapism was reported in the premarketing database. While the relationship of the reaction

to ziprasidone use has not been established, other drugs with alpha-adrenergic blocking effects have been reported to induce priapism, and it is possible that ziprasidone may share this capacity. Severe priapism may require surgical intervention.

## 5.14 Body Temperature Regulation

Although not reported with ziprasidone in premarketing trials, disruption of the body's ability to reduce core body temperature has been attributed to antipsychotic agents. Appropriate care is advised when prescribing ziprasidone for patients who will be experiencing conditions which may contribute to an elevation in core body temperature, e.g., exercising strenuously, exposure to extreme heat, receiving concomitant medication with anticholinergic activity, or being subject to dehydration.

#### 5.15 Suicide

The possibility of a suicide attempt is inherent in psychotic illness or bipolar disorder, and close supervision of high-risk patients should accompany drug therapy. Prescriptions for ziprasidone should be written for the smallest quantity of capsules consistent with good patient management in order to reduce the risk of overdose.

#### 5.16 Patients with concomitant illnesses

Clinical experience with ziprasidone in patients with certain concomitant systemic illnesses is limited [see <u>Use in Specific Populations (8.6),(8.7)</u>]

Ziprasidone has not been evaluated or used to any appreciable extent in patients with a recent history of myocardial infarction or unstable heart disease. Patients with these diagnoses were excluded from premarketing clinical studies. Because of the risk of QTc prolongation and orthostatic hypotension with ziprasidone, caution should be observed in cardiac patients [see<u>Warnings and Precautions (5.2),(5.7)]</u>

## 5.17 Laboratory Tests

Patients being considered for ziprasidone treatment that are at risk of significant electrolyte disturbances should have baseline serum potassium and magnesium measurements. Low serum potassium and magnesium should be replaced before proceeding with treatment. Patients who are started on diuretics during ziprasidone therapy need periodic monitoring of serum potassium and magnesium. Ziprasidone should be discontinued in patients who are found to have persistent QTc measurements >500 msec. [see Warnings and Precautions (5.2)]

#### ADVERSE REACTIONS

### 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.

Clinical trials for oral ziprasidone included approximately 5700 patients and /or normal subjects exposed to one or more doses of ziprasidone. Of these 5700, over 4800 were patients who participated in multiple-dose effectiveness trials, and their experience corresponded to approximately 1831 patient-years. These patients include: (1) 4331 patients who participated in multiple-dose trials, predominantly in schizophrenia, representing approximately 1698 patient-years of exposure as of February 5, 2000; and (2) 472 patients who participated in bipolar mania trials representing approximately 133 patient-years of exposure. An additional 127 patients with bipolar disorder participated in a long-term maintenance treatment study representing approximately 74.7 patient-years of exposure to ziprasidone. The conditions and duration of treatment with ziprasidone included open-label and double-blind studies, inpatient and outpatient studies, and short-term and longer-term exposure.

Adverse reactions during exposure were obtained by collecting voluntarily reported adverse experiences, as well as results of physical examinations, vital signs, weights, laboratory analyses, ECGs, and results of ophthalmologic examinations.

The stated frequencies of adverse reactions represent the proportion of individuals who experienced, at

least once, a treatment-emergent adverse reaction of the type listed. A reaction was considered treatment emergent if it occurred for the first time or worsened while receiving therapy following baseline evaluation.

Adverse Findings Observed in Short-Term, Placebo-Controlled Trials with Oral Ziprasidone The following findings are based on the short-term placebo-controlled premarketing trials for schizophrenia (a pool of two 6-week, and two 4-week fixed-dose trials) and bipolar mania (a pool of two 3-week flexible-dose trials) in which ziprasidone was administered in doses ranging from 10 to 200 mg/day.

Commonly Observed Adverse Reactions in Short Term-Placebo-Controlled Trials The following adverse reactions were the most commonly observed adverse reactions associated with the use of ziprasidone (incidence of 5% or greater) and not observed at an equivalent incidence among placebo-treated patients (ziprasidone incidence at least twice that for placebo): Schizophrenia trials (seeTable 1)

Somnolence

**Respiratory Tract Infection** 

Bipolar trials (see Table 2)

Somnolence

Extrapyramidal Symptoms which includes the following adverse reaction terms: extrapyramidal syndrome, hypertonia, dystonia, dyskinesia, hypokinesia, tremor, paralysis and twitching. None of these adverse reactions occurred individually at an incidence greater than 10% in bipolar mania trials.

Dizziness which includes the adverse reaction terms dizziness and lightheadedness.

Akathisia

Abnormal Vision

Asthenia

Vomiting

#### **SCHIZOPHRENIA**

## Adverse Reactions Associated with Discontinuation of Treatment in Short-Term, Placebo-Controlled Trials of Oral Ziprasidone

Approximately 4.1% (29/702) of ziprasidone-treated patients in short-term, placebo-controlled studies discontinued treatment due to an adverse reaction, compared with about 2.2% (6/273) on placebo. The most common reaction associated with dropout was rash, including 7 dropouts for rash among ziprasidone patients (1%) compared to no placebo patients [SeeWarnings and Precautions (5.6)].

## Adverse Reactions Occurring at an Incidence of 2% or More Among Ziprasidone-Treated Patients in Short-Term, Oral, Placebo-Controlled Trials

Table 1 enumerates the incidence, rounded to the nearest percent, of treatment-emergent adverse reactions that occurred during acute therapy (up to 6 weeks) in predominantly patients with schizophrenia, including only those reactions that occurred in 2% or more of patients treated with ziprasidone and for which the incidence in patients treated with ziprasidone was greater than the incidence in placebo-treated patients.

# Table 1: Treatment-Emergent Adverse Reaction Incidence In Short-Term Oral Placebo-Controlled Trials Schizophrenia

**Percentage of Patients** 

Reporting ReactionBody System/Adverse ReactionZiprasidone

(N=702)Placebo

(N=273)\*

Extrapyramidal Symptoms includes the following adverse reaction terms: extrapyramidal syndrome, hypertonia, dystonia, dyskinesia, hypokinesia, tremor, paralysis and twitching. None of these adverse

reactions occurred individually at an incidence greater than 5% in schizophrenia trials.

Dizziness includes the adverse reaction terms dizziness and lightheadedness.**Body as a Whole**Asthenia53Accidental Injury42Chest

Pain32**Cardiovas cular**Tachycardia21**Diges tive**Nausea107Constipation98Dyspepsia87Diarrhea54Dry Mouth42Anorexia21**Nervous** Extrapyramidal

Symptoms<u>\*</u>148Somnolence147Akathisia87Dizziness86**Respiratory**Respiratory Tract Infection83Rhinitis42Cough Increased31**Skin and Appendages**Rash43Fungal Dermatitis21**Special Senses**Abnormal Vision32

**Dose Dependency of Adverse Reactions in Short-Term, Fixed-Dose, Placebo-Controlled Trials** An analysis for dose response in the schizophrenia 4-study pool revealed an apparent relation of adverse reaction to dose for the following reactions: asthenia, postural hypotension, anorexia, dry mouth, increased salivation, arthralgia, anxiety, dizziness, dystonia, hypertonia, somnolence, tremor, rhinitis, rash, and abnormal vision.

Extrapyramidal Symptoms (EPS)- The incidence of reported EPS (which included the adverse reaction terms extrapyramidal syndrome, hypertonia, dystonia, dyskinesia, hypokinesia, tremor, paralysis and twitching) for ziprasidone-treated patients in the short-term, placebo-controlled schizophrenia trials was 14% vs. 8% for placebo. Objectively collected data from those trials on the Simpson-Angus Rating Scale (for EPS) and the Barnes Akathisia Scale (for akathisia) did not generally show a difference between ziprasidone and placebo.

Dystonia- Class Effect: Symptoms of dystonia, prolonged abnormal contractions of muscle groups, may occur in susceptible individuals during the first few days of treatment. Dystonic symptoms include: spasm of the neck muscles, sometimes progressing to tightness of the throat, swallowing difficulty, difficulty breathing, and/or protrusion of the tongue. While these symptoms can occur at low doses, they occur more frequently and with greater severity with high potency and at higher doses of first generation antipsychotic drugs. An elevated risk of acute dystonia is observed in males and younger age groups.

Vital Sign Changes - Ziprasidone is associated with orthostatic hypotension [see Warnings and Precautions (5.7)

Weight Gain- The proportions of patients meeting a weight gain criterion of greater than or equal to 7% of body weight were compared in a pool of four 4- and 6-week placebo-controlled schizophrenia clinical trials, revealing a statistically significantly greater incidence of weight gain for ziprasidone (10%) compared to placebo (4%). A median weight gain of 0.5 kg was observed in ziprasidone patients compared to no median weight change in placebo patients. In this set of clinical trials, weight gain was reported as an adverse reaction in 0.4% and 0.4% of ziprasidone and placebo patients, respectively. During long-term therapy with ziprasidone, a categorization of patients at baseline on the basis of body mass index (BMI) revealed the greatest mean weight gain and highest incidence of clinically significant weight gain (>7% of body weight) in patients with low BMI (<23) compared to normal (23-27) or overweight patients (>27). There was a mean weight gain of 1.4 kg for those patients with a "low" baseline BMI, no mean change for patients with a "normal" BMI, and a 1.3 kg mean weight loss for patients who entered the program with a "high" BMI.

ECG Changes - Ziprasidone is associated with an increase in the QTc interval [see Warnings and Precautions (5.2)]. In the schizophrenia trials, ziprasidone was associated with a mean increase in heart rate of 1.4 beats per minute compared to a 0.2 beats per minute decrease among placebo patients.

Other Adverse Reactions Observed During the Premarketing Evaluation of Oral Ziprasidone

Following is a list of COSTART terms that reflect treatment-emergent adverse reactions as defined in the introduction to the ADVERSE REACTIONS section reported by patients treated with ziprasidone in schizophrenia trials at multiple doses >4 mg/day within the database of 3834 patients. All reported reactions are included except those already listed in Table 1 or elsewhere in labeling, those reaction terms that were so general as to be uninformative, reactions reported only once and that did not have a substantial probability of being acutely life-threatening, reactions that are part of the illness being treated or are otherwise common as background reactions, and reactions considered unlikely to be drug-related. It is important to emphasize that, although the reactions reported occurred during treatment with ziprasidone, they were not necessarily caused by it.

Adverse reactions are further categorized by body system and listed in order of decreasing frequency according to the following definitions:

Frequent - adverse reactions occurring in at least 1/100 patients (greater than or equal to 1.0% of patients) (only those not already listed in the tabulated results from placebo-controlled trials appear in this listing);

Infrequent - adverse reactions occurring in 1/100 to 1/1000 patients (in 0.1-1.0% of patients) Rare-adverse reactions occurring in fewer than 1/1000 patients (<0.1% of patients).

### **Body as a Whole**

Frequent-abdominal pain, flu syndrome, fever, accidental fall, face edema, chills, photosensitivity reaction, flank pain, hypothermia, motor vehicle accident**Cardiovas cular System**Frequent-tachycardia, hypertension, postural hypotensionInfrequentbradycardia, angina pectoris, atrial fibrillationRarefirst degree AV block, bundle branch block, phlebitis, pulmonary embolus, cardiomegaly, cerebral infarct, cerebrovascular accident, deep thrombophlebitis, myocarditis, thrombophlebitis**Digestive System** 

Frequent-anorexia, vomitingInfrequentrectal hemorrhage, dysphagia, tongue edemaRaregum hemorrhage, jaundice, fecal impaction, gamma glutamyl transpeptidase increased, hematemesis, cholestatic jaundice, hepatitis, hepatomegaly, leukoplakia of mouth, fatty liver deposit, melena**Endocrine** 

Rare-hypothyroidism, hyperthyroidism, thyroiditis**Hemic and Lymphatic System** Infrequent-anemia, ecchymosis, leukocytosis, leukopenia, eosinophilia, lymphadenopathy Rare-thrombocytopenia, hypochromic anemia, lymphocytosis, monocytosis, basophilia, lymphedema, polycythemia, thrombocythemia**Metabolic and Nutritional Disorders** 

Infrequent-thirst, transaminase increased, peripheral edema, hyperglycemia, creatine phosphokinase increased, alkaline phosphatase increased, hypercholesteremia, dehydration, lactic dehydrogenase increased, albuminuria, hypokalemia Rare-BUN increased, creatinine increased, hyperlipemia, hypocholesteremia, hyperkalemia, hypochloremia, hypoglycemia, hyponatremia, hypoproteinemia, glucose tolerance decreased, gout, hyperchloremia, hyperuricemia, hypocalcemia, hypoglycemic reaction, hypomagnesemia, ketosis, respiratory alkalosis **Musculos keletal System** 

Frequent-myalgia Infrequent-tenosynovitis Rare- myopathy**Nervous System** 

Frequentagitation, extrapyramidal syndrome, tremor, dystonia, hypertonia, dyskinesia, hostility, twitching, paresthesia, confusion, vertigo, hypokinesia, hyperkinesia, abnormal gait, oculogyric crisis, hypesthesia, ataxia, amnesia, cogwheel rigidity, delirium, hypotonia, akinesia, dysarthria, withdrawal syndrome, buccoglossal syndrome, choreoathetosis, diplopia, incoordination, neuropathy Infrequent-paralysisRaremyoclonus, nystagmus, torticollis, circumoral paresthesia, opisthotonos, reflexes increased, trismus**Respiratory System** 

Frequent-dyspnea Infrequent-pneumonia, epistaxis Rare-hemoptysis, laryngismus**Skin and Appendages** Infrequent-maculopapular rash, urticaria, alopecia, eczema, exfoliative dermatitis, contact dermatitis, vesiculobullous rash**Special Senses** 

Frequent-fungal dermatitisInfrequentconjunctivitis, dry eyes, tinnitus, blepharitis, cataract, photophobiaRareeye hemorrhage, visual field defect, keratitis, keratoconjunctivitis**Urogenital System** Infrequent-impotence, abnormal ejaculation, amenorrhea, hematuria, menorrhagia, female lactation, polyuria, urinary retention, metrorrhagia, male sexual dysfunction, anorgasmia, glycosuria Raregynecomastia, vaginal hemorrhage, nocturia, oliguria, female sexual dysfunction, uterine hemorrhage

#### **BIPOLAR DISORDER**

Acute Treatment of Manic or Mixed Episodes

## Adverse Reactions Associated with Discontinuation of Treatment in Short Term, Placebo-Controlled Trials

Approximately 6.5% (18/279) of ziprasidone-treated patients in short-term, placebo-controlled studies discontinued treatment due to an adverse reaction, compared with about 3.7% (5/136) on placebo. The most common reactions associated with dropout in the ziprasidone-treated patients were akathisia, anxiety, depression, dizziness, dystonia, rash and vomiting, with 2 dropouts for each of these reactions among ziprasidone patients (1%) compared to one placebo patient each for dystonia and rash (1%) and no placebo patients for the remaining adverse reactions.

## Adverse Reactions Occurring at an Incidence of 2% or More Among Ziprasidone-Treated Patients in Short-Term, Oral, Placebo-Controlled Trials

Table 2 enumerates the incidence, rounded to the nearest percent, of treatment-emergent adverse reactions that occurred during acute therapy (up to 3 weeks) in patients with bipolar mania, including only those reactions that occurred in 2% or more of patients treated with ziprasidone and for which the incidence in patients treated with ziprasidone was greater than the incidence in placebo-treated patients.

## Table 2: Treatment-Emergent Adverse Reactions Incidence In Short-Term Oral Placebo-Controlled Trials Manic and Mixed Episodes Associated with Bipolar Disorder Percentage of Patients

Reporting ReactionBody System/Adverse ReactionZiprasidone (N=279)Placebo

(N=136)\*

Extrapyramidal Symptoms includes the following adverse reaction terms: extrapyramidal syndrome, hypertonia, dyskinesia, hypokinesia, tremor, paralysis and twitching. None of these adverse reactions occurred individually at an incidence greater than 10% in bipolar mania trials.

Dizziness includes the adverse reaction terms dizziness and lightheadedness.**Body as a Whole**Headache1817Asthenia62Accidental

Injury41**Cardiovas cular**Hypertension32**Diges tive**Nausea107Diarrhea54Dry

Mouth54Vomiting52Increased Salivation40Tongue

Edema31Dysphagia20**Mus culos keletal**Myalgia20**Nervous** Somnolence3112Extrapyramidal Symptoms\*3112Dizziness167Akathisia105Anxiety54Hypesthesia21Speech

Disorder 20**Respiratory**Pharyngitis 31Dyspnea 21**Skin and Appendages** Fungal Dermatitis 21**Special Senses** Abnormal Vision 63

Explorations for interactions on the basis of gender did not reveal any clinically meaningful differences in the adverse reaction occurrence on the basis of this demographic factor.

Weight Gain-During a 6-month placebo-controlled bipolar maintenance study in adults with ziprasidone as an adjunct to lithium or valproate, the incidence of clinically significant weight gain (greater than or equal to 7% of body weight) during the double-blind period was 5.6% for both ziprasidone and placebo treatment groups who completed the 6 months of observation for relapse. Interpretation of these findings should take into consideration that only patients who adequately tolerated ziprasidone entered the maintenance phase of this study, and there were substantial dropouts by the 6 month endpoint.

## 6.2 Postmarketing Experience

The following adverse reactions have been identified during post approval use of ziprasidone. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Adverse reaction reports not listed above that have been received since market introduction include rare occurrences of the following: Cardiac Disorders: Tachycardia, torsade de pointes (in the presence of multiple confounding factors), [See Warnings and Precautions (5.2)]; Digestive System Disorder: Swollen Tongue; Reproductive System and Breast Disorders: Galactorrhea, priapism; Nervous System Disorders: Facial Droop, neuroleptic malignant syndrome, serotonin syndrome (alone or in combination with serotonergic medicinal products), tardive dyskinesia; Psychiatric Disorders: Insomnia, mania/hypomania; Skin and subcutaneous Tissue Disorders: Allergic reaction (such as allergic dermatitis, angioedema, orofacial edema, urticaria), rash; Urogenital System Disorders: Enuresis, urinary incontinence; Vascular Disorders: Postural hypotension, syncope.

#### **DRUG INTERACTIONS**

Drug-drug interactions can be pharmacodynamic (combined pharmacologic effects) or pharmacokinetic (alteration of plasma levels). The risks of using ziprasidone in combination with other drugs have been evaluated as described below. All interactions studies have been conducted with oral ziprasidone. Based upon the pharmacodynamic and pharmacokinetic profile of ziprasidone, possible interactions could be anticipated:

### 7.1 Metabolic Pathway

Approximately two-thirds of ziprasidone is metabolized via a combination of reduction by glutathione and enzymatic reduction by aldehyde oxidase. There are no known clinically relevant inhibitors or inducers of aldehyde oxidase. Less than one-third of ziprasidone metabolic clearance is mediated by cytochrome P450 catalyzed oxidation.

#### 7.2 In Vitro Studies

An in vitro enzyme inhibition study utilizing human liver microsomes showed that ziprasidone had little inhibitory effect on CYP1A2, CYP2C9, CYP2C19, CYP2D6 and CYP3A4, and thus would not likely interfere with the metabolism of drugs primarily metabolized by these enzymes. There is little potential for drug interactions with ziprasidone due to displacement [See<u>Clinical Pharmacology (12.3)].</u>

## 7.3 Pharmacodynamic Interactions

Ziprasidone should not be used with any drug that prolongs the QT interval [See<u>Contraindications (4.1)]</u>. Given the primary CNS effects of ziprasidone, caution should be used when it is taken in combination with other centrally acting drugs.

Because of its potential for inducing hypotension, ziprasidone may enhance the effects of certain antihypertensive agents.

Ziprasidone may antagonize the effects of levodopa and dopamine agonists.

#### 7.4 Pharmacokinetic Interactions

#### Carbamazepine

Carbamazepine is an inducer of CYP3A4; administration of 200 mg twice daily for 21 days resulted in a decrease of approximately 35% in the AUC of ziprasidone. This effect may be greater when higher doses of carbamazepine are administered.

#### Ketoconazole

Ketoconazole, a potent inhibitor of CYP3A4, at a dose of 400 mg QD for 5 days, increased the AUC and Cmax of ziprasidone by about 35-40%. Other inhibitors of CYP3A4 would be expected to have similar effects.

#### Cimetidine

Cimetidine at a dose of 800 mg QD for 2 days did not affect ziprasidone pharmacokinetics.

#### Antacid

The co-administration of 30 mL of Maaloxwith ziprasidone did not affect the pharmacokinetics of ziprasidone.

#### 7.5 Lithium

Ziprasidone at a dose of 40 mg twice daily administered concomitantly with lithium at a dose of 450 mg twice daily for 7 days did not affect the steady-state level or renal clearance of lithium. Ziprasidone dosed adjunctively to lithium in a maintenance trial of bipolar patients did not affect mean therapeutic lithium levels.

## 7.6 Oral Contraceptives

In vivo studies have revealed no effect of ziprasidone on the pharmacokinetics of estrogen or progesterone components. Ziprasidone at a dose of 20 mg twice daily did not affect the pharmacokinetics of concomitantly administered oral contraceptives, ethinyl estradiol (0.03 mg) and levonorgestrel (0.15 mg).

#### 7.7 Dextromethorphan

Consistent with in vitro results, a study in normal healthy volunteers showed that ziprasidone did not alter the metabolism of dextromethorphan, a CYP2D6 model substrate, to its major metabolite, dextrorphan. There was no statistically significant change in the urinary dextromethorphan/dextrorphan ratio.

## 7.8 Valproate

A pharmacokinetic interaction of ziprasidone with valproate is unlikely due to the lack of common metabolic pathways for the two drugs. Ziprasidone dosed adjunctively to valproate in a maintenance trial of bipolar patients did not affect mean therapeutic valproate levels.

## 7.9 Other Concomitant Drug Therapy

Population pharmacokinetic analysis of schizophrenic patients enrolled in controlled clinical trials has not revealed evidence of any clinically significant pharmacokinetic interactions with benztropine, propranolol, or lorazepam.

#### 7.10 Food Interaction

The absolute bioavailability of a 20 mg dose under fed conditions is approximately 60%. The absorption of ziprasidone is increased up to two-fold in the presence of food [see<u>Clinical Pharmacology (12.3)].</u>

# USE IN SPECIFIC POPULATIONS 8.1 Pregnancy

#### Pregnancy Category C

In animal studies ziprasidone demonstrated developmental toxicity, including possible teratogenic effects at doses similar to human therapeutic doses. When ziprasidone was administered to pregnant rabbits during the period of organogenesis, an increased incidence of fetal structural abnormalities (ventricular septal defects and other cardiovascular malformations and kidney alterations) was observed at a dose of 30 mg/kg/day (3 times the MRHD of 200 mg/day on a mg/m2 basis). There was no evidence to suggest that these developmental effects were secondary to maternal toxicity. The developmental noeffect dose was 10 mg/kg/day (equivalent to the MRHD on a mg/m2 basis). In rats, embryofetal toxicity (decreased fetal weights, delayed skeletal ossification) was observed following administration of 10 to 160 mg/kg/day (0.5 to 8 times the MRHD on a mg/m2 basis) during organogenesis or throughout gestation, but there was no evidence of teratogenicity. Doses of 40 and 160 mg/kg/day (2 and 8 times the MRHD on a mg/m2 basis) were associated with maternal toxicity. The developmental no-effect dose

was 5 mg/kg/day (0.2 times the MRHD on a mg/m2 basis).

There was an increase in the number of pups born dead and a decrease in postnatal survival through the first 4 days of lactation among the offspring of female rats treated during gestation and lactation with doses of 10 mg/kg/day (0.5 times the MRHD on a mg/m2 basis) or greater. Offspring developmental delays and neurobehavioral functional impairment were observed at doses of 5 mg/kg/day (0.2 times the MRHD on a mg/m2 basis) or greater. A no-effect level was not established for these effects. There are no adequate and well-controlled studies in pregnant women. Ziprasidone should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

## Non-teratogenic Effects

Neonates exposed to antipsychotic drugs, during the third trimester of pregnancy are at risk for extrapyramidal and/or withdrawal symptoms following delivery. There have been reports of agitation, hypertonia, hypotonia, tremor, somnolence, respiratory distress and feeding disorder in these neonates. These complications have varied in severity; while in some cases symptoms have been self-limited, in other cases neonates have required intensive care unit support and prolonged hospitalization. Ziprasidone should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

## 8.2 Labor and Delivery

The effect of ziprasidone on labor and delivery in humans is unknown.

## 8.3 Nursing Mothers

It is not known whether ziprasidone or its metabolites are excreted in human milk. It is recommended that women receiving ziprasidone should not breastfeed.

#### 8.4 Pediatric Use

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

#### 8.5 Geriatric Use

Of the total number of subjects in clinical studies of ziprasidone, 2.4 percent were 65 and over. No overall differences in safety or effectiveness were observed between these subjects and younger subjects, 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. Nevertheless, the presence of multiple factors that might increase the pharmacodynamic response to ziprasidone, or cause poorer tolerance or orthostasis, should lead to consideration of a lower starting dose, slower titration, and careful monitoring during the initial dosing period for some elderly patients.

#### 8.6 Renal Impairment

Because ziprasidone is highly metabolized, with less than 1% of the drug excreted unchanged, renal impairment alone is unlikely to have a major impact on the pharmacokinetics of ziprasidone. The pharmacokinetics of ziprasidone following 8 days of 20 mg twice daily dosing were similar among subjects with varying degrees of renal impairment (n=27), and subjects with normal renal function, indicating that dosage adjustment based upon the degree of renal impairment is not required. Ziprasidone is not removed by hemodialysis.

### 8.7 Hepatic Impairment

As ziprasidone is cleared substantially by the liver, the presence of hepatic impairment would be expected to increase the AUC of ziprasidone; a multiple-dose study at 20 mg twice daily for 5 days in subjects (n=13) with clinically significant (Childs-Pugh Class A and B) cirrhosis revealed an increase in AUC 0-12 of 13% and 34% in Childs-Pugh Class A and B, respectively, compared to a matched control group (n=14). A half-life of 7.1 hours was observed in subjects with cirrhosis compared to 4.8 hours in the control group.

## 8.8 Age and Gender Effects

In a multiple-dose (8 days of treatment) study involving 32 subjects, there was no difference in the pharmacokinetics of ziprasidone between men and women or between elderly (>65 years) and young (18 to 45 years) subjects. Additionally, population pharmacokinetic evaluation of patients in controlled trials has revealed no evidence of clinically significant age or gender-related differences in the pharmacokinetics of ziprasidone. Dosage modifications for age or gender are, therefore, not recommended.

#### 8.9 Smoking

Based on in vitro studies utilizing human liver enzymes, ziprasidone is not a substrate for CYP1A2; smoking should therefore not have an effect on the pharmacokinetics of ziprasidone. Consistent with these in vitro results, population pharmacokinetic evaluation has not revealed any significant pharmacokinetic differences between smokers and nonsmokers.

#### DRUG ABUSE AND DEPENDENCE

## 9.3 Dependence

Ziprasidone has not been systematically studied, in animals or humans, for its potential for abuse, tolerance, or physical dependence. While the clinical trials did not reveal any tendency for drugseeking behavior, these observations were not systematic and it is not possible to predict on the basis of this limited experience the extent to which ziprasidone will be misused, diverted, and/or abused once marketed. Consequently, patients should be evaluated carefully for a history of drug abuse, and such patients should be observed closely for signs of ziprasidone misuse or abuse (e.g., development of tolerance, increases in dose, drug-seeking behavior).

#### **OVERDOSAGE**

### 10.1 Human Experience

In premarketing trials involving more than 5400 patients and/or normal subjects, accidental or intentional overdosage of oral ziprasidone was documented in 10 patients. All of these patients survived without sequelae. In the patient taking the largest confirmed amount, 3,240 mg, the only symptoms reported were minimal sedation, slurring of speech, and transitory hypertension (200/95).

Adverse reactions reported with ziprasidone overdose included extrapyramidal symptoms, somnolence, tremor, and anxiety. [see Adverse Reactions (6.2)]

#### 10.2 Management of Overdosage

In case of acute overdosage, establish and maintain an airway and ensure adequate oxygenation and ventilation. Intravenous access should be established, and gastric lavage (after intubation, if patient is unconscious) and administration of activated charcoal together with a laxative should be considered. The possibility of obtundation, seizure, or dystonic reaction of the head and neck following overdose may create a risk of aspiration with induced emesis.

Cardiovascular monitoring should commence immediately and should include continuous electrocardiographic monitoring to detect possible arrhythmias. If antiarrhythmic therapy is administered, disopyramide, procainamide, and quinidine carry a theoretical hazard of additive QT-prolonging effects that might be additive to those of ziprasidone.

Hypotension and circulatory collapse should be treated with appropriate measures such as intravenous fluids. If sympathomimetic agents are used for vascular support, epinephrine and dopamine should not be used, since beta stimulation combined withantagonism associated with ziprasidone may worsen hypotension. Similarly, it is reasonable to expect that the alpha-adrenergic-blocking properties of bretylium might be additive to those of ziprasidone, resulting in problematic hypotension. In cases of severe extrapyramidal symptoms, anticholinergic medication should be administered. There is no specific antidote to ziprasidone, and it is not dialyzable. The possibility of multiple drug involvement should be considered. Close medical supervision and monitoring should continue until the patient recovers.

#### **DESCRIPTION**

Ziprasidone is available as capsules (ziprasidone hydrochloride) for oral administration. Ziprasidone is a psychotropic agent that is chemically unrelated to phenothiazine or butyrophenone antipsychotic agents. It has a molecular weight of 412.94 (free base), with the following chemical name: 5-[2-[4-(1,2-benzisothiazol-3-yl)-1-piperazinyl]ethyl]-6-chloro-1,3-dihydro-2H-indol-2-one. The empirical formula of C21H21ClN4OS (free base of ziprasidone) represents the following structural formula:

Ziprasidone capsules contain a monohydrochloride, monohydrate salt of ziprasidone. Chemically, ziprasidone hydrochloride monohydrate is 5-[2-[4-(1,2-benzisothiazol-3-yl)-1-piperazinyl]ethyl]-6-chloro-1,3-dihydro-2H-indol-2-one, monohydrochloride, monohydrate. The empirical formula is C21H21ClN4OS times HCl times H2O and its molecular weight is 467.42. Ziprasidone hydrochloride monohydrate is a white to slightly pink powder.

Ziprasidone capsules are supplied for oral administration in 20 mg (blue/white), 40 mg (blue/blue), 60 mg (white/white), and 80 mg (blue/white) capsules. Ziprasidone capsules contain ziprasidone hydrochloride monohydrate, lactose, pregelatinized starch, and magnesium stearate.

### **CLINICAL PHARMACOLOGY**

#### 12.1 Mechanism of Action

The mechanism of action of ziprasidone, as with other drugs having efficacy in schizophrenia, is unknown. However, it has been proposed that this drug's efficacy in schizophrenia is mediated through a combination of dopamine type 2 (D2) and serotonin type 2 (5HT2) antagonism. As with other drugs having efficacy in bipolar disorder, the mechanism of action of ziprasidone in bipolar disorder is unknown.

### 12.2 Pharmacodynamics

Ziprasidone exhibited high in vitro binding affinity for the dopamine D2 and D3, the serotonin 5HT2A, 5HT2C, 5HT1A, 5HT1D, andreceptors (Ki s of 4.8, 7.2, 0.4, 1.3, 3.4, 2, and 10 nM, respectively), and moderate affinity for the histamine H1 receptor (Ki=47 nM). Ziprasidone functioned as an antagonist at the D2, 5HT2A, and 5HT1D receptors, and as an agonist at the 5HT1A receptor. Ziprasidone inhibited synaptic reuptake of serotonin and norepinephrine. No appreciable affinity was exhibited for other receptor/binding sites tested, including the cholinergic muscarinic receptor (IC50 >1 uM). Antagonism at receptors other than dopamine and 5HT2 with similar receptor affinities may explain some of the other therapeutic and side effects of ziprasidone. Ziprasidone's antagonism of histamine H1 receptors may explain the somnolence observed with this drug. Ziprasidone's antagonism ofreceptors may explain the orthostatic hypotension observed with this drug.

#### 12.3 Pharmacokinetics

#### **Oral Pharmacokinetics**

Ziprasidone's activity is primarily due to the parent drug. The multiple-dose pharmacokinetics of ziprasidone are dose-proportional within the proposed clinical dose range, and ziprasidone accumulation is predictable with multiple dosing. Elimination of ziprasidone is mainly via hepatic metabolism with a mean terminal half-life of about 7 hours within the proposed clinical dose range. Steady-state concentrations are achieved within one to three days of dosing. The mean apparent systemic clearance is 7.5 mL/min/kg. Ziprasidone is unlikely to interfere with the metabolism of drugs metabolized by cytochrome P450 enzymes.

Absorption: Ziprasidone is well absorbed after oral administration, reaching peak plasma concentrations in 6 to 8 hours. The absolute bioavailability of a 20 mg dose under fed conditions is approximately 60%. The absorption of ziprasidone is increased up to two-fold in the presence of food.

Distribution:Ziprasidone has a mean apparent volume of distribution of 1.5 L/kg. It is greater than 99% bound to plasma proteins, binding primarily to albumin and glycoprotein. The in vitro plasma protein binding of ziprasidone was not altered by warfarin or propranolol, two highly protein-bound drugs, nor did ziprasidone alter the binding of these drugs in human plasma. Thus, the potential for drug interactions with ziprasidone due to displacement is minimal.

Metabolism and Elimination:Ziprasidone is extensively metabolized after oral administration with only a small amount excreted in the urine (<1%) or feces (<4%) as unchanged drug. Ziprasidone is primarily cleared via three metabolic routes to yield four major circulating metabolites, benzisothiazole (BITP) sulphoxide, BITP-sulphone, ziprasidone sulphoxide, and S-methyl-dihydroziprasidone. Approximately 20% of the dose is excreted in the urine, with approximately 66% being eliminated in the feces. Unchanged ziprasidone represents about 44% of total drug-related material in serum. In vitro studies using human liver subcellular fractions indicate that S-methyldihydroziprasidone is generated in two steps. These studies indicate that the reduction reaction is mediated primarily by chemical reduction by glutathione as well as by enzymatic reduction by aldehyde oxidase and the subsequent methylation is mediated by thiol methyltransferase. In vitro studies using human liver microsomes and recombinant enzymes indicate that CYP3A4 is the major CYP contributing to the oxidative metabolism of ziprasidone. CYP1A2 may contribute to a much lesser extent. Based on in vivo abundance of excretory metabolites, less than one-third of ziprasidone metabolic clearance is mediated by cytochrome P450 catalyzed oxidation and approximately two-thirds via reduction. There are no known clinically relevant inhibitors or inducers of aldehyde oxidase.

#### NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

#### Carcinogenesis

Lifetime carcinogenicity studies were conducted with ziprasidone in Long Evans rats and CD-1 mice. Ziprasidone was administered for 24 months in the diet at doses of 2, 6, or 12 mg/kg/day to rats, and 50, 100, or 200 mg/kg/day to mice (0.1 to 0.6 and 1 to 5 times the maximum recommended human dose [MRHD] of 200 mg/day on a mg/m2 basis, respectively). In the rat study, there was no evidence of an increased incidence of tumors compared to controls. In male mice, there was no increase in incidence of tumors relative to controls. In female mice, there were dose-related increases in the incidences of pituitary gland adenoma and carcinoma, and mammary gland adenocarcinoma at all doses tested (50 to 200 mg/kg/day or 1 to 5 times the MRHD on a mg/m2 basis). Proliferative changes in the pituitary and mammary glands of rodents have been observed following chronic administration of other antipsychotic agents and are considered to be prolactin-mediated. Increases in serum prolactin were observed in a 1-month dietary study in female, but not male, mice at 100 and 200 mg/kg/day (or 2.5 and 5 times the MRHD on a mg/m2 basis). Ziprasidone had no effect on serum prolactin in rats in a 5-week dietary study at the doses that were used in the carcinogenicity study. The relevance for human risk of the findings of

prolactin-mediated endocrine tumors in rodents is unknown [see Warnings and Precautions (5.11)].

#### **Mutagenesis**

Ziprasidone was tested in the Ames bacterial mutation assay, the in vitro mammalian cell gene mutation mouse lymphoma assay, the in vitro chromosomal aberration assay in human lymphocytes, and the in vivo chromosomal aberration assay in mouse bone marrow. There was a reproducible mutagenic response in the Ames assay in one strain of S. typhimurium in the absence of metabolic activation. Positive results were obtained in both the in vitro mammalian cell gene mutation assay and the in vitro chromosomal aberration assay in human lymphocytes.

## **Impairment of Fertility**

Ziprasidone was shown to increase time to copulation in Sprague-Dawley rats in two fertility and early embryonic development studies at doses of 10 to 160 mg/kg/day (0.5 to 8 times the MRHD of 200 mg/day on a mg/m2 basis). Fertility rate was reduced at 160 mg/kg/day (8 times the MRHD on a mg/m2 basis). There was no effect on fertility at 40 mg/kg/day (2 times the MRHD on a mg/m2 basis). The effect on fertility appeared to be in the female since fertility was not impaired when males given 160 mg/kg/day (8 times the MRHD on a mg/m2 basis) were mated with untreated females. In a 6-month study in male rats given 200 mg/kg/day (10 times the MRHD on a mg/m2 basis) there were no treatment-related findings observed in the testes.

#### **CLINICAL STUDIES**

## 14.1 Schizophrenia

The efficacy of oral ziprasidone in the treatment of schizophrenia was evaluated in 5 placebo-controlled studies, 4 short-term (4- and 6-week) trials and one maintenance trial. All trials were in adult inpatients, most of whom met DSM III-R criteria for schiophrenia. Each study included 2 to 3 fixed doses of ziprasidone as well as placebo. Four of the 5 trials were able to distinguish ziprasidone from placebo; one short-term study did not. Although a single fixed-dose haloperidol arm was included as a comparative treatment in one of the three short-term trials, this single study was inadequate to provide a reliable and valid comparison of ziprasidone and haloperidol.

Several instruments were used for assessing psychiatric signs and symptoms in these studies. The Brief Psychiatric Rating Scale (BPRS) and the Positive and Negative Syndrome Scale (PANSS) are both multi-item inventories of general psychopathology usually used to evaluate the effects of drug treatment in schizophrenia. The BPRS psychosis cluster (conceptual disorganization, hallucinatory behavior, suspiciousness, and unusual thought content) is considered a particularly useful subset for assessing actively psychotic schizophrenic patients. A second widely used assessment, the Clinical Global Impression (CGI), reflects the impression of a skilled observer, fully familiar with the manifestations of schizophrenia, about the overall clinical state of the patient. In addition, the Scale for Assessing Negative Symptoms (SANS) was employed for assessing negative symptoms in one trial.

## The results of the oral ziprasidone trials in schizophrenia follow:

In a 4-week, placebo-controlled trial (n=139) comparing 2 fixed doses of ziprasidone (20 and 60 mg twice daily) with placebo, only the 60 mg dose was superior to placebo on the BPRS total score and the CGI severity score. This higher dose group was not superior to placebo on the BPRS psychosis cluster or on the SANS.

In a 6-week, placebo-controlled trial (n=302) comparing 2 fixed doses of ziprasidone (40 and 80 mg twice daily) with placebo, both dose groups were superior to placebo on the BPRS total score, the BPRS psychosis cluster, the CGI severity score and the PANSS total and negative subscale scores. Although 80 mg twice daily had a numerically greater effect than 40 mg twice daily, the difference was not statistically significant.

In a 6-week, placebo-controlled trial (n=419) comparing 3 fixed doses of ziprasidone (20, 60, and 100 mg twice daily) with placebo, all three dose groups were superior to placebo on the PANSS total score, the BPRS total score, the BPRS psychosis cluster, and the CGI severity score. Only the 100 mg twice daily dose group was superior to placebo on the PANSS negative subscale score. There was no

clear evidence for a dose-response relationship within the 20 mg twice daily to 100 mg twice daily dose range.

In a 4-week, placebo-controlled trial (n=200) comparing 3 fixed doses of ziprasidone (5, 20, and 40 mg twice daily), none of the dose groups was statistically superior to placebo on any outcome of interest.

A study was conducted in stable chronic or subchronic (CGI-S less than or equal to 5 at baseline) schizophrenic inpatients (n=294) who had been hospitalized for not less than two months. After a 3-day single-blind placebo run-in, subjects were randomized to one of 3 fixed doses of ziprasidone (20 mg, 40 mg, or 80 mg twice daily) or placebo and observed for relapse. Patients were observed for "impending psychotic relapse," defined as CGI-improvement score of greater than or equal to 6 (much worse or very much worse) and/or scores greater than or equal to 6 (moderately severe) on the hostility or uncooperativeness items of the PANSS on two consecutive days. Ziprasidone was significantly superior to placebo in time to relapse, with no significant difference between the different dose groups. There were insufficient data to examine population subsets based on age and race. Examination of population subsets based on gender did not reveal any differential responsiveness.

## 14.2 Bipolar I Disorder (Acute Mixed or Manic Episodes and Maintenance Treatment as an Adjunct to Lithium or Valproate)

## Acute Manic and Mixed Episodes Associated with Bipolar I Disorder

The efficacy of ziprasidone was established in 2 placebo-controlled, double-blind, 3-week monotherapy studies in patients meeting DSM-IV criteria for bipolar I disorder, manic or mixed episode with or without psychotic features. Primary rating instruments used for assessing manic symptoms in these trials were: (1) the Mania Rating Scale (MRS), which is derived from the Schedule for Affective Disorders and Schizophrenia-Change Version (SADS-CB) with items grouped as the Manic Syndrome subscale (elevated mood, less need for sleep, excessive energy, excessive activity, grandiosity), the Behavior and Ideation subscale (irritability, motor hyperactivity, accelerated, speech, racing thoughts, poor judgement) and impaired insight; and (2) the Clinical Global Impression-Severity of Illness Scale (CGI-S), which was used to assess the clinical significance of treatment response. The results of the oral ziprasidone trials in adult bipolar I disorder, manic/mixed episode follow: in a 3week placebo-controlled trial (n=210), the dose of ziprasidone was 40 mg twice daily on Day 1 and 80 mg twice daily on Day 2. Titration within the range of 40mg twice daily (in 20 mg twice daily increments) was permitted for the duration of the study. Ziprasidone was significantly more effective than placebo in reduction of the MRS total score and the CGI-S score. The mean daily dose of ziprasidone in this study was 132 mg. In a second 3-week placebo-controlled trial (n=205), the dose of ziprasidone was 40 mg twice daily on Day 1. Titration within the range of 40 mg twice daily (in 20 mg twice daily increments) was permitted for the duration of study (beginning on Day 2). Ziprasidone was significantly more effective than placebo in reduction of the MRS total score and the CGI-S score. The mean daily dose of ziprasidone in this study was 112 mg.

## **Maintenance Therapy**

The efficacy of ziprasidone as adjunctive therapy to lithium or valproate in the maintenance treatment of bipolar I disorder was established in a placebo-controlled trial in patients who met DSM-IV criteria for bipolar I disorder. The trial included patients whose most recent episode was manic or mixed, with or without psychotic features. In the open-label phase, patients were required to be stabilized on ziprasidone plus lithium or valproic acid for at least 8 weeks in order to be randomized. In the double-blind randomized phase, patients continued treatment with lithium or valproic acid and were randomized to receive either ziprasidone (administered twice daily totaling 80 mg to 160 mg per day) or placebo. Generally, in the maintenance phase, patients continued on the same dose on which they were stabilized during the stabilization phase. The primary endpoint in this study was time to recurrence of a mood episode (manic, mixed or depressed episode) requiring intervention, which was defined as any of the following: discontinuation due to a mood episode, clinical intervention for a mood episode (e.g., initiation of medication or hospitalization), or Mania Rating Scale score greater than or equal to 18 or a

MADRS score greater than or equal to 18 (on 2 consecutive assessments no more than 10 days apart). A total of 584 subjects were treated in the open-label stabilization period. In the double-blind randomization period, 127 subjects were treated with ziprasidone, and 112 subjects were treated with placebo. Ziprasidone was superior to placebo in increasing the time to recurrence of a mood episode. The types of relapse events observed included depressive, manic, and mixed episodes. Depressive, manic, and mixed episodes accounted for 53%, 34%, and 13%, respectively, of the total number of relapse events in the study.

#### **HOW SUPPLIED**

Ziprasidone capsules are differentiated by capsule color/size and are imprinted in black ink with "G" and a unique number. Ziprasidone capsules are supplied for oral administration in 20 mg (blue/white), 40 mg (blue/blue), 60 mg (white/white), and 80 mg (blue/white) capsules. They are supplied in the following strengths and package configurations:

## **Ziprasidone Capsules**

**Package ConfigurationCapsule Strength (mg)NDC CodeImprint**Bottles of 6020NDC-59762-2001-12001Bottles of 6040NDC-59762-2002-12002Bottles of 6060NDC-59762-2003-12003Bottles of 6080NDC-59762-2004-12004Bottles of 50080NDC-59762-2004-22004

#### STORAGE AND HANDLING

Ziprasidone capsules should be stored at 25 C (77 F); excursions permitted to 15-30 C (59-86 F) [See USP Controlled Room Temperature].

#### PATIENT COUNSELING INFORMATION

SeeFDA-Approved Patient Labeling (17.3).

Please refer to the patient package insert. To assure safe and effective use of ziprasidone, the information and instructions provided in the patient information should be discussed with patients.

#### 17.1 Administration with Food

Patients should be instructed to take ziprasidone capsules with food for optimal absorption. The absorption of ziprasidone is increased up to two-fold in the presence of food [see<u>Drug Interactions</u> (7.8)andClinical Pharmacology (12.3)].

### 17.2 QTc Prolongation

Patients should be advised to inform their health care providers of the following: History of QT prolongation; recent acute myocardial infarction; uncompensated heart failure; prescription of other drugs that have demonstrated QT prolongation; risk for significant electrolyte abnormalities; and history of cardiac arrhythmia [seeContraindications (4.1)andWarnings and Precautions (5.2)]. Patients should be instructed to report the onset of any conditions that put them at risk for significant electrolyte disturbances, hypokalemia in particular, including but not limited to the initiation of diuretic therapy or prolonged diarrhea. In addition, patients should be instructed to report symptoms such as dizziness, palpitations, or syncope to the prescriber [seeWarnings and Precautions (5.2)].

## 17.3 FDA-Approved Patient Labeling



#### PATIENT SUMMARY OF INFORMATION ABOUT

## Ziprasidone Capsules

(ziprasidone HCl)

## Information for patients taking ziprasidone or their caregivers

This summary contains important information about ziprasidone. It is not meant to take the place of your doctor's instructions. Read this information carefully before you take ziprasidone. Ask your doctor or pharmacist if you do not understand any of this information or if you want to know more about ziprasidone.

## What Is ziprasidone?

Ziprasidone is a type of prescription medicine called a psychotropic, also known as an atypical antipsychotic. Ziprasidone can be used to treat symptoms of schizophrenia and acute manic or mixed episodes associated with bipolar disorder. Ziprasidone can also be used as maintenance treatment of bipolar disorder when added to lithium or valproate.

## Who Should Take ziprasidone?

Only your doctor can know if ziprasidone is right for you. ziprasidone may be prescribed for you if you have schizophrenia or bipolar disorder.

Symptoms of schizophrenia may include:

hearing voices, seeing things, or sensing things that are not there (hallucinations)

beliefs that are not true (delusions)

unusual suspiciousness (paranoia)

becoming withdrawn from family and friends

Symptoms of manic or mixed episodes of bipolar disorder may include:

extremely high or irritable mood

increased energy, activity, and restlessness

racing thoughts or talking very fast

easily distracted

little need for sleep

If you show a response to ziprasidone, your symptoms may improve. If you continue to take ziprasidone there is less chance of your symptoms returning. Do not stop taking the capsules even when you feel better without first discussing it with your doctor.

It is also important to remember that ziprasidone capsules should be taken with food.

What is the most important safety information I should know about ziprasidone? Ziprasidone is not approved for the treatment of patients with dementia-related psychosis. Elderly patients with a diagnosis of psychosis related to dementia treated with antipsychotics are at an increased risk of death when compared to patients who are treated with placebo (a sugar pill).

Ziprasidone is an effective drug to treat the symptoms of schizophrenia and the manic or mixed episodes of bipolar disorder. However, one potential side effect is that it may change the way the electrical current in your heart works more than some other drugs. The change is small and it is not known whether this will be harmful, but some other drugs that cause this kind of change have in rare cases caused dangerous heart rhythm abnormalities. Because of this, ziprasidone should be used only after your doctor has considered this risk for ziprasidone against the risks and benefits of other medications available for treating schizophrenia or bipolar manic and mixed episodes.

Your risk of dangerous changes in heart rhythm can be increased if you are taking certain other medicines and if you already have certain abnormal heart conditions. Therefore, it is important to tell your doctor about any other medicines that you take, including non-prescription medicines, supplements, and herbal medicines. You must also tell your doctor about any heart problems you have or have had.

## Who should NOT take ziprasidone?

Elderly patients with a diagnosis of psychosis related to dementia. Ziprasidone is not approved for the

treatment of these patients.

Anything that can increase the chance of a heart rhythm abnormality should be avoided. Therefore, do not take ziprasidone if:

You have certain heart diseases, for example, long QT syndrome, a recent heart attack, severe heart failure, or certain irregularities of heart rhythm (discuss the specifics with your doctor)

You are currently taking medications that should not be taken in combination with ziprasidone, for example, dofetilide, sotalol, quinidine, other Class Ia and III anti-arrhythmics, mesoridazine, thioridazine, chlorpromazine, droperidol, pimozide, sparfloxacin, gatifloxacin, moxifloxacin, halofantrine, mefloquine, pentamidine, arsenic trioxide, levomethadyl acetate, dolasetron mesylate, probucol or tacrolimus.

## What To Tell Your Doctor Before You Start ziprasidone

Only your doctor can decide if ziprasidone is right for you. Before you start ziprasidone, be sure to tell your doctor if you:

have had any problem with the way your heart beats or any heart related illness or disease any family history of heart disease, including recent heart attack

have had any problem with fainting or dizziness

are taking or have recently taken any prescription medicines

are taking any over-the-counter medicines you can buy without a prescription, including natural/herbal remedies

have had any problems with your liver

are pregnant, might be pregnant, or plan to get pregnant

are breast feeding

are allergic to any medicines

have ever had an allergic reaction to ziprasidone or any of the other ingredients of ziprasidone capsules. Ask your doctor or pharmacist for a list of these ingredients

have low levels of potassium or magnesium in your blood

Your doctor may want you to get additional laboratory tests to see if ziprasidone is an appropriate treatment for you.

## **Ziprasidone And Other Medicines**

There are some medications that may be unsafe to use when taking ziprasidone, and there are some medicines that can affect how well ziprasidone works. While you are on ziprasidone, check with your doctor before starting any new prescription or over-the-counter medications, including natural/herbal remedies.

## How To Take ziprasidone

Take ziprasidone only as directed by your doctor.

Swallow the capsules whole.

Take ziprasidone capsules with food.

It is best to take ziprasidone at the same time each day.

Ziprasidone may take a few weeks to work. It is important to be patient.

Do not change your dose or stop taking your medicine without your doctor's approval.

Remember to keep taking your capsules, even when you feel better.

#### **Possible Side Effects**

Because these problems could mean you're having a heart rhythm abnormality, contact your doctor **IMMEDIATELY if you:** 

Faint or lose consciousness

Feel a change in the way that your heart beats (palpitations)

Common side effects of ziprasidone include the following and should also be discussed with your doctor if they occur:

Feeling unusually tired or sleepy

Nausea or upset stomach

Constipation

Dizziness

Restlessness

Abnormal muscle movements, including tremor, shuffling, and uncontrolled involuntary movements

Diarrhea

Rash

Increased cough / runny nose

If you develop any side effects that concern you, talk with your doctor. It is particularly important to tell your doctor if you have diarrhea, vomiting, or another illness that can cause you to lose fluids. Your doctor may want to check your blood to make sure that you have the right amount of important salts after such illnesses.

For a list of all side effects that have been reported, ask your doctor or pharmacist for the ziprasidone Professional Package Insert.

#### What To Do For An Overdose

In case of an overdose, call your doctor or poison control center right away or go to the nearest emergency room.

## **Other Important Safety Information**

A serious condition called neuroleptic malignant syndrome (NMS) can occur with all antipsychotic medications including ziprasidone. Signs of NMS include very high fever, rigid muscles, shaking, confusion, sweating, or increased heart rate and blood pressure. NMS is a rare but serious side effect that could be fatal. Therefore, tell your doctor if you experience any of these signs.

Adverse reactions related to high blood sugar (hyperglycemia), sometimes serious, have been reported in patients treated with atypical antipsychotics. There have been few reports of hyperglycemia or diabetes in patients treated with ziprasidone, and it is not known if ziprasidone is associated with these reactions. Patients treated with an atypical antipsychotic should be monitored for symptoms of hyperglycemia.

Dizziness caused by a drop in your blood pressure may occur with ziprasidone, especially when you first start taking this medication or when the dose is increased. If this happens, be careful not to stand up too quickly, and talk to your doctor about the problem.

Before taking ziprasidone, tell your doctor if you are pregnant or plan on becoming pregnant. It is advised that you don't breast feed an infant if you are taking ziprasidone.

Because ziprasidone can cause sleepiness, be careful when operating machinery or driving a motor vehicle.

Since medications of the same drug class as ziprasidone may interfere with the ability of the body to adjust to heat, it is best to avoid situations involving high temperature or humidity.

It is best to avoid consuming alcoholic beverages while taking ziprasidone.

Call your doctorimmediatelyif you take more than the amount of ziprasidone prescribed by your doctor.

Ziprasidone has not been shown to be safe or effective in the treatment of children and teenagers under the age of 18 years old.

## Keep ziprasidone and all medicines out of the reach of children.

## How To Store ziprasidone

Store ziprasidone capsules at room temperature (59-86 F or 15-30 C).

#### For More Information About ziprasidone

This sheet is only a summary. Ziprasidone is a prescription medicine and only your doctor can decide if it is right for you. If you have any questions or want more information about ziprasidone, talk with your doctor or pharmacist.

#### PACKAGE LABEL.PRINCIPAL DISPLAY PANEL SECTION

DRUG: Ziprasidone

GENERIC: ZIPRASIDONE HYDROCHLORIDE

DOSAGE: CAPSULE

ADMINSTRATION: ORAL

NDC: 52125-186-02 STRENGTH:20 mg COLOR: blue

SHAPE: CAPSULE SCORE: No score

SIZE: 14 mm IMPRINT: 30 QTY: 30



## ZIPRASIDONE HCL

20 MG CAP QTY:00030

NDC#: 52125-0186-02 INT:MS ID#:G 2001

EXPIRES: 08/2013 LOT#: DP812012345

COL: wht/grn SHP: oblong

DIST: GREENSTONE LLC PEAPACK NJ 07977
MFG: GREENSTONE LLC PEAPACK NJ 07977
A.Caution Federal law prohibits transfer of this drug to any
person other than for whom it was prescribed.

8.6tore at a temperature between 15 degree C and 30 degree C (59 degree F and 86 degree F) (see USP)

C. Re-packaged by: RemedyRepack Inc. 655 Kolter Dr., Indiana, PA 15701, 1-724-465-8762





## **ZIPRASIDONE**

ziprasidone hydrochloride capsule

Product Information			
Product Type	HUMAN PRESCRIPTION DRUG LABEL	Item Code (Source)	NDC:52125- 186(NDC:59762-2001)
Route of Administration	ORAL	DEA Schedule	

Active Ingredient/Active Moiety			
	Ingredient Name	Basis of Strength	Strength
	ZIPRASIDONE HYDRO CHLO RIDE (ZIPRASIDONE)	ZIPRASIDONE	20 mg

Inactive Ingredients			
Ingredient Name	Strength		
LACTOSE			
MAGNESIUM STEARATE			

## STARCH, CORN

Product Characteristics			
Color	blue, white	Score	no score
Shape	CAPSULE (CAPSULE)	Size	14mm
Flavor		Imprint Code	G;2001
Contains			

Pac	ckaging			
#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1 N	DC:52125-186-02	30 in 1 BLISTER PACK		

Marketing Information			
Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
NDA authorized generic	NDA020825	0 1/0 4/20 13	

Labeler - REMEDYREPACK INC. (829572556)

Revised: 1/2013 REMEDYREPACK INC.