

PRODUCT MONOGRAPH

Pr ABILIFY*

Aripiprazole Tablets

2 mg, 5 mg, 10 mg, 15 mg, 20 mg and 30 mg

Antipsychotic

Bristol-Myers Squibb Canada
Montreal, Canada

Date of Preparation:
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Pr **ABILIFY***

Aripiprazole Tablets

PART I: HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Route of Administration	Dosage Form / Strength	Nonmedicinal Ingredients
oral	Tablet, 2 mg, 5 mg, 10 mg, 15 mg, 20 mg and 30 mg	Cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. and coloring agents (2 mg: FD&C Blue No. 2 Aluminum Lake and iron oxide Yellow; 5 mg: FD&C Blue No. 2 Aluminum Lake; 10 mg and 30 mg: iron oxide red; 15 mg: iron oxide yellow)

INDICATIONS AND CLINICAL USE

Schizophrenia

ABILIFY (aripiprazole) is indicated for the treatment of schizophrenia and related psychotic disorders. In controlled clinical trials, ABILIFY was found to improve both positive and negative symptoms.

ABILIFY has been shown to be more effective than placebo in maintaining clinical improvement for up to 26 weeks.

Bipolar Disorder

ABILIFY (aripiprazole) is indicated for the acute treatment of manic or mixed episodes in Bipolar I Disorder. ABILIFY may be used as acute monotherapy or cotherapy with lithium or divalproex sodium when there is an insufficient acute response to these agents alone.

The physician who elects to use ABILIFY for extended periods should periodically re evaluate the long term usefulness of the drug for the individual patient.

Geriatrics (≥ 65 years of age): ABILIFY is not indicated in elderly patients with dementia. (See WARNINGS AND PRECAUTIONS – Serious Warnings and Precaution and Special populations). The safety and efficacy of ABILIFY in patients 65 years of age or older has not been established. Caution should be used when treating geriatric patients. (See WARNINGS AND PRECAUTIONS, Special Populations and ACTIONS AND CLINICAL PHARMACOLOGY).

Pediatrics (<18 years of age)

Safety and efficacy of ABILIFY in pediatric and adolescent patients have not been established. ABILIFY is not indicated for the treatment of pediatric and adolescent patients.

CONTRAINDICATIONS

ABILIFY (aripiprazole) is contraindicated in those patients with a known hypersensitivity to this drug or the excipients of the product. For a complete listing, see DOSAGE FORMS, COMPOSITION AND PACKAGING.

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

Increased Mortality in Elderly Patients with Dementia

Elderly patients with dementia treated with atypical antipsychotic drugs are at an increased risk of death compared to placebo. Analyses of thirteen placebo-controlled trials with various atypical antipsychotics (modal duration of 10 weeks) in these patients showed a mean 1.6-fold increase in the death rate in the drug-treated patients. 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 (see WARNINGS AND PRECAUTIONS - Special Populations, Use in Elderly Patients with Dementia).

General

Body Temperature Regulation

Disruption of the body's ability to reduce core body temperature has been attributed to antipsychotic agents. Appropriate care is advised when prescribing ABILIFY for patients who will be experiencing conditions which may contribute to an elevation in core body temperature, (eg, exercising strenuously, exposure to extreme heat, receiving concomitant medication with anticholinergic activity, or being subject to dehydration) (see ADVERSE REACTIONS).

Carcinogenesis and Mutagenesis

For animal data, see Part II: TOXICOLOGY section.

Cardiovascular

Orthostatic Hypotension

Aripiprazole may be associated with orthostatic hypotension, perhaps due to its α 1-adrenergic receptor antagonism. ABILIFY may induce orthostatic hypotension, tachycardia, dizziness, and sometimes syncope, especially at the initiation of treatment. The incidence of orthostatic hypotension-associated events from short-term, placebo-controlled trials of patients on oral ABILIFY (n=2096) included (aripiprazole incidence, placebo incidence): orthostatic hypotension (1.1%, 0.4%), postural dizziness (0.5%, 0.3%), and syncope (0.4%, 0.5%). The risk of orthostatic hypotension may be reduced by more gradual titration to the target dose.

The incidence of a significant orthostatic change in blood pressure (defined as a decrease in systolic blood pressure \geq 20 mmHg accompanied by an increase in heart rate \geq 25 bpm when comparing standing to supine values) for oral aripiprazole was not statistically different from placebo (aripiprazole incidence, placebo incidence): 4.6%, 3.0%.

Aripiprazole should be used with caution in patients with known cardiovascular disease (e.g., history of myocardial infarction or ischemic heart disease, heart failure or conduction abnormalities), cerebrovascular disease, or conditions which would predispose patients to hypotension (e.g., dehydration, hypovolemia, and treatment with antihypertensive medications). Patients with a history of clinically significant cardiovascular disorders were excluded from clinical trials.

QT Interval

In clinical trials with aripiprazole, the incidence of QT prolongation was comparable to placebo. In post-marketing experience, QT prolongation has been reported very rarely with ABILIFY treatment. As with other antipsychotics, caution should be exercised when ABILIFY is prescribed in patients with a history of cardiac arrhythmias, in patients with congenital or family history of long QT syndrome, and in concomitant use with drugs known to prolong the QT interval (See ADVERSE REACTIONS - Postmarketing Adverse Drug Reactions).

Dependence/Tolerance

Aripiprazole has not been systematically studied in humans for its potential for abuse, tolerance, or physical dependence. In physical dependence studies in monkeys, withdrawal symptoms were observed upon abrupt cessation of dosing. While the clinical trials did not reveal any tendency for any drug-seeking behavior, these observations were not systematic and it is not possible to predict on the basis of this limited experience the extent to which a CNS-active drug will be misused, diverted, 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 ABILIFY misuse or abuse (eg, development of tolerance, increases in dose, drug-seeking behavior).

Endocrine and Metabolism

Hyperglycemia and Diabetes Mellitus

As with some other antipsychotics, exacerbation of pre-existing diabetes and hyperglycemia have been reported rarely and diabetic ketoacidosis and diabetic coma including some fatal cases, have been reported very rarely during the use of ABILIFY (see ADVERSE REACTIONS).

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 hyperglycemia-related adverse events is not completely understood. However, epidemiological studies which did not include ABILIFY suggest an increased risk of treatment-emergent hyperglycemia-related adverse events in patients treated with the atypical antipsychotics. Because ABILIFY was not marketed at the time these studies were performed, it is not known if ABILIFY is associated with this increased risk. Precise risk estimates for hyperglycemia-related adverse events in patients treated with atypical antipsychotics are not available.

Any patient treated with atypical antipsychotics should be monitored for symptoms of hyperglycemia including polydipsia, polyuria, polyphagia, and weakness. Patients who develop symptoms of hyperglycemia during treatment with atypical antipsychotics should undergo fasting blood glucose testing. In some cases, hyperglycemia has resolved when the atypical antipsychotic was discontinued; however, some patients required continuation of anti-diabetic treatment despite discontinuation of the suspect drug. Patients with risk factors for diabetes mellitus (eg, 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. Patients with an established diagnosis of diabetes mellitus who are started on atypical antipsychotics should be monitored regularly for worsening of glucose control.

Genitourinary

Priapism

Rare cases of priapism have been reported with ABILIFY. This adverse reaction, as with other psychotropic drugs, did not appear to be dose-dependent and did not correlate with the duration of treatment. The most likely mechanism of action of priapism is a relative decrease in sympathetic tone.

Hematologic

Infrequent cases of leukopenia have been reported with ABILIFY. In case of symptoms of infection, WBC count and differential count should be considered.

Neurologic

Neuroleptic Malignant Syndrome (NMS)

Neuroleptic malignant syndrome is a potentially fatal symptom complex that has been reported in association with antipsychotic drugs, including aripiprazole.

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 creatine phosphokinase, myoglobinuria (rhabdomyolysis), and acute renal failure.

In arriving at a diagnosis, it is important to identify 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 pathology.

The management of NMS should include 1) immediate discontinuation of all antipsychotic drugs including ABILIFY and other drugs not essential to 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 for uncomplicated NMS.

If a patient requires antipsychotic drug treatment after recovery from NMS, the potential re-introduction of therapy should be very carefully considered. The patient should be carefully monitored, since recurrence of NMS has been reported.

Tardive Dyskinesia

A syndrome of potentially irreversible, involuntary, dyskinetic movements may develop in patients treated with antipsychotic drugs. Although the prevalence of the syndrome is 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 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, ABILIFY 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 ABILIFY, drug discontinuation should be considered. However, some patients may require treatment with ABILIFY despite the presence of the syndrome.

Seizure/Convulsion

In short-term, placebo-controlled trials of patients treated with oral aripiprazole, seizures/convulsions occurred in 0.1% (3/2096) of patients. There were confounding factors that may have contributed to the occurrence of seizures in some of these patients.

As with other antipsychotic drugs, aripiprazole should be used cautiously in patients with a history of seizures or with conditions that lower the seizure threshold. Conditions that lower the seizure threshold may be more prevalent in a population of 65 years or older.

Potential for Cognitive and Motor Impairment

Like other antipsychotics drugs, ABILIFY has the potential to impair judgment, thinking, or motor skills. Somnolence was a commonly reported adverse event in patients treated with ABILIFY in clinical trials.

Because ABILIFY may cause somnolence, and impair motor skills, patients should be cautioned about performing activities requiring mental alertness, such as operating hazardous machinery, including motor vehicles, until they are reasonably certain that ABILIFY therapy does not affect them adversely.

Psychiatric

Suicide

The possibility of a suicide attempt is inherent in psychotic illnesses and bipolar disorder, and close supervision and appropriate clinical management of high-risk patients should accompany drug therapy.

Special Populations

Pregnant Women

There are no adequate and well-controlled studies in pregnant women. It is not known whether aripiprazole can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. In animal studies, aripiprazole demonstrated developmental toxicity, including possible teratogenic effects in rats and rabbits. Aripiprazole should be used during pregnancy only if the potential benefit outweighs the potential risk to the fetus.

Labor and Delivery

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

Nursing Women

Aripiprazole was excreted in milk of rats during lactation. It is not known whether aripiprazole or its metabolites are excreted in human milk. It is recommended that women receiving aripiprazole should not breast-feed.

Pediatrics (< 18 years of age)

Safety and efficacy in children under the age of 18 years of age have not been established. ABILIFY is not indicated for the treatment of pediatric and adolescent patients.

Geriatrics (≥ 65 years of age)

In formal single-dose pharmacokinetic studies (with aripiprazole given in a single dose of 15 mg), aripiprazole clearance was 20% lower in elderly (≥65 years) subjects compared to younger adult subjects (18 to 64 years). There was no detectable age effect, however, in the population pharmacokinetic analysis in schizophrenia patients. Also, the pharmacokinetics of aripiprazole after multiple doses in elderly patients appeared similar to that observed in young, healthy subjects. (see WARNINGS AND PRECAUTIONS - Serious Warnings and Precautions and DOSAGE AND ADMINISTRATION - Geriatrics).

Placebo-controlled studies of oral aripiprazole in schizophrenia or bipolar mania did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects.

Nevertheless, geriatric patients generally have decreased cardiac, hepatic and renal function, and more frequent use of concomitant medication. The presence of multiple factors that might

increase the pharmacodynamic response to aripiprazole, 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 elderly patients.

Use in Elderly Patients with Dementia

Studies of elderly patients with Alzheimer's disease have suggested that there may be a different tolerability profile in this population compared to younger patients with schizophrenia (see WARNINGS AND PRECAUTIONS - Serious Warnings and Precautions). The safety and efficacy of ABILIFY in the treatment of patients with Alzheimer's disease has not been established. If the prescriber elects to treat such patients with ABILIFY, vigilance should be exercised.

Overall Mortality

Elderly patients with dementia treated with atypical antipsychotic drugs showed increased mortality compared to placebo in a meta-analysis of 13 placebo-controlled trials of various atypical antipsychotic drugs. In three placebo-controlled studies of aripiprazole in elderly patients with Alzheimer's disease (n=938; mean age: 82.4 years; range: 56-99 years), the rate of death in aripiprazole-treated patients was 3.5%, compared to a rate of 1.7% in the placebo group during or within 30 days after termination from the double-blind phase of the studies. Although the causes of death were varied, most of the deaths appeared to be either cardiovascular (eg, heart failure, sudden death) or infectious (eg, pneumonia) in nature. ABILIFY is not indicated for the treatment of patients with dementia (see Serious Warnings and Precautions).

Dysphagia

Esophageal dysmotility and aspiration have been associated with antipsychotic drug use, including ABILIFY. Aspiration pneumonia is a common cause of morbidity and mortality in elderly patients, in particular those with advanced Alzheimer's dementia. Aripiprazole and other antipsychotic drugs should be used cautiously in patients at risk for aspiration pneumonia (see ADVERSE REACTIONS).

Cerebrovascular Adverse Events, Including Stroke in Elderly Patients with Dementia

In placebo-controlled clinical studies (two flexible dose and one fixed dose study) of elderly patients with dementia, there was an increased incidence of cerebrovascular adverse events (e.g., stroke, transient ischemic attack), including fatalities, in aripiprazole-treated patients. In the fixed-dose study, there was a statistically significant dose response relationship for cerebrovascular adverse events in patients treated with aripiprazole. Aripiprazole is not indicated for the treatment of patients with dementia (see WARNINGS AND PRECAUTIONS - Serious Warnings and Precautions).

Safety Experience in Elderly Patients with Alzheimer's Disease

In three, 10-week, placebo-controlled studies of aripiprazole in elderly patients with Alzheimer's disease (n=938; mean age: 82.4 years; range: 56-99 years), the treatment-emergent adverse events that were reported at an incidence of $\geq 3\%$ and aripiprazole incidence at least twice that for

placebo were lethargy [placebo 2%, aripiprazole 5%], somnolence (including sedation) [placebo 3%, aripiprazole 8%], and incontinence (primarily, urinary incontinence) [placebo 1%, aripiprazole 5%], excessive salivation (placebo 0%, aripiprazole 4%), and lightheadedness (placebo 1%, aripiprazole 4%).

The safety and efficacy of ABILIFY in the treatment of patients with dementia have not been established. If the prescriber elects to treat such patients with ABILIFY, vigilance should be exercised, particularly for the emergence of difficulty swallowing or excessive somnolence, which could predispose to accidental injury or aspiration (see WARNINGS AND PRECAUTIONS - Serious Warnings and Precautions).

Use in Patients with Renal Impairment

No dosage adjustment is required in subjects with renal impairment (see ACTION AND CLINICAL PHARMACOLOGY; Special populations – Renal Impairment).

Use in Patients with Hepatic Impairment

No dosage adjustment is required in subjects with hepatic impairment (see ACTION AND CLINICAL PHARMACOLOGY; Special populations – Hepatic Impairment).

Use in Patients with Concomitant Illness

Clinical experience with ABILIFY in patients with certain concomitant systemic illnesses is limited. ABILIFY 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 pre-marketing clinical studies (see WARNINGS AND PRECAUTIONS, Cardiovascular-Orthostatic Hypotension).

Gender

C_{max} and AUC of aripiprazole and its active metabolite, dehydro-aripiprazole, are 30 to 40% higher in women than in men, and correspondingly, the apparent oral clearance of aripiprazole is lower in women. These differences, however, are largely explained by differences in body weight (25%) between men and women. No dosage adjustment is recommended based on gender.

Race

Although no specific pharmacokinetic study was conducted to investigate the effects of race on the disposition of aripiprazole, population pharmacokinetic evaluation did not demonstrate important race-related differences in the pharmacokinetics of aripiprazole. No dosage adjustment is recommended based on race.

Lactose

ABILIFY tablets contain lactose (70 mg, 67 mg, 62 mg, 57 mg, 124 mg and 187 mg for the 2 mg, 5 mg, 10 mg, 15 mg, 20 mg and 30 mg tablets respectively). Patients with rare hereditary problems of galactose intolerance or glucose-galactose malabsorption should not take ABILIFY.

ADVERSE REACTIONS

Adverse Drug Reaction Overview

Aripiprazole was evaluated for safety in 13,543 patients who participated in multiple-dose, clinical trials in schizophrenia, bipolar disorder, major depression, dementia of the Alzheimer's type, Parkinson's disease, and alcoholism, and who had approximately 7619 patient-years of exposure to oral aripiprazole and 749 patients with exposure to aripiprazole injection. A total of 3390 patients were treated with oral aripiprazole for at least 180 days and 1933 patients treated with oral aripiprazole had at least 1 year of exposure.

The conditions and duration of treatment with aripiprazole (monotherapy or adjunctive therapy with antidepressants or mood stabilizers) included (in overlapping categories) double-blind, comparative and noncomparative open-label studies, inpatient and outpatient studies, fixed- and flexible-dose studies, and short- and longer-term exposure.

Adverse events during exposure were obtained by collecting volunteered adverse events, as well as results of physical examinations, vital signs, weights, laboratory analyses, and ECG. Adverse events were recorded by clinical investigators using terminology of their own choosing. In the tables and tabulations that follow, MedDRA dictionary terminology has been used to classify reported adverse events into a smaller number of standardized event categories, in order to provide a meaningful estimate of the proportion of individuals reporting adverse events.

The stated frequencies of adverse events represent the proportion of individuals who reported at least once, a treatment-emergent adverse event of the type listed. An event was considered treatment emergent if it occurred for the first time or worsened while receiving therapy following baseline evaluation. There was no attempt to use investigator causality assessments; i.e. all events meeting the defined criteria, regardless of investigator causality are included.

Clinical Trial Adverse Drug Reactions

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

Short-Term, Placebo-Controlled Trials of Patients with Schizophrenia

The following findings are based on a pool of five placebo-controlled trials (four 4-week and one 6-week) in which aripiprazole was administered orally in doses ranging from 2 to 30 mg/day.

Adverse Events Associated with Discontinuation of Treatment

Overall, there was little difference in the incidence of discontinuation due to adverse events between aripiprazole-treated (7%) and placebo-treated (9%) patients. The types of adverse events that led to discontinuation were similar between the aripiprazole and placebo-treated patients.

Commonly Reported Adverse Events

The only commonly observed adverse event associated with the use of aripiprazole in patients with schizophrenia (incidence of 5% or greater and aripiprazole incidence at least twice that for placebo) was akathisia (placebo 4%; aripiprazole 8%).

Short-Term, Placebo-Controlled Trials of Aripiprazole in Patients with Bipolar Mania

The following findings are based on a pool of 3-week, placebo-controlled, bipolar mania trials in which aripiprazole was administered orally at doses of 15 or 30 mg/day.

Adverse Events Associated with Discontinuation of Treatment

Overall, in patients with bipolar mania, there was little difference in the incidence of discontinuation due to adverse events between aripiprazole-treated (11%) and placebo-treated (10%) patients. The types of adverse events that led to discontinuation were similar between the aripiprazole and placebo-treated patients. Akathisia, the most common adverse event leading to discontinuation in the aripiprazole group, led to withdrawal of 2% of aripiprazole-treated patients and 0.3% of patients on placebo.

Commonly Reported Adverse Events

Commonly reported adverse events associated with the use of aripiprazole in patients with bipolar mania (incidence of 5% or greater and aripiprazole incidence at least twice that for placebo) are shown in Table 1.

Table 1: Commonly Reported Adverse Events in Short-Term, Placebo-Controlled Trials of Patients with Bipolar Mania Treated with ABILIFY

Preferred Term	Percentage of Patients Reporting Event	
	Aripiprazole (n=917)	Placebo (n=753)
Akathisia	13	4
Sedation	8	3
Restlessness	6	2
Extrapyramidal Disorder	5	2

Adverse Events Reported at an Incidence of 2% or More Among Aripiprazole-Treated Patients and Greater than Placebo in Short-Term, Schizophrenia and Bipolar Mania Placebo-Controlled Trials

Table 2 enumerates the pooled incidence, rounded to the nearest percent, of treatment-emergent adverse events that were reported during acute therapy (up to 6 weeks in schizophrenia and up to 3 weeks in bipolar mania), including only those events that were reported in 2% or more of patients treated with aripiprazole (doses ≥ 2 mg/day) and for which the incidence in patients treated with aripiprazole was greater than the incidence in patients treated with placebo in the combined dataset.

Table 2: Treatment-Emergent Adverse Events in Short-Term, Placebo-Controlled Trials in Patients with Schizophrenia^a and Bipolar Mania^b Treated with Oral ABILIFY

	Percentage of Patients Reporting Event ^c	
System Organ Class	Aripiprazole	Placebo
Preferred Term	(n=1843)	(n=1166)
Eye Disorders		
Blurred Vision	3	1
Gastrointestinal Disorders		
Nausea	15	11
Constipation	11	7
Vomiting	11	6
Dyspepsia	9	7
Dry Mouth	5	4
Toothache	4	3
Abdominal Discomfort	3	2
Stomach Discomfort	3	2
General Disorders and Administration Site Conditions		
Fatigue	6	4
Pain	3	2
Musculoskeletal and Connective Tissue Disorders		
Musculoskeletal Stiffness	4	3
Pain in Extremity	4	2
Myalgia	2	1
Muscle Spasms	2	1
Nervous System Disorders		
Headache	27	23
Dizziness	10	7
Akathisia	10	4

Table 2: Treatment-Emergent Adverse Events in Short-Term, Placebo-Controlled Trials in Patients with Schizophrenia^a and Bipolar Mania^b Treated with Oral ABILIFY

System Organ Class	Percentage of Patients Reporting Event ^c	
	Aripiprazole (n=1843)	Placebo (n=1166)
Preferred Term		
Sedation	7	4
Extrapyramidal Disorder	5	3
Tremor	5	3
Somnolence	5	3
Psychiatric Disorders		
Agitation	19	17
Insomnia	18	13
Anxiety	17	13
Restlessness	5	3
Respiratory, Thoracic, and Mediastinal Disorders		
Pharyngolaryngeal Pain	3	2
Cough	3	2

^a 926 aripiprazole-treated patients and 413 placebo treated patients

^b 917 aripiprazole-treated patients and 753 placebo-treated patients

^c Events reported by at least 2% of patients treated with oral aripiprazole, except events which had an incidence equal to or less than placebo.

An examination of population subgroups did not demonstrate a difference in the incidence of adverse events based on age, gender, or race.

Short-Term, Placebo-Controlled Trial of Adjunctive Therapy in Patients with Bipolar Mania

In a placebo-controlled trial of patients with bipolar mania who were already tolerating either lithium or valproate as monotherapy, aripiprazole was administered orally for 6 weeks at doses of 15 or 30 mg as adjunctive therapy with lithium or valproate. The adverse events reported in that study were generally similar to the adverse events listed in Table 1 from clinical trials in which aripiprazole was used as monotherapy. Akathisia and tremor were reported more frequently when aripiprazole was used as adjunctive therapy. Akathisia was reported in 19% of patients treated with aripiprazole as adjunctive therapy compared to 5% of patients who received placebo as adjunctive therapy. In the lithium subgroup, the incidence of akathisia was 28% in patients treated with aripiprazole as adjunct and 4% in patients treated with placebo. In the valproate subgroup akathisia was reported in 12% of patients treated with aripiprazole as adjunctive therapy compared to 6% treated with placebo as adjunctive therapy. The incidence of tremor was 9% for patients treated with aripiprazole as adjunctive therapy and 6% for patients who received placebo as adjunctive therapy. Other commonly reported adverse events in this

trial were insomnia 8% vs 4% and extrapyramidal disorder 5% vs 1%, in aripiprazole-treated patients and placebo-treated patients, respectively.

Discontinuation rates due to adverse events were 12% for patients treated with adjunctive aripiprazole compared to 6% for patients treated with adjunctive placebo. Akathisia, the most common adverse event leading to discontinuation in the aripiprazole group, led to withdrawal of 5% of aripiprazole-treated patients and 1% of patients on placebo.

Dose-Related Adverse Events

Dose response relationships for the incidence of treatment-emergent adverse events were evaluated from four trials in patients with schizophrenia comparing various fixed oral doses (2, 5, 10, 15, 20, or 30 mg/day) of aripiprazole to placebo. This analysis, stratified by study, indicated that the only adverse event to have a possible dose response relationship, and then most prominent only with 30 mg, was somnolence [including sedation]; (incidences were placebo, 7.4%; 10 mg, 8.5%; 15 mg, 8.7%; 20 mg, 7.5%; 30 mg, 12.6%). In two clinical trials in patients with bipolar mania comparing fixed doses of 15 or 30 mg of oral aripiprazole to placebo, no dose response relationship for treatment-emergent adverse events was found.

Extrapyramidal Symptoms

Table 3 provides the percentage of patients reporting treatment-emergent extrapyramidal symptoms in short-term placebo-controlled trials.

Table 3: Percentage of Patients Reporting Treatment-Emergent Extrapyramidal Symptoms in Short-Term Placebo-Controlled Trials

	Percentage of Patients Reporting Event					
	Schizophrenia		Bipolar Mania Monotherapy		Bipolar Mania Cotherapy	
	Aripiprazole	Placebo	Aripiprazole	Placebo	Aripiprazole	Placebo
EPS-related AEs (excluding akathisia)	14	14	16	8	15	8
Akathisia-related events	8	4	13	4	19	5

Table 4 provides the mean change from baseline to endpoint score on the Simpson Angus Rating Scale (for EPS) (SAS), Barnes Akathisia Scale (for akathisia), and the Assessments of Involuntary Movement Scales (for dyskinesia) (AIMS) from short-term, placebo-controlled trials.

Table 4 Mean change from baseline to endpoint score on the SAS, Barnes Akathisia Scale, and AIMS from short-term placebo-controlled trials

	Mean Change from Baseline to Endpoint Score					
	Schizophrenia		Bipolar Mania Monotherapy		Bipolar Mania Cotherapy	
	Aripiprazole	Placebo	Aripiprazole	Placebo	Aripiprazole	Placebo
SAS	-0.06	-0.08	0.50 ³	-0.01	0.73 ¹	0.07
Barnes	0.08	-0.05	0.21 ³	-0.05	0.30 ²	0.11
AIMS	-0.44 ¹	-0.02	-0.02	-0.06	0.08	-0.10

* A negative score indicates improvement.

¹ p ≤ 0.01

² p ≤ 0.05

³ p ≤ 0.001

In a long-term (26-week), placebo-controlled trial of schizophrenia, data on the Simpson Angus Rating Scale (for EPS), the Barnes Akathisia Scale (for akathisia), and the Assessments of Involuntary Movement Scales (for dyskinesias) did not show a difference between aripiprazole and placebo.

Weight Gain

In 4- to 6- week trials in schizophrenia, there was a slight difference in mean weight gain between aripiprazole and placebo patients (+0.7 kg vs. -0.05 kg, respectively) and also a statistically significant difference in the proportion of patients meeting a weight gain criterion of ≥7% of body weight [aripiprazole (8%) compared to placebo (3%)].

In 3-week trials in bipolar mania, the mean weight gain for aripiprazole and placebo patients was 0.1 kg vs. 0.0 kg, respectively. The proportion of patients meeting a weight gain criterion of ≥7% of body weight was aripiprazole 2% compared to placebo 3%. In the 6-week trial in mania in which aripiprazole or placebo was used as adjunctive therapy with either lithium or valproate, the mean weight gain for aripiprazole and placebo patients was 0.6 kg vs. 0.2 kg, respectively. The proportion of patients meeting a weight gain criterion of ≥7% of body weight with adjunctive aripiprazole was 3% compared to adjunctive placebo 4%.

In a long-term (26-week) placebo-controlled study of aripiprazole, a categorization of patients with schizophrenia at baseline on the basis of body mass index [BMI < 23 (“low”); 23-27 (“normal”); > 27 (“high”)] revealed mean weight losses in patients treated with aripiprazole and patients on placebo (“low” BMI, -0.5 kg weight loss in both treatment groups; “normal” BMI, mean weight loss of -1.3 kg in aripiprazole-treated patients and -0.6 kg in placebo-treated patients; “high” BMI, mean weight loss of -2.1 kg in aripiprazole-treated patients and -1.5 kg in placebo-treated patients).

In a long-term (52-week) study of aripiprazole and haloperidol, a categorization of patients with schizophrenia at baseline on the basis of BMI revealed the greatest mean weight gain in patients with low BMI compared to normal or overweight patients in both groups (patients with “low” BMI, mean weight gain 2.6 kg in aripiprazole-treated patients and 1.5 kg in haloperidol-treated patients; “normal” BMI, a mean weight gain of 1.4 kg in aripiprazole-treated patients and 0.2 kg in haloperidol-treated patients; “high” BMI, weight loss of -1.2 kg in aripiprazole-treated patients and -0.8 kg in haloperidol-treated patients).

In both studies, the highest incidence of clinically significant weight gain (>7% of body weight) was in patients with a low BMI (<23) compared to normal (23-27) or overweight patients (>27).

ECG Changes

Between group comparisons for a pooled analysis of placebo-controlled trials in patients with schizophrenia or bipolar mania, revealed no significant differences between oral aripiprazole and placebo in the proportion of patients experiencing potentially important changes in ECG parameters. Aripiprazole was associated with a median increase in heart rate of 2 beats per minute compared to no increase among placebo patients.

Additional Findings Observed in Clinical Trials

Adverse Events in Long-Term, Double-Blind, Placebo-Controlled Trials

The adverse events reported in a 26-week, double-blind trial comparing oral ABILIFY and placebo in patients with schizophrenia were generally consistent with those reported in the short-term, placebo-controlled trials, except for a higher incidence of tremor [8% (12/153) for ABILIFY vs. 2% (3/153) for placebo]. In this study, the majority of the cases of tremor were of mild intensity (8/12 mild and 4/12 moderate), occurred early in therapy (9/12 ≤49 days), and were of limited duration (7/12 ≤10 days). Tremor infrequently led to discontinuation (<1% of ABILIFY). In addition, in a long-term (52-week), active-controlled study, the incidence of tremor for ABILIFY was 5% (40/859).

A similar adverse event profile was observed in a long-term, 26-week placebo-controlled study in bipolar mania.

Other Adverse Events Observed During the Pre-marketing Evaluation of Oral Aripiprazole

Following is a list of MedDRA terms that reflect treatment-emergent adverse events as defined in the introduction to the ADVERSE REACTIONS section reported by patients treated with oral aripiprazole at multiple doses ≥2 mg/day during any phase of a trial within the database of 13,543 patients. All events assessed as possible adverse drug reactions have been included. In addition, medically/clinically meaningful events particularly those that are likely to be useful to the prescriber or that have pharmacologic plausibility, have been included. Events already listed in Tables 2, 3, or 4, or other parts of the ADVERSE REACTIONS section have been excluded.

Although the events reported occurred during treatment with aripiprazole, they were not necessarily caused by it.

Events are further categorized by MedDRA system organ class and listed in order of decreasing frequency according to the following definitions:

frequent adverse events are defined as those occurring on 1 or more occasions in at least 1/100 patients (only those not already listed in the tabulated results from placebo-controlled trials appear in this listing); infrequent adverse events are those occurring in less than 1/100 but at least 1/1,000 patients; rare events are those occurring in less than 1/1,000.

Blood and Lymphatic System Disorders:

Infrequent: leukopenia, neutropenia, thrombocytopenia

Cardiac Disorders:

Infrequent : bradycardia, palpitations, cardiopulmonary failure, myocardial infarction, cardio-respiratory arrest, atrioventricular block, extrasystoles, sinus tachycardia, atrial fibrillation, angina pectoris, myocardial ischemia;

Rare: atrial flutter, supraventricular tachycardia, ventricular tachycardia

Endocrine Disorders:

Infrequent: diabetes mellitus (including blood insulin increased, carbohydrate tolerance decreased, diabetes mellitus non-insulin-dependent, glucose tolerance impaired, glycosuria, glucose urine, glucose urine present), hyperglycemia, hypoglycemia, polydipsia;

Rare: - diabetic ketoacidosis, diabetic hyperosmolar coma

Eye Disorders:

Infrequent: photophobia, diplopia, eyelid edema, photopsia

Gastrointestinal Disorders:

Infrequent: gastroesophageal reflux disease, dysphagia, swollen tongue, esophagitis;

Rare: pancreatitis

General Disorders and Administration Site Conditions:

Frequent: asthenia, peripheral edema, pyrexia, irritability, chest pain;

Infrequent feeling jittery, face edema, thirst, angioedema;

Rare: hypothermia

Hepatobiliary Disorders:

Rare: hepatitis, jaundice

Immune System Disorders:

Infrequent: hypersensitivity

Injury, Poisoning, and Procedural Complications:

Frequent: fall;

Infrequent: self mutilation;

Rare: heat stroke

Investigations:

Frequent: weight decreased, creatine phosphokinase increased;

Infrequent: hepatic enzyme increased (increased ALT, increased AST), blood glucose increased, blood prolactin increased, blood urea increased, electrocardiogram QT prolonged, blood creatinine increased, blood bilirubin increased;

Rare: blood lactate dehydrogenase increased, glycosylated hemoglobin increased, gamma-glutamyl transferase (GGT) increased

Metabolism and Nutrition Disorders:

Frequent: decreased appetite;

Infrequent: hyperlipidemia, anorexia, hypokalemia, hyponatremia

Musculoskeletal and Connective Tissue Disorders:

Frequent: arthralgia;

Infrequent: muscle rigidity, muscular weakness, muscle tightness, mobility decreased;

Rare: rhabdomyolysis

Nervous System Disorders:

Frequent: coordination abnormal;

Infrequent: speech disorder, dyskinesia, parkinsonism, dystonia, memory impairment, cogwheel rigidity, cerebrovascular accident, convulsion, hypokinesia, tardive dyskinesia, hypotonia, myoclonus, hypertonia, akinesia, bradykinesia;

Rare: Grand Mal convulsion, choreoathetosis, neuroleptic malignant syndrome

Psychiatric Disorders:

Frequent: suicidal ideation;

Infrequent: aggression, loss of libido, suicide attempt, hostility, libido increased, anger, anorgasmia, delirium, intentional self injury, completed suicide, tic, homicidal ideation;

Rare: catatonia, sleep walking

Renal and Urinary Disorders:

Infrequent: urinary incontinence, urinary retention, polyuria, nocturia

Reproductive System and Breast Disorders:

Infrequent: menstruation irregular, erectile dysfunction, amenorrhea, breast pain;

Rare: gynaecomastia, priapism

Respiratory, Thoracic, and Mediastinal Disorders:

Frequent: nasal congestion, dyspnea, pneumonia aspiration

Skin and Subcutaneous Tissue Disorders:

Frequent: rash (including erythematous, exfoliative, generalized, macular, maculopapular, papular rash; acneiform, allergic, contact, exfoliative, seborrheic dermatitis, neurodermatitis, and drug eruption), hyperhidrosis;
Infrequent: pruritus, photosensitivity reaction, alopecia, urticaria

Vascular Disorders:

Frequent: hypertension;
Infrequent: hypotension, syncope

Abnormal Hematologic and Clinical Chemistry Findings

A between-group comparison for 3- to 6-week, placebo-controlled trials in patients with bipolar mania and schizophrenia revealed no differences between the aripiprazole and placebo groups in the proportions of patients experiencing clinically important changes in most routine serum chemistry, hematology, or urinalysis parameters (including changes in prolactin, fasting glucose, triglyceride, HDL, LDL and total cholesterol measurements).

Similarly, there were no differences in the incidence of discontinuations for changes in serum chemistry, hematology, or urinalysis.

In a long-term (26-week), placebo-controlled trial there were no clinically important differences between the aripiprazole and placebo patients in the mean change from baseline in prolactin, fasting glucose, triglyceride, HDL, LDL, and total cholesterol measurements.

Higher percentages of elevated creatine phosphokinase were observed in aripiprazole-treated patients compared to placebo-treated patients in short-term and long-term clinical trials. The most common AEs that were temporally associated with elevated CPK levels were musculoskeletal stiffness, myalgia, chest pain, fall, and muscle rigidity.

Post-Market Adverse Drug Reactions

The adverse reactions presented in Table 5 were reported during the post-marketing use of aripiprazole. 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.

Table 5 - Post-Introduction Treatment-Emergent Adverse Drug Reactions

<i>Investigations:</i>	<i>Very rare:</i> Weight increased, Blood glucose fluctuation
<i>Skin and Subcutaneous Tissue Disorders:</i>	<i>Very rare:</i> Allergic reaction (eg, anaphylactic reaction, angioedema, laryngospasm, oropharyngeal spasm)
<i>Gastrointestinal Disorders:</i>	<i>Very rare:</i> Diarrhea

As with other antipsychotics, sudden death, torsades de pointes, ventricular tachycardia, arrhythmia, cardiopulmonary arrest and QT prolongation have been reported during treatment with ABILIFY. These events during ABILIFY treatment have been very rare or isolated. Many of the patients had pre-existing cardiovascular disease, were on concomitant medications known to prolong the QT interval, had risk factors for QT prolongation, took an overdose of ABILIFY, and/or were morbidly obese. Very rarely, QT prolongation has been reported in the absence of confounding factors.

DRUG INTERACTIONS

Overview

Drug-Drug Interactions

Potential for Other Drugs to Affect ABILIFY

Aripiprazole is not a substrate of CYP1A1, CYP1A2, CYP2A6, CYP2B6, CYP2C8, CYP2C9, CYP2C19, or CYP2E1 enzymes. Aripiprazole also does not undergo direct glucuronidation. This suggests that an interaction of aripiprazole with inhibitors or inducers of these enzymes, or other factors, like smoking, is unlikely.

Both CYP3A4 and CYP2D6 are responsible for aripiprazole metabolism (see ACTIONS AND CLINICAL PHARMACOLOGY).

Agents that induce CYP3A4 (eg, carbamazepine) could cause an increase in aripiprazole clearance and lower blood levels. Inhibitors of CYP3A4 (e.g. ketoconazole) or CYP2D6 (e.g. quinidine, fluoxetine, or paroxetine) can inhibit aripiprazole elimination and cause increased blood levels.

Approximately 8% of Caucasians lack the capacity to metabolize CYP2D6 substrates and are classified as poor metabolizers (PM), whereas the rest are extensive metabolizers (EM). CYP2D6 metabolizing capacity should be considered when aripiprazole is co-administered with drugs that inhibit CYP2D6.

Ketoconazole and Other CYP3A4 Inhibitors

Coadministration of ketoconazole (200 mg/day for 14 days) with a 15-mg single dose of aripiprazole increased the AUC of aripiprazole and its active metabolite by 63% and 77%, respectively. The effect of a higher ketoconazole dose (400 mg/day) has not been studied. When ketoconazole is administered concomitantly with aripiprazole, aripiprazole dose should be reduced to one-half of its normal dose. Other strong inhibitors of CYP3A4 (itraconazole) would be expected to have similar effects and require similar dose reductions; weaker inhibitors (erythromycin, grapefruit juice) have not been studied. When the CYP3A4 inhibitor is withdrawn from the combination therapy, the aripiprazole dose should be increased.

Quinidine and Other CYP2D6 Inhibitors

Coadministration of quinidine (166 mg/day for 13 days), a potent inhibitor of CYP2D6, with a 10-mg single dose of aripiprazole increased the AUC of aripiprazole by 107% but decreased the AUC of its active metabolite, dehydro-aripiprazole, by 32%. The dose of aripiprazole should be reduced to one-half of its normal dose when quinidine is administered concomitantly with aripiprazole.

Concomitant administration of other significant inhibitors of CYP2D6, such as fluoxetine or paroxetine, would be expected to have similar effects and, therefore, should be accompanied by similar dose reductions. When the CYP2D6 inhibitor is withdrawn from the combination therapy, the aripiprazole dose should be increased.

Carbamazepine

Coadministration of carbamazepine (200 mg BID), a potent CYP3A4 inducer, with aripiprazole (30 mg QD) resulted in an approximate 70% decrease in C_{max} and AUC values of both aripiprazole and its active metabolite, dehydro-aripiprazole. When carbamazepine is added to aripiprazole therapy, the dose of aripiprazole should be doubled. Additional dose increases should be based on clinical evaluation. When carbamazepine is withdrawn from the combination therapy, the aripiprazole dose should be reduced.

Potential for ABILIFY to Affect Other Drugs

Aripiprazole is unlikely to cause clinically important pharmacokinetic interactions with drugs metabolized by cytochrome P450 enzymes. In *in vivo* studies, 10-mg/day to 30-mg/day doses of aripiprazole had no significant effect on metabolism by CYP2D6 (dextromethorphan), CYP2C9 (warfarin), CYP2C19 (omeprazole, warfarin), and CYP3A4 (dextromethorphan) substrates. Additionally, aripiprazole and dehydro-aripiprazole did not show potential for altering CYP1A2-mediated metabolism *in vitro*.

Due to its alpha-1 adrenergic receptor antagonist activity, aripiprazole has the potential to enhance the effect of certain antihypertensive agents

Drugs having no clinically important interactions with ABILIFY

Famotidine

Co-administration of aripiprazole (given in a single dose of 15 mg) with a 40-mg single dose of the H₂ antagonist famotidine, a potent gastric acid blocker, decreased the solubility of aripiprazole and, hence, its rate of absorption. The C_{max} of aripiprazole and dehydro-aripiprazole, was reduced by 37% and 21%, respectively. The extent of absorption (AUC) of aripiprazole and dehydro-aripiprazole, was reduced by 13% and 15%, respectively. No dosage adjustment of aripiprazole is required when administered concomitantly with famotidine.

Valproate

When valproate (500-1500 mg/day) and aripiprazole (30 mg/day) were co-administered, at steady state the C_{max} and AUC of aripiprazole were decreased by 25%. No dosage adjustment of aripiprazole is required when administered concomitantly with valproate.

When aripiprazole (30 mg/day) and valproate (1000 mg/day) were co-administered, at steady state there were no clinically important changes in the C_{max} or AUC of valproate. No dosage adjustment of valproate is required when administered concomitantly with aripiprazole.

Lithium

A pharmacokinetic interaction of aripiprazole with lithium is unlikely because lithium is not bound to plasma proteins, is not metabolized, and is almost entirely excreted unchanged in urine. Co-administration of therapeutic doses of lithium (1200-1800 mg/day) for 21 days with aripiprazole (30 mg/day) did not result in clinically important changes in the pharmacokinetics of aripiprazole or its active metabolite, dehydro-aripiprazole (C_{max} and AUC increased by less than 20%). No dosage adjustment of aripiprazole is required when administered concomitantly with lithium.

Co-administration of aripiprazole (30 mg/day) with lithium (900 mg/day) did not result in clinically important changes in the pharmacokinetics of lithium. No dosage adjustment of lithium is required when administered concomitantly with aripiprazole.

Lamotrigine

Co-administration of 10 to 30 mg daily oral doses of aripiprazole for 14 days to subjects with bipolar I disorder had no effect on the steady-state pharmacokinetics 100 to 400 mg once daily lamotrigine, a UDP-glucuronosyltransferase 1A4 substrate. No dosage adjustment of lamotrigine is required if aripiprazole and lamotrigine are administered concomitantly. Dosing recommendations for lamotrigine should be followed closely if valproate is also to be administered.

Venlafaxine

Co-administration of 10 to 20 mg daily oral doses of aripiprazole for 14 days to healthy subjects had no effect on the steady-state pharmacokinetics of venlafaxine and O-desmethylvenlafaxine

following 75 mg once daily venlafaxine XR, a CYP2D6 substrate. No dosage adjustment of venlafaxine is required if aripiprazole is administered concomitantly with venlafaxine.

Escitalopram

Co-administration of 10 mg daily oral doses of aripiprazole for 14 days to healthy subjects had no effect on the steady-state pharmacokinetics of 10 mg once daily escitalopram, a substrate of CYP2C19 and CYP3A4. No dosage adjustment of escitalopram is required if aripiprazole and escitalopram are administered concomitantly.

Dextromethorphan

Aripiprazole at doses of 10 to 30 mg per day for 14 days had no effect on dextromethorphan's O-dealkylation to its major metabolite, dextrorphan, a pathway dependent on CYP2D6 activity. Aripiprazole also had no effect on dextromethorphan's N-demethylation to its metabolite 3-methyoxymorphan, a pathway dependent on CYP3A4 activity. No dosage adjustment of dextromethorphan is required when administered concomitantly with aripiprazole.

Warfarin

Aripiprazole 10 mg per day for 14 days had no effect on the pharmacokinetics of R- and S-warfarin or on the pharmacodynamic end point of International Normalized Ratio, indicating the lack of a clinically relevant effect of aripiprazole on CYP2C9 and CYP2C19 metabolism or the binding of highly protein-bound warfarin. No dosage adjustment of warfarin is required when administered concomitantly with aripiprazole.

Omeprazole

Co-administration of aripiprazole (10 mg per day for 15 days) and a single 20-mg dose of omeprazole, a CYP2C19 substrate, had no effect on the pharmacokinetics of omeprazole in healthy subjects. No dosage adjustment of omeprazole is required when administered concomitantly with aripiprazole.

Lorazepam

Co-administration of oral lorazepam (2 mg) and oral aripiprazole (15 mg) to healthy subjects (n=24 males; ages 18-43 years old) did not result in clinically important changes in the pharmacokinetics of either drug. No dosage adjustment of either drug is required when they are administered concomitantly. However, the intensity of sedation was greater with the combination as compared to that observed with aripiprazole alone and the incidence of orthostatic hypotension observed was greater with the combination as compared to that observed with lorazepam alone (see WARNINGS AND PRECAUTIONS).

Drug-Food Interactions

ABILIFY can be administered with or without food (see ACTION AND CLINICAL PHARMACOLOGY).

Drug-Herb Interactions

Interactions with herbal products have not been studied.

Drug-Laboratory Interactions

Interactions with laboratory tests have not been identified

Drug-Lifestyle Interactions

Alcohol/CNS Drugs

Given the primary CNS effects of aripiprazole, as with most psychoactive medications, combination use of aripiprazole with alcohol or other CNS drugs with overlapping undesirable effects such as sedation, should be avoided

Smoking

Aripiprazole is metabolised by multiple pathways involving the CYP2D6 and CYP3A4 enzymes but not CYP1A enzymes. Thus, no dosage adjustment is required for smokers.

DOSAGE AND ADMINISTRATION

Dosing Considerations

The efficacy and safety of ABILIFY, at doses greater than 30 mg/day, have not been established.

Schizophrenia

Usual Dose in Adults: The recommended starting and target dose for ABILIFY is 10 or 15 mg/day administered on a once-a-day schedule without regard to meals. Doses in the range of 10 to 30 mg/day have been established as effective in clinical trials. However, greater efficacy has not been demonstrated at doses higher than 10 mg/day. Dosage increases, if needed, should only be made after 2 weeks, the time needed to achieve steady state. The maximum daily dose should not exceed 30 mg/day.

Patients should be maintained on the lowest effective dose that provides optimal clinical response and tolerability and should be periodically reassessed to determine the need for maintenance treatment.

Switching from Other Antipsychotics

There are no systematically collected data to specifically address switching patients with schizophrenia from other antipsychotics to ABILIFY or concerning concomitant administration

with other antipsychotics. While immediate discontinuation of the previous antipsychotic treatment may be acceptable for some patients with schizophrenia, more gradual discontinuation may be most appropriate for others. In all cases, the period of overlapping antipsychotic administration should be minimized.

Bipolar Disorder

Usual Dose in Adults: The recommended starting dose for ABILIFY as acute monotherapy or as cotherapy with lithium or valproate is 15 mg given once a day, without regard to meals. The dose can be increased to 30 mg/day based on clinical response.

Patients should be treated with the lowest effective dose that provides optimal clinical response and tolerability. The maximum daily dose should not exceed 30 mg/day.

Dosing Considerations in Special Populations

Pediatric (< 18 years of age): Safety and efficacy of ABILIFY in pediatric and adolescent patients have not been established. ABILIFY is not indicated for the treatment of pediatric and adolescent patients.

Geriatric (\geq 65 years of age): Safety and efficacy of ABILIFY in the treatment of schizophrenia and Bipolar I Disorder in patients 65 years of age or older have not been established. Given the greater sensitivity of this population, a lower starting dose may be considered when clinical factors warrant (see WARNINGS AND PRECAUTIONS-Special Populations, Geriatrics).

Patients with hepatic impairment: No dosage adjustment is required for patients with hepatic impairment.

Patients with renal impairment: No dosage adjustment is required in patients with renal impairment.

Gender: No dosage adjustment is required for female patients as compared to male patients.

Smoking status: No dosage adjustment is required for smokers (see DRUG INTERACTIONS – Drug Lifestyle Interaction).

Refer to DRUG INTERACTION section for dosage adjustment in patients taking aripiprazole concomitantly with strong CYP3A4 inhibitors (such as ketoconazole or clarithromycin), with potential CYP2D6 inhibitors (such as quinidine, fluoxetine, or paroxetine) or with potential CYP3A4 inducers (such as carbamazepine).

Missed Dose

If a patient misses a dose by a few hours, the patient should be advised to take their dose as soon

as he/she remembers. If most of the day has passed, he/she should be advised to wait until the next scheduled dose. Patients should be advised to not take 2 doses of ABILIFY at once.

OVERDOSAGE

Human Experience

In clinical studies, no deaths were associated with accidental or intentional acute overdosage of aripiprazole alone. In clinical trials, in the patient taking the largest confirmed amount of aripiprazole, 1080 mg, ingested with alcohol, the only symptom reported was vomiting.

In postmarketing experience, there is a single case of death that was possibly associated with accidental or intentional acute overdosage of aripiprazole alone. The patient ingested 900 mg of aripiprazole, was hospitalized in the intensive care unit for 10 to 14 days and died. The patient's medical history included excessive alcohol use, although it is unclear whether alcohol was present at the time of overdosage. In the patient taking the largest confirmed amount of aripiprazole, 1680 mg, the only symptoms reported were vomiting, fatigue, and dizziness. In addition, a report of non-fatal accidental overdose with aripiprazole alone (up to 195 mg) in a 2.5 year old child has been received. Vomiting, somnolence, lethargy, transient loss of consciousness and CNS depression were reported for this patient. Other potentially medically important signs and symptoms that have been observed during overdose included blood pressure increased and tachycardia. In the patients who were evaluated in hospital settings, there were no reported observations indicating clinically important adverse change in vital signs, laboratory assessments, or electrocardiogram.

Management of Overdosage

No specific information is available on the treatment of overdose with aripiprazole. Management of overdose should concentrate on supportive therapy, maintaining an adequate airway, oxygenation and ventilation, and management of symptoms. The possibility of multiple drug involvement should be considered. Therefore, cardiovascular monitoring should commence immediately and should include continuous electrocardiographic monitoring to detect possible arrhythmias. Following any confirmed or suspected overdose with aripiprazole, close medical supervision and monitoring should continue until the patient recovers.

Charcoal: In the event of an overdose of ABILIFY, an early charcoal administration may be useful in partially preventing the absorption of aripiprazole. Administration of 50 g of activated charcoal, one hour after a single 15-mg oral dose of aripiprazole, decreased the mean AUC and C_{max} of aripiprazole by 50%.

Hemodialysis: Although there is no information on the effect of hemodialysis in treating an overdose with aripiprazole, hemodialysis is unlikely to be useful in overdose management since aripiprazole is highly bound to plasma proteins.

For up-to-date information on the management of a suspected drug overdose, contact the regional Poison Control Centre.

ACTION AND CLINICAL PHARMACOLOGY

Mechanism of Action

The mechanism of action of aripiprazole, as with other drugs having efficacy in schizophrenia and bipolar disorder is unknown. However, it has been proposed that the efficacy of aripiprazole may be mediated through a combination of partial agonist activity at D2 and 5-HT1A receptors and antagonist activity at 5-HT2A receptors; however, the clinical relevance of these interactions has not been established. Actions at receptors other than D2, 5-HT1A, and 5-HT2A may explain some of the other clinical effects of aripiprazole (eg, the orthostatic hypotension observed with aripiprazole may be explained by its antagonist activity at adrenergic alpha1 receptors). The clinical relevance of these receptor interactions with aripiprazole is unknown.

Pharmacodynamics

Aripiprazole exhibits high affinity for dopamine D2 and D3, serotonin 5-HT1A and 5-HT2A receptors (K_i values of 0.34, 0.8, 1.7, and 3.4 nM, respectively), moderate affinity for dopamine D4, serotonin 5-HT2C and 5-HT7, alpha1-adrenergic and histamine H1 receptors (K_i values of 44, 15, 39, 57, and 61 nM, respectively), and moderate affinity for the serotonin reuptake site (K_i=98 nM). Aripiprazole has no appreciable affinity for cholinergic muscarinic receptors (IC₅₀>1000 nM). Aripiprazole functions as a partial agonist at the dopamine D2 and the serotonin 5-HT1A receptors, and as an antagonist at serotonin 5-HT2A receptor. The clinical relevance of these receptor interactions with aripiprazole is unknown.

Pharmacokinetics

ABILIFY activity is presumably primarily due to the parent drug, aripiprazole, and to a lesser extent, to its major metabolite, dehydro-aripiprazole, which has affinities for D2 receptors similar to the parent drug and represents 40% of the parent drug exposure in plasma. The mean elimination half-lives are about 75 hours and 94 hours for aripiprazole and dehydro-aripiprazole, respectively. Steady-state concentrations are attained within 14 days of dosing for both active moieties. Aripiprazole accumulation is predictable from single-dose pharmacokinetics. At steady state, the pharmacokinetics of aripiprazole are dose-proportional. Elimination of aripiprazole is mainly through hepatic metabolism involving two P450 isozymes, CYP2D6 and CYP3A4.

Absorption

Aripiprazole is well absorbed after oral administration of the tablet, with peak plasma concentrations occurring within 3 to 5 hours; the absolute oral bioavailability of the tablet formulation is 87%. ABILIFY can be administered with or without food. Administration of a 15-mg ABILIFY Tablet with a standard high-fat meal did not significantly affect the C_{max} or AUC of aripiprazole or its active metabolite, dehydro-aripiprazole, but delayed T_{max} by 3 hours for aripiprazole and 12 hours for dehydro-aripiprazole.

Distribution

The steady-state volume of distribution of aripiprazole following intravenous administration is high (404 L or 4.9 L/kg), indicating extensive extravascular distribution. At therapeutic concentrations, aripiprazole and its major metabolite are greater than 99% bound to serum proteins, primarily to albumin. In healthy human volunteers administered 0.5 to 30 mg/day aripiprazole for 14 days, there was dose-dependent D2 receptor occupancy. The clinical relevance of this receptor occupancy by aripiprazole is unknown.

Metabolism and Elimination

Aripiprazole is metabolized primarily by three biotransformation pathways: dehydrogenation, hydroxylation, and N-dealkylation. Based on in vitro studies, CYP3A4 and CYP2D6 enzymes are responsible for dehydrogenation and hydroxylation of aripiprazole, and N-dealkylation is catalyzed by CYP3A4. Aripiprazole is the predominant drug moiety in the systemic circulation. At steady state, dehydro-aripiprazole, the active metabolite, represents about 40% of aripiprazole AUC in plasma.

Approximately 8% of Caucasians lack the capacity to metabolize CYP2D6 substrates and are classified as poor metabolizers (PM), whereas the rest are extensive metabolizers (EM). PMs have about an 80% increase in aripiprazole exposure and about a 30% decrease in exposure to the active metabolite compared to EMs, resulting in about a 60% higher exposure to the total active moieties from a given dose of aripiprazole compared to EMs. Co-administration of ABILIFY with known inhibitors of CYP2D6, like quinidine in EMs, results in a 112% increase in aripiprazole plasma exposure, and dose adjustment is needed (see DRUG INTERACTIONS). The mean elimination half-life for aripiprazole is about 75 hours in EMs and 146 hours in PMs. Aripiprazole does not inhibit or induce the CYP2D6 pathway.

Following a single oral dose of [¹⁴C]-labeled aripiprazole, approximately 25% and 55% of the administered radioactivity was recovered in the urine and feces, respectively. Less than 1% of unchanged aripiprazole was excreted in the urine and approximately 18% of the oral dose was recovered unchanged in the feces.

Special Populations and Conditions

Geriatrics

In formal single-dose pharmacokinetic studies (with aripiprazole given in a single dose of 15 mg), clearance of aripiprazole was 20% lower in elderly (≥65 years) subjects compared to younger adult subjects (18 to 64 years). However, there was no effect of age in the population pharmacokinetic analysis in schizophrenia patients. Also, the pharmacokinetics of aripiprazole after multiple doses in elderly patients appeared similar to that observed in young, healthy subjects. (see WARNINGS AND PRECAUTIONS - Special Populations, Geriatrics and DOSAGE AND ADMINISTRATION).

Gender

C_{max} and AUC of aripiprazole and its active metabolite, dehydro-aripiprazole, are 30 to 40% higher in women than in men, and correspondingly, the apparent oral clearance of aripiprazole is lower in women. However, these differences are largely explained by differences in body weight (25%) between men and women. No dosage adjustment is recommended based on gender.

Race

Although no specific pharmacokinetic study was conducted to investigate the effects of race on the disposition of aripiprazole, population pharmacokinetic evaluation did not demonstrate clinically important race-related differences in the pharmacokinetics of aripiprazole. No dosage adjustment is recommended based on race.

Renal Impairment

In patients with severe renal impairment (creatinine clearance <30 mL/min), C_{max} of aripiprazole (given in a single dose of 15 mg) and dehydro-aripiprazole increased by 36% and 53%, respectively, but AUC was 15% lower for aripiprazole and 7% higher for dehydro-aripiprazole. Renal excretion of both unchanged aripiprazole and dehydro-aripiprazole is less than 1% of the dose. No dosage adjustment is required in subjects with renal impairment.

Hepatic Impairment

In a single-dose study (15 mg of aripiprazole) in subjects with varying degrees of liver cirrhosis (Child-Pugh Classes A, B, and C), the AUC of aripiprazole, compared to healthy subjects, increased 31% in mild HI, increased 8% in moderate HI, and decreased 20% in severe HI. None of these differences would require dose adjustment.

Smoking

Based on studies utilizing human liver enzymes in vitro, aripiprazole is not a substrate for CYP1A2 and also does not undergo direct glucuronidation. Smoking should, therefore, not have an effect on the pharmacokinetics of aripiprazole. Consistent with these in vitro results, population pharmacokinetic evaluation did not demonstrate any significant pharmacokinetic differences between smokers and nonsmokers. No dosage adjustment is recommended based on smoking status.

STORAGE AND STABILITY

Store tablets at 15° C to 30° C.

DOSAGE FORMS, COMPOSITION AND PACKAGING

2 mg

Each green, modified rectangle tablet imprinted with "A-006" and "2" contains: aripiprazole 2 mg. Non-medicinal ingredients: cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. Coloring agents: FD&C Blue No. 2 Aluminum Lake and Iron Oxide Yellow. Bottles of 30 tablets.

5 mg

Each blue, modified rectangle tablet imprinted with "A-007" and "5" contains: aripiprazole 5 mg. Non-medicinal ingredients: cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. Coloring agents: FD&C Blue No. 2 Aluminum Lake. Bottles of 30 tablets.

10 mg

Each pink, modified rectangle tablet imprinted with "A-008" and "10" contains: aripiprazole 10 mg. Non-medicinal ingredients: cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. Coloring agents: Iron oxide red. Bottles of 30 tablets.

15 mg

Each yellow, round tablet imprinted with "A-009" and "15" contains: aripiprazole 15 mg. Non-medicinal ingredients: cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. Coloring agents: Iron oxide yellow. Bottles of 30 tablets.

20 mg

Each white, round tablet imprinted with "A-010" and "20" contains: aripiprazole 20 mg. Non-medicinal ingredients: cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. Bottles of 30 tablets.

30 mg

Each pink, round tablet imprinted with "A-011" and "30" contains: aripiprazole 30 mg. Non-medicinal ingredients: cornstarch, hydroxypropyl cellulose, lactose monohydrate, magnesium stearate, and microcrystalline cellulose. Coloring agents: Iron Oxide Red. Bottles of 30 tablets.

PART II: SCIENTIFIC INFORMATION

PHARMACEUTICAL INFORMATION

Drug Substance

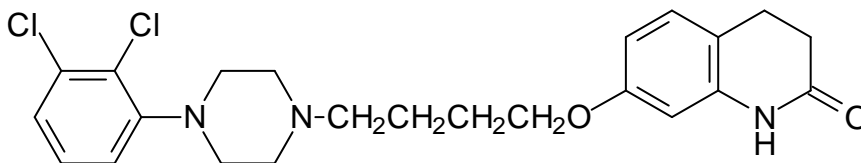
Proper name: aripiprazole

Chemical name: 7-[4-[4-(2,3-dichlorophenyl)-1-piperazinyl]butoxy]-3,4-dihydrocarbostyryl.

Molecular formula: C₂₃H₂₇Cl₂N₃O₂

Molecular mass: 448.38

Structural formula:



Physicochemical properties: Aripiprazole is a white crystalline powder. Aripiprazole is practically insoluble in water. The pKa was determined to be 7.6 (in 20% ethanol solution).

CLINICAL TRIALS

Schizophrenia

The efficacy of ABILIFY (aripiprazole) in the treatment of schizophrenia was evaluated in five short-term (4- and 6-week), placebo-controlled trials of acutely relapsed inpatients who predominantly met DSM-III/IV criteria for schizophrenia. Four of the five trials were able to distinguish aripiprazole from placebo, but one study, the smallest, did not. Three of these studies also included an active control group consisting of either risperidone (one trial) or haloperidol (two trials), but they were not designed to allow for a comparison of ABILIFY and the active comparators.

In the four positive trials for ABILIFY, four primary measures were used for assessing psychiatric signs and symptoms. The Positive and Negative Syndrome Scale (PANSS) is a multi-item inventory of general psychopathology used to evaluate the effects of drug treatment in schizophrenia. The PANSS positive subscale is a subset of items in the PANSS that rates seven positive symptoms of schizophrenia (delusions, conceptual disorganization, hallucinatory behavior, excitement, grandiosity, suspiciousness/persecution, and hostility). The PANSS negative subscale is a subset of items in the PANSS that rates seven negative symptoms of

schizophrenia (blunted affect, emotional withdrawal, poor rapport, passive apathetic withdrawal, difficulty in abstract thinking, lack of spontaneity/flow of conversation, stereotyped thinking). The Clinical Global Impression (CGI) assessment reflects the impression of a skilled observer, fully familiar with the manifestations of schizophrenia, about the overall clinical state of the patient.

In a 4-week trial (n=414) comparing two fixed doses of ABILIFY (15 or 30 mg/day) and haloperidol (10 mg/day) to placebo, both doses of ABILIFY were superior to placebo in the PANSS total score, PANSS positive subscale, and CGI-severity score. In addition, the 15-mg dose was superior to placebo in the PANSS negative subscale

In a 4-week trial (n=404) comparing two fixed doses of ABILIFY (20 or 30 mg/day) and risperidone (6 mg/day) to placebo, both doses of ABILIFY were superior to placebo in the PANSS total score, PANSS positive subscale, PANSS negative subscale, and CGI-severity score.

In a 6-week trial (n=420) comparing three fixed doses of ABILIFY (10, 15, or 20 mg/day) to placebo, all three doses of ABILIFY were superior to placebo in the PANSS total score, PANSS positive subscale, and the PANSS negative subscale.

In a 6-week trial (n=367) comparing three fixed doses of ABILIFY (2, 5, or 10 mg/day) to placebo, the 10-mg dose of ABILIFY was superior to placebo in the PANSS total score, the primary outcome measure of the study. The 2-mg and 5-mg doses did not demonstrate superiority to placebo on the primary outcome measure.

In a fifth study, a 4-week trial (n=103) comparing ABILIFY in a range of 5 to 30 mg/day or haloperidol 5 to 20 mg/day to placebo, haloperidol was superior to placebo, in the Brief Psychiatric Rating Scale (BPRS), a multi-item inventory of general psychopathology traditionally used to evaluate the effects of drug treatment in psychosis, and in a responder analysis based on the CGI-severity score, the primary outcomes for that trial. ABILIFY was only significantly different compared to placebo in a responder analysis based on the CGI-severity score.

Thus, the efficacy of 10-mg, 15-mg, 20-mg, and 30-mg daily doses was established in two studies for each dose. Among these doses, there was no evidence that the higher dose groups offered any advantage over the lowest dose group of these studies.

An examination of population subgroups did not demonstrate any clear evidence of differential responsiveness on the basis of age, gender, or race.

A longer-term trial enrolled 310 inpatients or outpatients meeting DSM-IV criteria for schizophrenia who were, by history, symptomatically stable on other antipsychotic medications for periods of 3 months or longer. These patients were discontinued from their antipsychotic medications and randomized to ABILIFY 15 mg or placebo for up to 26 weeks of observation

for relapse. Relapse during the double-blind phase was defined as CGI-Improvement score of ≥ 5 (minimally worse), scores ≥ 5 (moderately severe) on the hostility or uncooperativeness items of the PANSS, or $\geq 20\%$ increase in the PANSS total score. Patients receiving ABILIFY 15 mg experienced a significantly longer time to relapse over the subsequent 26 weeks compared to those receiving placebo.

Bipolar Disorder

The efficacy of ABILIFY in the treatment of acute manic episodes was established in four 3-week, placebo-controlled studies in hospitalized patients who met the DSM-IV criteria for Bipolar I Disorder with manic or mixed episodes. These studies included patients with or without psychotic features and two of the studies also included patients with or without a rapid-cycling course (approximately 20% with rapid cycling course in both studies). Two of these studies included an active control group for assay sensitivity. In the studies that included active control groups, patients were allowed to continue on aripiprazole or active control for up to 12 weeks.

The primary instrument used for assessing manic symptoms in all four studies was the Young Mania Rating Scale (Y-MRS) an 11-item clinician-rated scale traditionally used to assess the degree of manic symptomatology (irritability, disruptive/aggressive behavior, sleep, elevated mood, speech, increased activity, sexual interest, language/thought disorder, thought content, appearance, and insight) in a range from 0 (no manic features) to 60 (maximum score). The primary efficacy endpoint was the mean change from baseline in total Y-MRS score at the Week 3 endpoint (Last Observation Carried Forward, LOCF). A key secondary endpoint was the Severity of Illness score (mania) from the Clinical Global Impression - Bipolar (CGI-BP) Scale.

In the four studies, patients were randomized to placebo (n=132, n=135, n=165, n=152) or aripiprazole (n=130, n=137, n=155, n=167). Studies with an active control group included a group of patients randomized to haloperidol (n=160) in one study, and a group of patients randomized to lithium (n=165) in the other study.

All four studies evaluated flexible doses of ABILIFY 15 or 30 mg/day, administered once daily (with a starting dose of 15 mg/day in two studies and 30 mg/day in two studies). In all four studies the majority of patients were treated with the 30-mg dose.

In all four studies, ABILIFY was superior to placebo in the reduction of manic symptoms, as measured by the mean change from baseline to Week 3 (LOCF) in Y-MRS total score (primary endpoint) and CGI-BP Severity of Illness score (mania) (key secondary endpoint).

Adjunctive Therapy

The efficacy of adjunctive ABILIFY with concomitant lithium or valproate in the treatment of manic or mixed episodes was established in a 6-week, placebo-controlled study (n=384) with a 2-week lead-in mood stabilizer monotherapy phase in patients who met DSM-IV criteria for Bipolar I Disorder. This study included patients with manic or mixed episodes and with or without psychotic features.

Patients were initiated on open-label treatment with lithium or valproate, and remained on stable doses at therapeutic serum levels (lithium 0.6 mEq/L to 1.0 mEq/L; valproate 50 µg/mL to 125 µg/mL) for 2 weeks. At the end of 2 weeks, patients demonstrating partial non-response (Y-MRS ≥ 16) to lithium or valproate were randomized to receive either aripiprazole (n=253) or placebo (n=131) as adjunctive therapy with open-label lithium or valproate. In the 6-week placebo-controlled phase, adjunctive ABILIFY (15 or 30 mg/day, starting dose 15 mg/day) was superior to adjunctive placebo, when each was administered concomitantly with lithium or valproate (at therapeutic serum levels), in the reduction of the Y-MRS total score (primary endpoint) and CGI-BP Severity of Illness score (mania) (key secondary endpoint).

DETAILED PHARMACOLOGY

Nonclinical pharmacodynamics

Extensive *in vitro* and *in vivo* studies demonstrated that aripiprazole is a potent partial agonist at dopamine D₂ and serotonin 5-HT_{1A} receptors and an antagonist at serotonin 5-HT₂ receptors. Aripiprazole binds with high affinity to dopamine D₂ and D₃ and serotonin 5-HT_{1A} and 5-HT_{2A} receptors; with moderate affinity to dopamine D₄, serotonin 5-HT_{2C} and 5-HT₇, alpha₁-adrenergic and histamine H₁ receptors and the serotonin transporter and with low affinity to muscarinic receptors. As a D₂ partial agonist, aripiprazole blocks postsynaptic D₂ receptors at a dose comparable to that at which it acts as agonist at presynaptic dopamine receptors. Aripiprazole exhibits the properties of an agonist in animal models of dopaminergic hypoactivity and the properties of an antagonist in animal models of dopaminergic hyperactivity. In multiple behavioral models, aripiprazole exhibits an antipsychotic profile and is several fold less potent than atypical antipsychotics in animal models predictive of extrapyramidal side effect liability.

Cardiorespiratory System

Aripiprazole and OPC-14857 inhibited the HERG/IKr current at 140- and 461-fold multiples of the maximum steady-state plasma free-drug concentration, respectively, and there were no effects on action potential duration (APD) in the rabbit Purkinje fiber assay. OPC-3373 demonstrated no *in vitro* inhibition of HERG/IKr current or prolongation of APD at concentrations up to 10 µM. Neither aripiprazole nor the main human metabolites (OPC-14857, OPC-3373) accumulate in rat cardiac tissue following single or repeat (13 days) dosing. Potential cardiovascular effects were also assessed in *in vitro* and *in vivo* safety pharmacology (anesthetized dogs) and toxicology studies (39-week treatment in monkeys) in which no significant changes were observed.

Central and Peripheral Nervous Systems

In animals, aripiprazole was less potent than chlorpromazine and haloperidol in producing behavioral signs consistent with CNS depression, in inducing catalepsy, and in suppressing spontaneous motor activity and, unlike these comparators, did not cause convulsions. Additionally, it reduced motor coordination and prolonged the duration of hexobarbital-induced

hypnosis with a potency comparable to chlorpromazine. In contrast, aripiprazole demonstrated less potential than chlorpromazine or haloperidol to induce muscular relaxation and analgesia.

Other Systems and Tissues

In vitro and *in vivo* safety pharmacology studies were conducted to assess the potential of aripiprazole to alter gastric secretion, gastrointestinal motility, smooth muscle contractility, and urine volume and electrolyte excretion. These studies indicated that aripiprazole has little potential to cause gastrointestinal or renal side effects or affect smooth muscle contractility.

Nonclinical Pharmacokinetics

The absorption, distribution, metabolism and excretion properties of aripiprazole were evaluated in a series of *in vitro* and *in vivo* studies in mice, rats, rabbits, dogs, minipigs, and monkeys. Aripiprazole had only moderate intrinsic membrane permeability *in vitro*, but was well absorbed following oral administration in animals and humans.

Following intravenous administration of aripiprazole, its elimination half-life (1 to 5 hours) was shorter and its plasma clearance (14 to 110 mL/min/kg) was more rapid in animals than in humans (75 hours and 0.7 mL/min/kg, respectively). As in humans, the steady-state volumes of distribution in animals suggest extensive extravascular distribution.

The exposure of mice, rats, and monkeys to aripiprazole after oral dosing was dose-related. In rats, possibly due to saturation of presystemic metabolism and/or clearance, the increase in exposure was greater than the dose increment; however, in mice and monkeys, exposure increased in a generally dose-proportional manner. After repeated daily doses, exposures to aripiprazole and its pharmacologically-active metabolite, dehydro-aripiprazole, were slightly higher in female rats than in male rats; there were no gender-related differences in mice or monkeys. Systemic accumulation of aripiprazole and its metabolites was seen at toxicologically-relevant doses after once-daily chronic administration in both rats and monkeys.

In rats, concentrations of unchanged aripiprazole in the brain were up to 5-times higher than plasma concentrations. Following [¹⁴C]-aripiprazole administration to pregnant rats, radioactivity in the fetus was low and only a trace amount was detected in the amniotic fluid. After [¹⁴C]-aripiprazole administration to lactating rats, milk vs blood concentration ratios were greater than one for up to 24 hours. *In vitro*, aripiprazole bound extensively (99.4 to 99.8%) to proteins in mouse, rat, rabbit, dog, monkey, and human sera.

Parent drug was undetectable in rat and monkey urine, indicating that renal clearance is not an important mechanism of elimination. Aripiprazole was mainly eliminated via metabolic clearance and aripiprazole metabolites were eliminated by both renal and biliary routes in monkeys and predominantly by the biliary route in rats. After oral administration of [¹⁴C]-aripiprazole to rats and monkeys, drug-derived radioactivity was recovered primarily in the feces (~90 and 62% of dose, respectively). The metabolism of aripiprazole in rats and monkeys was

qualitatively similar to that in humans, though the rate of elimination through metabolism in humans was slower compared to animals. The metabolism of aripiprazole was primarily by dehydrogenation, hydroxylation, and N-dealkylation. Formation of the pharmacologically-active dehydro-aripiprazole was a major route metabolism. This and other Phase 1 metabolites were subject to further metabolism, including conjugation reactions. In rats, as in humans, unchanged drug was the major drug-related component in plasma, while in monkeys, aripiprazole accounted for only 13% of the drug-related material in plasma. All of the major metabolites in human plasma were present in the plasma rats and monkeys, the principle species used for nonclinical toxicity testing, indicating that these species were appropriate for safety assessment of aripiprazole and its metabolites.

In vitro studies indicated that cytochrome P450 (CYP) isoforms, CYP3A4 and CYP2D6 were responsible for the dehydrogenation and hydroxylation of aripiprazole, while its N-dealkylation was catalyzed by CYP3A4 only. Clinical studies were conducted to evaluate the potential for drug-drug interactions in vivo. While coadministration of CYP3A4 or CYP2D6 inhibitors decreased the oral clearance of aripiprazole by approximately 40-50% and coadministration of an inducer of CYP3A4 increased the oral clearance of aripiprazole, these changes were not regarded as clinically meaningful. In vitro studies also indicated that neither aripiprazole nor its dehydro metabolite should meaningfully inhibit the in vivo activity of CYP isozymes at clinically-relevant concentrations. This was confirmed in clinical studies in which no clinically-meaningful effect of aripiprazole on the clearance of substrates for CYP3A4, CYP2D6, CYP2C9, and CYP2C19 was found.

TOXICOLOGY

Acute Toxicity

The acute oral toxicity of aripiprazole was determined in rats and monkeys. The estimated median lethal oral dose in male and female rats was 953 and 705 mg/kg, respectively, and in monkeys was greater than 2000 mg/kg for both sexes. Clinical signs consistent with pharmacologically mediated central nervous (CNS) depression and extrapyramidal side effects were noted in both species. In rats, clinical signs included decreased spontaneous motor activity, crouching, prone position, ataxia, tremors, convulsions, straub tail, catalepsy, ptosis, and coldness to touch. In monkeys, principal drug-related effects included impaired motor activity, hyporeactivity to external stimuli, tremors, catalepsy, closed eyes, crouching, and prone and/or lateral position.

Short- and Long-Term Toxicity

The short- and long-term toxicity of aripiprazole was determined in 4- to 52-week oral toxicity studies in rats and monkeys. The results from these studies are summarized in the following table.

Short- and Long-Term Toxicity

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Rat/SD	Oral gavage	4 weeks	0, 60, 100	10 or 15 M 10 or 15 F	<p><u>60 and 100 mg/kg/day</u>: Sedation (primarily in Week 1) and dose-related decreases in body weight, body weight gain, and food consumption; dose-related minimal or mild increases in serum glutamic pyruvic transaminase, glutamic oxaloacetic transaminase, and γ-glutamyltranspeptidase; and microscopically, dose-related minimal to moderate adrenocortical hypertrophy, mild atrophy of the pars intermedia in the pituitary gland, minimal to mild bone marrow hypocellularity, increased incidence and severity of pulmonary alveolar foam cell accumulation in the lung, minimal salivary gland acinar cell hypertrophy, minimal mammary gland lobular hyperplasia with minimal to mild milk secretion, minimally decreased numbers of ovarian corpora lutea, and low incidences of minimal uterine atrophy.</p> <p><u>100 mg/kg/day</u>: Emaciation, transient hypothermia, lacrimation, tremors, and unkempt appearance and microscopically, minimal mucification of the vaginal epithelium.</p> <p>All mammary gland and reproductive tract changes in females were considered to be secondary to aripiprazole-related increases in serum prolactin. Additionally, all changes were reversible or partially reversible after a 4-week post-dose period for the 100 mg/kg/day animals.</p>
Rat/SD	Oral gavage	13 weeks	0, 2, 6, 20	10 or 16 M 10 or 16 F	<p><u>2 and 6 (M) mg/kg/day</u>: No drug-related changes.</p> <p><u>6 (F) and 20 mg/kg/day</u>: In females, minimal increases in body weight gain and food consumption (6 mg/kg/day only) and microscopically, mucification of vaginal epithelium and lobular hyperplasia of the mammary glands.</p> <p><u>20 mg/kg/day</u>: Minimal decreases in body weight gain and food consumption in males; decreased liver and uterus weights; and microscopically, mammary milk secretion in females. Anatomic changes in the mammary gland and reproductive tract of females were considered to be secondary to aripiprazole-related increases in serum prolactin. At the end of the 4-week post-dose period, all findings were reversible except for minimal decreases in body weight gain and food consumption.</p>

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Rats/SD	Oral gavage	26 weeks	0, 10, 30, 60	20 or 25 M 20 or 25 F	<p><u>10 mg/kg/day</u>: Minimal or mild increases in body weight and food consumption in females.</p> <p><u>10, 30, and 60 mg/kg/day</u>: Dose-related minimal to moderate decreases in body weight (10 mg/kg/day only in males), including initial weight loss at 60 mg/kg/day; minimal or mild decreases in serum total protein and albumin; pale discoloration of the lungs; and microscopically, dose-related minimal to moderate atrophy of pituitary pars intermedia, increased incidence of minimal to moderate pulmonary histiocytosis, and changes in the mammary gland (atrophy in males \geq 30 mg/kg/day; hyperplasia in females) and female reproductive tract (ie, persistent diestrus) that were considered secondary to drug-related hyperprolactinemia.</p> <p><u>30 and 60 mg/kg/day</u>: Dose-related increased incidences of transient post-dose hypoactivity and ptosis and predose hyperactivity; minimal to moderate decreases in food consumption; and microscopically, minimally increased adrenocortical lipofuscin pigment and minimal to mild adrenocortical hypertrophy in females.</p> <p><u>60 mg/kg/day</u>: Minimal decreases in hematocrit, reticulocytes, and hemoglobin (females); increased adrenal (females) and lung weights; decreased testicular size and weight; dark discoloration of the adrenals and ovaries; and, microscopically, minimal to moderate bilateral testicular atrophy and minimally increased ovarian lipofuscin pigment.</p> <p>Except for remnants of the adrenal and ovarian pigment, all aripiprazole-related effects were reversible or partially reversible (hyperactivity and pulmonary histiocytosis with associated increases in lung weight) after a 13-week post-dose period.</p>

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Rat/SD	Oral gavage	52 weeks	0, 1, 3, 10	20 M 20 F	<p><u>1, 3, and 10 mg/kg/day</u>: Mild to moderate uterine atrophy and slight increase in corpora lutea.</p> <p><u>3 and 10 mg/kg/day</u>: Minimal to mild increases (transient at 10 mg/kg/day) in body weights; minimal, sporadic increases in food consumption; decreases in adrenal, liver, kidney, and uterus weights and increases in ovarian weights; and microscopically, increased severity of lobular hyperplasia of mammary gland and increased incidence and severity of vaginal epithelial mucification in females (changes considered secondary to aripiprazole-related increases in prolactin).</p> <p><u>10 mg/kg/day</u>: Decreased liver weight; macroscopic evidence of mammary gland development in females; and microscopically, karyomegaly of hepatocytes, renal proximal tubular epithelium, and Harderian gland acinar cells.</p>

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Monkey/ Cynomolgus	Oral Gavage	4 weeks	1, 5, 25, 125	1 M 1 F	<p><u>1, 5, 25, and 125 mg/kg/day</u>: Impairment of motor activity characterized by ataxic gait, reduced motor activity, and/or absence of motion (1 mg/kg/day only in Week 1).</p> <p><u>5, 25, and 125 mg/kg/day</u>: Closed eyes, catalepsy, tremors, and slight decreases in food consumption (Weeks 1 and 2).</p> <p><u>25 and 125 mg/kg/day</u>: Abnormal posture (crouching, lateral, or prone position) and hyporeactivity; minimal dose-related body weight loss (Weeks 1 and 2); and at necropsy, retention of gallsand (granular material) in the gallbladder.</p> <p><u>125 mg/kg/day</u>: At necropsy, a stone (calculus) in the gallbladder of 1 animal.</p>

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Monkey/ Cynomolgus	Oral Gavage	13 weeks	0, 0.5, 1, 5, 25	3 to 5 M 3 to 5 F	<p><u>0.5 and 1 mg/kg/day</u>: No drug-related findings.</p> <p><u>5 and 25 mg/kg/day</u>: Dose-related impairment of motor activity, hyporeactivity, tremors, catalepsy, and abnormal posture. These clinical signs generally were mild at 5 mg/kg/day and severe at 25 mg/kg/day early in the study, but improved with continued dosing at 25 mg/kg/day.</p> <p><u>25 mg/kg/day</u>: Minimal decreases in body weight, moderate decreases in food consumption, and sporadic absence of feces in Weeks 1 and 2 and moderate to severe muddy substance in the bile at necropsy.</p> <p>All drug-related alterations disappeared or improved during the 4-week post-dose period.</p>

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Monkey/ Cynomolgus	Oral Gavage	39 weeks	0, 25, 50, 75/100	4 M 4 F	<p>Due to pronounced clinical signs at 100 mg/kg/day on Day 1, high-dose animals were not treated on Days 2 to 4. Starting on Day 5 through remainder of the study, high-dose animals were treated at 75 mg/kg/day.</p> <p><u>25 mg/kg/day</u>: Low incidence of impaired motor activity in 1 male.</p> <p><u>25, 50, and 75 mg/kg/day</u>: Dose-related tremors and mild to moderate hypoactivity (transient at 25 mg/kg/day), vomitus (emesis), qualitatively reduced food consumption, low incidences of hunched or unusual posture, and mucus-like and granular (gallsand) materials in the gallbladder.</p> <p><u>50 and 75 mg/kg/day</u>: Low incidences of excessive salivation, sternal recumbency, and gallbladder calculi (gallstones); and, microscopically, low incidence of generally minimal liver alterations consistent with hepatolithiasis in the subcapsular parenchyma of the right median lobe proximal to the gallbladder.</p> <p><u>75 mg/kg/day</u>: One female euthanatized moribund in Week 3 due to severe clinical toxicity characterized by mild to severe hypoactivity, tremors, excessive salivation, lateral or sternal recumbency, hunched or unusual posture, impaired motor activity, and reduced food consumption (low or none). This female was the only high-dose animal that had not recovered when dosing resumed at 75 mg/kg/day on Day 5. Minimal decreases in body weight in males and low incidence of ataxia in 1 female.</p> <p>Analyses of gallsand and gallstones indicated that sulfate conjugates of hydroxy metabolites of aripiprazole were the major drug-related constituents; and bile acids, principally taurodeoxycholic acid, were the primary nondrug-related constituents. Analyses of intrahepatic concretions (hepatoliths) demonstrated morphologic features and elemental composition that were similar to gallsand and gallstones.</p>

Species/ Strain	Route of Administration	Duration of Dosing	Dose (mg/kg)	Number/ Sex	Noteworthy Findings
Monkey/ Cynomolgus	Oral Gavage	52 weeks	0, 0.5, 5, 25	4 M 4 F	<p><u>0.5 mg/kg/day</u>: No drug-related changes.</p> <p><u>5 and 25 mg/kg/day</u>: Dose-related incidences and/or severity of impaired motor activity, hyporeactivity, tremors, catalepsy, and abnormal posture (crouching, lateral, and/or prone position) that were most evident during Weeks 1 and 2. At 25 mg/kg/day, impaired motor activity was severe in Week 1 and generally mild during the remainder of the study. Hyporeactivity disappeared by Week 3 and catalepsy and abnormal posture were observed sporadically throughout the dosing period.</p> <p><u>25 mg/kg/day</u>: Minimal decreases in body weight and mild to moderate decreases in food consumption during Weeks 1 and 2. At necropsy, slight to generally moderate gallsand in 3 animals and gallstones in 1 animal. In comparison, slight gallsand noted in 2 controls.</p>

Mutagenesis

The mutagenic potential of aripiprazole was tested in the in vitro bacterial reverse-mutation assay, the in vitro bacterial DNA repair assay, the in vitro forward gene mutation assay in mouse lymphoma cells, the in vitro chromosomal aberration assay in Chinese hamster lung (CHL) cells, the in vivo micronucleus assay in mice, and the unscheduled DNA synthesis assay in rats. Aripiprazole was clastogenic in the in vitro chromosomal aberration assay in CHL cells with and without metabolic activation. A positive response was obtained in the in vivo micronucleus assay in mice; however, the response was due to a mechanism considered not relevant to humans.

Reproductive Toxicity

In animal studies, aripiprazole demonstrated developmental toxicity, including possible teratogenic effects in rats and rabbits.

Pregnant rats were treated with oral doses of 3, 10, and 30 mg/kg/day (1, 3, and 10 times the maximum recommended human dose [MRHD] on a mg/m² basis) of aripiprazole during the period of organogenesis. Gestation was slightly prolonged at 30 mg/kg. Treatment caused a slight delay in fetal development, as evidenced by decreased fetal weight (30 mg/kg), undescended testes (30 mg/kg), and delayed skeletal ossification (10 and 30 mg/kg). There were no adverse effects on embryofetal or pup survival. Delivered offspring had decreased bodyweights (10 and 30 mg/kg), and increased incidences of hepatodiaphragmatic nodules and diaphragmatic hernia at 30 mg/kg (the other dose groups were not examined for these findings). A low incidence of diaphragmatic hernia was also seen in the fetuses exposed to 30 mg/kg. Postnatally, delayed vaginal opening was seen at 10 and 30 mg/kg and impaired reproductive performance (decreased fertility rate, corpora lutea, implants, and live fetuses and increased post-implantation loss, likely mediated through effects on female offspring) was seen at 30 mg/kg. Some maternal toxicity was seen at 30 mg/kg; however, there was no evidence to suggest that these developmental effects were secondary to maternal toxicity.

In pregnant rats receiving aripiprazole injection intravenously (3, 9, and 27 mg/kg/day) during the period of organogenesis, decreased fetal weight and delayed skeletal ossification were seen at the highest dose, which also caused maternal toxicity.

Pregnant rabbits were treated with oral doses of 10, 30, and 100 mg/kg/day (2, 3, and 11 times human exposure at MRHD based on AUC) of aripiprazole during the period of organogenesis. Decreased maternal food consumption and increased abortions were seen at 100 mg/kg. Treatment caused increased fetal mortality (100 mg/kg), decreased fetal weight (30 and 100 mg/kg), increased incidence of a skeletal abnormality (fused sternebrae at 30 and 100 mg/kg), and minor skeletal variations (100 mg/kg).

In pregnant rabbits receiving aripiprazole injection intravenously (3, 10, and 30 mg/kg/day) during the period of organogenesis, the highest dose, which caused pronounced maternal toxicity, resulted in decreased fetal weight, increased fetal abnormalities (primarily skeletal), and decreased fetal skeletal ossification. The fetal no-effect dose was 10 mg/kg, which produced 5 times the human exposure at the MRHD based on AUC.

In a study in which rats were treated with oral doses of 3, 10, and 30 mg/kg/day (1, 3, and 10 times the MRHD on a mg/m² basis) of aripiprazole perinatally and postnatally (from day 17 of gestation through day 21 postpartum), slight maternal toxicity and slightly prolonged gestation were seen at 30 mg/kg. An increase in stillbirths and decreases in pup weight (persisting into adulthood) and survival were seen at this dose.

In rats receiving aripiprazole injection intravenously (3, 8, and 20 mg/kg/day) from day 6 of gestation through day 20 postpartum, an increase in stillbirths was seen at 8 and 20 mg/kg, and decreases in early postnatal pup weights and survival were seen at 20 mg/kg. These doses produced some maternal toxicity. There were no effects on postnatal behavioral and reproductive development.

Impairment of fertility

Female rats were treated with oral doses of 2, 6, and 20 mg/kg/day (0.6, 2, and 6 times the MRHD on a mg/m² basis) of aripiprazole from 2 weeks prior to mating through day 7 of gestation. Estrus cycle irregularities and increased corpora lutea were seen at all doses, but no impairment of fertility was seen. Increased pre-implantation loss was seen at 6 and 20 mg/kg and decreased fetal weight was seen at 20 mg/kg.

Male rats were treated with oral doses of 20, 40, and 60 mg/kg/day (6, 13, and 19 times the MRHD on a mg/m² basis) of aripiprazole from 9 weeks prior to mating through mating. Disturbances in spermatogenesis were seen at 60 mg/kg and prostate atrophy was seen at 40 and 60 mg/kg, but no impairment of fertility was seen.

Carcinogenicity

Lifetime carcinogenicity studies were conducted in ICR mice and in Sprague-Dawley (SD) and F344 rats. Aripiprazole was administered for 2 years in the diet at doses of 1, 3, 10, and 30 mg/kg/day to ICR mice and 1, 3, and 10 mg/kg/day to F344 rats (0.2 to 5 and 0.3 to 3 times the MRHD based on mg/m², respectively). In addition, SD rats were dosed orally for 2 years at 10, 20, 40, and 60 mg/kg/day (3 to 19 times the MRHD based on mg/m²). Aripiprazole did not induce tumors in male mice or rats. In female mice, the incidences of pituitary gland adenomas and mammary gland adenocarcinomas and adenoacanthomas were increased at dietary doses of 3 to 30 mg/kg/day (0.1 to 0.9 times human exposure at MRHD based on AUC and 0.5 to 5 times the MRHD based on mg/m²). In female rats, the incidence of mammary gland fibroadenomas was increased at a dietary dose of 10 mg/kg/day (0.1 times human exposure at MRHD based on AUC); and the incidences of adrenocortical carcinomas and combined adrenocortical adenomas/carcinomas were increased at an oral dose of 60 mg/kg/day (10 times human exposure at MRHD based on AUC).

Proliferative changes in the pituitary and mammary gland of rodents have been observed following chronic administration of other antipsychotic agents and are considered prolactin-mediated. Serum prolactin was not measured in the aripiprazole carcinogenicity studies. However, increases in serum prolactin levels were observed in female mice in a 13-week dietary study at the doses associated with mammary gland and pituitary tumors. Serum prolactin was not

increased in female rats in 4- and 13-week dietary studies at the dose associated with mammary gland tumors. The relevance for human risk of the findings of prolactin-mediated endocrine tumors in rodents is unknown.

Other Toxicity Studies

Adrenocortical Changes in Rats

A series of investigative studies were conducted in rats to determine the mechanism for the aripiprazole-related adrenocortical changes after subchronic and chronic dosing. The data from these studies supported the conclusion that the female rat-specific adrenocortical tumorigenic response at 60 mg/kg/day in the oral carcinogenicity study was secondary to aripiprazole-related adrenocortical cytotoxicity and consequent increased cell proliferation. The female specificity of the adrenocortical tumorigenic response was considered a consequence of the earlier onset and greater severity of the adrenocortical cytotoxic changes. The adrenocortical cytotoxic and tumorigenic effects have no established clinical relevance since they occurred at a dose 10 times human exposure at the MRHD based on AUC.

Retinal Degeneration in Rats

Aripiprazole produced retinal degeneration in albino Sprague-Dawley (SD) rats in a 26-week chronic toxicity study at a dose of 60 mg/kg and in a 2-year carcinogenicity study at doses of 40 and 60 mg/kg. The 40 and 60 mg/kg doses are 7 to 10 times human exposure at the MRHD based on AUC. In a subsequent 18-month investigative study in albino SD and pigmented Long-Evans (LE) rats administered 60 mg/kg/day aripiprazole, pharmacologically mediated hyperactivity occurred in both rat strains early in the study predisposing the animals to increased light exposure. Time-dependent retinal degeneration with electroretinographic and morphologic features consistent with spontaneous light-induced retinal degeneration was observed in albino SD rats, whereas there was no evidence of light-induced retinal injury in pigmented LE rats at any timepoint despite comparable systemic exposures to aripiprazole. This was due to the photoprotective effect of ocular melanin pigment in LE rats. Therefore, the retinal degeneration observed in albino SD rats after chronic dosing at high doses of aripiprazole was considered to be a consequence of drug-related, pharmacologically mediated hyperactivity during the animal room light phase, resulting in increased light exposure rather than a direct drug effect on the retina. Light-induced retinal degeneration in albino SD rats has no established clinical relevance.

Dermal Sensitization and Dermal and Ocular Irritation

Aripiprazole was not a dermal sensitizer in mice and was nonirritating to rabbit skin and eye.

Phototoxicity

Aripiprazole was nonphototoxic in Balb/c 3T3 mouse fibroblast cultures.

Antigenicity

Aripiprazole produced no evidence of active systemic anaphylaxis or passive cutaneous reactions in guinea pigs.

Immunotoxicity

Aripiprazole did not adversely affect the T-cell-dependent humoral immune response to sheep red blood cells in rats.

Dependence

In a battery of studies conducted to evaluate physical dependence and abuse potential, aripiprazole demonstrated no abuse liability in rats; mild, transient physical dependence in monkeys (rebound arousal) considered to be of little clinical significance; and no positive reinforcing effects in monkeys. Overall, the results support that aripiprazole has no abuse liability.

Metabolites

In single-dose intravenous studies in rats, OPC-14857 produced clinical effects similar to those observed at high single oral doses of parent drug, whereas OPC-3373 produced no drug-related toxicity. In a 28-day oral toxicity study in rats, 2,3-DCPP produced CNS-related clinical signs with deaths at the high dose (30 mg/kg/day) but no evidence of target organ toxicity. All 3 metabolites were not mutagenic in bacterial reverse-mutation tests. In an in vitro cytogenetics assay in CHL cells, 2,3-DCPP increased chromosome aberrations in the presence and absence of metabolic activation; however, the increases were considered secondary to excessive cytotoxicity rather than direct DNA reactivity.

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PART III: CONSUMER INFORMATION**ABILIFY*
Aripiprazole Tablets**

This leaflet is part III of a three-part "Product Monograph" published when ABILIFY was approved for sale in Canada and is designed specifically for Consumers. This leaflet is a summary and will not tell you everything about ABILIFY. Contact your doctor or pharmacist if you have any questions about the drug.

ABOUT THIS MEDICATION**What the medication is used for:**

ABILIFY is used to treat symptoms of schizophrenia in adults. Schizophrenia is characterised by symptoms such as:

- hearing, seeing or sensing things that are not there,
- suspiciousness, mistaken beliefs,
- incoherent speech and behaviour and emotional flatness.

People with this condition may also feel depressed, guilty, anxious or tense.

ABILIFY is also used to treat adults who suffer from bipolar disorder. Bipolar disorder is a condition with symptoms such as:

- feeling invincible or an all powerful inflated self-esteem
- racing thoughts, easily losing train of thought
- overreaction to what is seen or heard
- misinterpretation of events
- sped-up activity, talking very quickly, too loudly, or more than usual,
- decreased need for sleep
- poor judgment
- sometimes exhibiting severe irritability

ABILIFY is not a cure for your condition, but it can help manage your symptoms and may reduce the risk of relapse.

Your doctor may have prescribed ABILIFY for another reason. Ask your doctor if you have any questions about why ABILIFY has been prescribed for you.

What it does:

ABILIFY belongs to a group of medicines called atypical antipsychotic drugs.

Antipsychotic medications affect the chemicals that allow communication between nerve cells (neurotransmitters). Illnesses that affect the brain, such as schizophrenia, may be due to certain chemicals in the brain being out of balance. These imbalances may cause some of the symptoms you may be experiencing. Doctors and scientists are not sure what causes these imbalances to

occur. Exactly how ABILIFY works is unknown. However, it seems to adjust the balance of chemicals called dopamine and serotonin.

When it should not be used:

Do not take ABILIFY if you have had an allergic reaction to ABILIFY or any of the ingredients listed in the "What the nonmedicinal ingredients are" section of this leaflet. Signs of allergic reaction may include a rash, itching, shortness of breath or swelling of the face, lips or tongue.

What the medicinal ingredient is:

ABILIFY tablets contain the active ingredient called aripiprazole.

What the nonmedicinal ingredients are:

ABILIFY tablets contain the following inactive ingredients: lactose monohydrate, maize starch, microcrystalline cellulose, hydroxypropyl cellulose, magnesium stearate and coloring agents (2 mg: FD&C Blue No. 2 Aluminum Lake and iron oxide Yellow; 5 mg: FD&C Blue No. 2 Aluminum Lake; 10 mg and 30 mg: iron oxide red; 15 mg: iron oxide yellow).

What dosage forms it comes in:

ABILIFY tablets are available in strengths of 2 mg, 5 mg, 10 mg, 15 mg, 20 mg and 30 mg.

WARNINGS AND PRECAUTIONS **Serious Warnings and Precautions**

Various medicines of the group to which ABILIFY belongs, including ABILIFY, have been associated with an increased rate of death when used in elderly patients with dementia. ABILIFY is not indicated in elderly patients with dementia.

ABILIFY is not for use in children under 18 years of age.

BEFORE you use ABILIFY talk to your doctor or pharmacist if you:

- are taking any other medicines (prescriptions or over the counter medicines).
- are pregnant, think you are pregnant or plan to become pregnant. You should not take ABILIFY if you are pregnant unless you have discussed this with your doctor.
- are breast-feeding or plan to breast-feed. Breast-feeding mothers should not take ABILIFY.
- have high blood sugar or a family history of diabetes.
- have ever had blackouts or seizures.
- have involuntary, irregular muscle movements, especially in the face.
- suffer from heart disease or have a family history of heart disease, stroke or "mini" stroke.

- have a history of any problems with the way your heart beats or if you are taking any medicines that may have an impact on the way your heart beats.
- suffer from abnormal (high) blood pressure or have rapid heart beat and a drop in blood pressure when getting up.
- are an elderly patient suffering from dementia (loss of memory and other mental abilities), you or your carer/relative should tell your doctor if you have ever had a stroke or "mini" stroke.
- exercise vigorously or work in hot, sunny places.
- drink alcoholic beverages or use recreational drugs.
- have ever abused drugs.
- suffer from lactose intolerance or have hereditary galactose intolerance or glucose-galactose malabsorption, because ABILIFY tablets contain lactose.

INTERACTIONS WITH THIS MEDICATION

Tell all doctors, dentists and pharmacists who are treating you that you are taking ABILIFY.

Please tell your doctor or pharmacist if you are taking or have recently taken any other medicines, including medicines obtained without a prescription.

- If you are taking other medicines, your doctor may need to change your dose of ABILIFY. You should tell your doctor if you are taking ketoconazole (antifungal), quinidine (antiarrhythmic), paroxetine (antidepressant) or fluoxetine (antidepressant). These medicines may lead to higher concentrations of aripiprazole in your blood.
- You should also tell your doctor if you are taking carbamazepine as it may lead to lower concentrations of aripiprazole in your blood, making ABILIFY less effective.

ABILIFY may increase the effect of medicines used to lower the blood pressure. Be sure to tell your doctor if you take a medicine to keep your blood pressure under control.

The effects of alcohol could be made worse while taking ABILIFY. It is recommended that you **do not** drink alcohol while taking ABILIFY.

Only take other medicines while you are on ABILIFY if your doctor tells you to.

PROPER USE OF THIS MEDICATION

Usual adult dose:

The most important thing about taking ABILIFY is to take it exactly the way your doctor has prescribed it, every day. You should check with your doctor or pharmacist if you are not sure. Your doctor has decided on the best dosage for you based on your individual situation. Your doctor may increase or decrease your dose depending on your response. **The usual dose is 10 mg or**

15 mg once a day. However your doctor may prescribe a lower or higher dose to a maximum of 30 mg once a day.

Try to take ABILIFY at the same time each day. It does not matter whether you take it with or without food. Always take the tablet with water and swallow it whole.

If you have the impression that the effect of ABILIFY is too strong or too weak, talk to your doctor or pharmacist.

Even if you feel better, do not alter or discontinue the daily dose of ABILIFY without first consulting your doctor. Although ABILIFY cannot cure your condition, it can help relieve your symptoms. If your symptoms improve or disappear, it is probably because your treatment is working. ABILIFY should be taken for as long as you and your doctor believe it is helping you.

Do not give ABILIFY to anyone else. Your doctor has prescribed it for you and your condition.

ABILIFY is not for use in children under 18 years of age.

Overdose:

If you have taken more ABILIFY tablets than your doctor has recommended (or if someone else has taken some of your ABILIFY tablets), contact your regional Poison Control Centre and talk to your doctor right away or go to your nearest hospital emergency department. Take the medication package with you.

Missed Dose:

If you miss a dose, take the missed dose as soon as you remember but **do not take two doses in one day.**

SIDE EFFECTS AND WHAT TO DO ABOUT THEM

Like other medicines, ABILIFY can cause some side effects. These side effects are most likely to be minor and temporary. However, some may be serious and need medical attention.

The most common side effects of ABILIFY are:

- feeling of restlessness (akathisia)
- drowsiness
- abnormal movements
- nausea, vomiting, upset stomach
- dizziness
- constipation
- headaches
- insomnia
- anxiety

You should tell your doctor if you notice any symptoms that worry you, even if you think the problems are not connected with the medicine or are not listed here.

Because some people experience sleepiness, you should avoid driving a car or operating machinery until you know how ABILIFY affects you.

SERIOUS SIDE EFFECTS, HOW OFTEN THEY HAPPEN AND WHAT TO DO ABOUT THEM

Symptom / effect	Talk with your doctor or pharmacist		Stop taking drug and seek immediate emergency help
	Only if severe	In all cases	
Common			
Skin Rash on its own	x		
Uncommon			
Muscle twitching or abnormal movement of your face or tongue		x	
Sudden weakness or numbness of the face, arms, or legs and speech or vision problems			x
Allergic reaction (symptoms include swelling in the mouth, tongue, face and throat, itching, rash)			x
Seizure i.e. loss of consciousness with uncontrollable shaking			x
Pronounced muscle stiffness or inflexibility with high fever, rapid or irregular heartbeat, sweating, state of confusion or reduced consciousness			x
Long-lasting (greater than 4 hours in duration) and painful erection of the penis			x

This is not a complete list of side effects. For any unexpected effects while taking ABILIFY, contact your doctor or pharmacist.

HOW TO STORE IT

ABILIFY should be stored at room temperature (15°C - 30°). Do not use ABILIFY after the expiry date which is stated on the label or carton after EXP. Keep out of the reach and sight of children.

REPORTING SUSPECTED SIDE EFFECTS

You can report any suspected adverse reactions associated with the use of health products to the Canada Vigilance Program by one of the following 3 ways:

- Report online at www.healthcanada.gc.ca/medeffect
- Call toll-free at 1-866-234-2345

- Complete a Canada Vigilance Reporting Form and:
 - Fax toll-free to 1-866-678-6789, or
 - Mail to:

Canada Vigilance Program
Health Canada
Postal Locator 0701C
Ottawa, ON K1A 0K9

Postage paid labels, Canada Vigilance Reporting Form and the adverse reaction reporting guidelines are available on the MedEffect™ Canada Web site at www.healthcanada.gc.ca/medeffect.

NOTE: Should you require information related to the management of side effects, contact your health professional. The Canada Vigilance Program does not provide medical advice.

MORE INFORMATION

This document plus the full product monograph, prepared for health professionals can be found at www.bmscanada.ca or obtained by contacting the sponsor, Bristol-Myers Squibb Canada, at 1-866-463-6267.

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