

PRODUCT MONOGRAPH  
INCLUDING PATIENT MEDICATION INFORMATION

**Pr JAMP Ondansetron Tablets**

Ondansetron Tablets

Tablets, 4 mg and 8 mg ondansetron (as ondansetron hydrochloride), Oral

USP

Antiemetic  
5-HT<sub>3</sub> receptor antagonist  
ATC code A04AA01

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## RECENT MAJOR LABEL CHANGES

N/A

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Sections or subsections that are not applicable at the time of authorization are not listed.

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## PART I: HEALTH PROFESSIONAL INFORMATION

### 1 INDICATIONS

JAMP Ondansetron Tablets (ondansetron hydrochloride) is indicated for:

- the prevention of nausea and vomiting associated with mildly and moderately emetogenic chemotherapy and radiotherapy.
- the maintenance of antiemesis following intravenous doses of ondansetron used for the prevention of nausea and vomiting associated with highly emetogenic chemotherapy, including cisplatin.
- the prevention of post-operative nausea and vomiting.

#### 1.1 Pediatrics (<18 years of age)

##### **Prevention of Nausea and Vomiting Associated with Mildly and Moderately Emetogenic Chemotherapy**

- **Pediatrics (4 to 12 years of age):** Based on the data submitted and reviewed by Health Canada, the safety and efficacy of ondansetron hydrochloride in pediatric patients 4 to 12 years of age has been established. Therefore, Health Canada has authorized an indication for pediatric use. (see [4.2 Recommended Dose and Dosage Adjustment](#)).
- **Pediatrics (<4 years of age):** No data are available to Health Canada; therefore, Health Canada has not authorized an indication for the use of JAMP Ondansetron Tablets in children less than 4 years of age.

##### **Prevention of Nausea and Vomiting Associated with Radiotherapy**

No data are available to Health Canada; therefore, Health Canada has not authorized an indication for this use in any pediatric population.

##### **Prevention of Post-Operative Nausea and Vomiting**

No data are available to Health Canada; therefore, Health Canada has not authorized an indication for this use in any pediatric population.

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

##### **Prevention of Nausea and Vomiting Associated with Mildly and Moderately Emetogenic Chemotherapy, and Radiotherapy**

Efficacy and tolerance of ondansetron hydrochloride were similar to that observed in younger adults. See [4.2 Recommended Dose and Dosage Adjustment, Chemotherapy Induced Nausea and Vomiting, Geriatrics](#); [7 WARNINGS AND PRECAUTIONS, Cardiovascular](#); [7.1.4 Geriatrics](#); [10.3 Pharmacokinetics, Geriatrics](#).

##### **Prevention of Post-Operative Nausea and Vomiting**

Clinical experience in the use of ondansetron hydrochloride in the prevention and treatment of post-operative nausea and vomiting is limited. Therefore, Health Canada has not authorized

an indication for use in the geriatric population.

## 2 CONTRAINDICATIONS

- JAMP Ondansetron Tablets (ondansetron hydrochloride) is contraindicated in patients who are hypersensitive to this drug or to any ingredient in the formulation, including any non-medicinal ingredient, or component of the container. For a complete listing, see [6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING](#).
- The concomitant use of apomorphine with JAMP Ondansetron Tablets is contraindicated, based on reports of profound hypotension and loss of consciousness when apomorphine was administered with ondansetron (see [9.1 Serious Drug Interactions](#); [9.4 Drug-Drug Interactions](#)).

## 4 DOSAGE AND ADMINISTRATION

### 4.1 Dosing Considerations

- JAMP Ondansetron Tablets (ondansetron hydrochloride) as an oral tablet. When injectable ondansetron is used, the product monograph for ondansetron hydrochloride dihydrate injection should be consulted.
- In patients with moderate or severe hepatic impairment, the total daily dose should not exceed 8 mg (See [7 WARNINGS AND PRECAUTIONS, Hepatic/Biliary/Pancreatic](#)).
- Exposure-response modelling predicted a greater effect on QTcF in patients  $\geq 75$  years of age compared to young adults. (See [10.3 Pharmacokinetics, Geriatrics](#)).
- Dosing considerations that reduce cardiac risks:
  - Carefully follow the dosing guidelines
  - Use the minimum effective dose.
  - Use oral ondansetron formulations, if possible (lower  $C_{max}$ ).

### 4.2 Recommended Dose and Dosage Adjustment

#### Prevention of Highly Emetogenic Chemotherapy Induced Nausea and Vomiting

- **Adults:**

JAMP Ondansetron Tablets is not indicated for this use.

Oral formulations of ondansetron, such as JAMP Ondansetron Tablets, are not intended for the prevention of nausea and vomiting associated with highly emetogenic chemotherapy, such as cisplatin. An intravenous formulation should be given as an initial dose prior to chemotherapy and within the first 24 hours. **Note: JAMP Ondansetron Tablets are only available as oral tablets. A product monograph for ondansetron hydrochloride dihydrate injection should be consulted.**

- **Pediatrics (<18 years of age):**  
Ondansetron is not indicated for this use in children.

### **Maintenance of Antiemesis Following Intravenous Doses of Ondansetron Used for the Prevention of Nausea and Vomiting Associated with Highly Emetogenic Chemotherapy**

- **Adults:**  
For the maintenance of anti-emesis established by intravenous ondansetron:
  - 8 mg orally every 8 hours, for up to 5 days; following the first 24 hours
- **Pediatrics (<18 years of age):**
  - JAMP Ondansetron Tablets is not indicated for this use in children under 18 years of age.
- **Geriatrics:**  
Efficacy and tolerance in patients 65 years of age and older were similar to that seen in younger adults. No dosage adjustment is required in this population (see [7.1.4 Geriatrics](#); [10.3 Pharmacokinetics, Geriatrics](#)).
- **Hepatic Insufficiency:**  
No dosage adjustment is needed in patients with mild hepatic impairment.  
In patients with moderate or severe hepatic impairment (Child-Pugh score  $\geq 7$ ), do not exceed a total daily dose of 8 mg (Child-Pugh score of 10 or greater) (see [7 WARNINGS AND PRECAUTIONS, Hepatic/Biliary/Pancreatic](#); [10.3 Pharmacokinetics](#)). This may be given as a single oral dose.
- **Renal Insufficiency:**  
No alteration of daily dosage, frequency of dosing, or route of administration is required in patients with impaired renal function (see [10.3 Pharmacokinetics, Renal Insufficiency](#)).

### **Prevention of Nausea and Vomiting Associated With Mildly and Moderately Emetogenic Chemotherapy**

- **Adults:**
  - 8 mg orally, 1-2 hours prior to chemotherapy, followed by 8 mg orally, twice daily for up to 5 days.
- **Pediatrics (4 to <18 years of age):**
  - Following chemotherapy\*: 4 mg orally, every 8 hours, for up to 5 days.  
\*For prevention of chemotherapy induced nausea and vomiting in children 4-17 years of age, intravenous ondansetron should be administered 30 minutes before chemotherapy. **Note: JAMP Ondansetron Tablets is only available as oral tablets. A product monograph for ondansetron hydrochloride dihydrate injection should be consulted.**

- **Pediatrics (<4 years of age):**  
JAMP Ondansetron Tablets is not indicated for this use in children under 4 years of age.
- **Geriatrics (≥65 years of age):**  
Efficacy and tolerance in patients aged over 65 years were similar to that seen in younger adults indicating no need to alter dosage schedules in this population (see [10.3 Pharmacokinetics, Geriatrics](#)).
- **Hepatic Insufficiency**  
No dosage adjustment is needed in patients with mild hepatic impairment.  
In patients with moderate or severe hepatic impairment (Child-Pugh score ≥7), do not exceed a total daily dose of 8 mg (Child-Pugh score of 10 or greater) (see [7 WARNINGS AND PRECAUTIONS, Hepatic/Biliary/Pancreatic](#); [10.3 Pharmacokinetics](#)). This may be given as a single oral dose.
- **Renal Insufficiency**  
No alteration of daily dosage, frequency of dosing, or route of administration is required in patients with impaired renal function (see [10.3 Pharmacokinetics, Renal Insufficiency](#)).

### Prevention of Radiotherapy Induced Nausea and Vomiting

- **Adults:**
  - 8 mg orally, given 1 to 2 hours before radiotherapy followed by 8 mg orally, given every 8 hours, for up to 5 days after a course of treatment.
- **Pediatrics (<18 years of age):**  
JAMP Ondansetron Tablets is not indicated for this use in the pediatric population.
- **Geriatrics (≥65 years of age):**  
Efficacy and tolerance in patients aged over 65 years were similar to that seen in younger adults, indicating no need to alter dosage schedules in this population (see [10.3 Pharmacokinetics, Geriatrics](#)).
- **Hepatic Insufficiency:**  
No dosage adjustment is needed in patients with mild hepatic impairment.  
In patients with moderate or severe hepatic impairment (Child-Pugh score ≥7), do not exceed a total daily dose of 8 mg (Child-Pugh score of 10 or greater) (see [7 WARNINGS AND PRECAUTIONS, Hepatic/Biliary/Pancreatic](#); [10.3 Pharmacokinetics](#)). This may be given as a single oral dose.
- **Renal Insufficiency:**  
No alteration of daily dosage, frequency of dosing, or route of administration is

required in patients with impaired renal function (see [10.3 Pharmacokinetics, Renal Insufficiency](#)).

## Prevention of Post-Operative Nausea and Vomiting

- **Adults:**
  - 16 mg orally, administered 1 hour prior to the induction of anesthesia.
- **Pediatrics (<18 years of age):**

JAMP Ondansetron Tablets is not indicated for this use in the pediatric population.
- **Geriatrics (≥65 years of age):**

JAMP Ondansetron Tablets is not indicated for this use in patients 65 years of age and older.
- **Hepatic Insufficiency:**

No dosage adjustment is needed in patients with mild hepatic impairment.  
In patients with moderate or severe hepatic impairment (Child-Pugh score ≥7), do not exceed a total daily dose of 8 mg (Child-Pugh score of 10 or greater) (see [7 WARNINGS AND PRECAUTIONS, Hepatic/Biliary/Pancreatic](#); [10.3 Pharmacokinetics](#)). This may be given as a single oral dose.
- **Renal Insufficiency:**

No alteration of daily dosage, frequency of dosing, or route of administration is required in patients with impaired renal function (see [10.3 Pharmacokinetics, Renal Insufficiency](#)).

## 4.4 Administration

JAMP Ondansetron Tablets should be swallowed whole, with a liquid.

## 4.5 Missed Dose

If a dose is missed, it should be taken as soon as possible. However, if it is almost time for the next dose, the missed dose should be skipped and the patient returned to their regular dosing schedule. Do not double doses.

If a dose is missed, and the patient feels nauseated or vomits, the missed dose should be taken as soon as possible.

## 5 OVERDOSAGE

At present there is little information concerning overdosage with ondansetron. Individual



doses of 84 mg and 145 mg and total daily doses as large as 252 mg have been administered with only mild side effects. There is no specific antidote for ondansetron, therefore, in cases of suspected overdose, symptomatic and supportive therapy should be given as appropriate.

The use of Ipecac to treat overdose with ondansetron is not recommended as patients are unlikely to respond due to the antiemetic action of ondansetron itself.

“Sudden blindness” (amaurosis) of 2 to 3 minutes duration plus severe constipation occurred in one patient that was administered 72 mg of ondansetron intravenously as a single dose. Hypotension (and faintness) occurred in another patient that took 48 mg of oral ondansetron. Following infusion of 32 mg over only a 4-minute period, a vasovagal episode with transient second-degree heart block was observed. Neuromuscular abnormalities, autonomic instability, somnolence, and a brief generalized tonic-clonic seizure (which resolved after a dose of benzodiazepine) were observed in a 12 months’ old infant who ingested seven or eight 8-mg ondansetron tablets (approximately forty times the recommended 0.1-0.15 mg/kg dose for a pediatric patient). In all instances, the events resolved completely.

Ondansetron prolongs QT interval in a dose-dependent fashion (see [10.2 Pharmacodynamics](#)). ECG monitoring is recommended in cases of overdose.

Cases consistent with serotonin syndrome have been reported in young children following oral overdose (see [7 WARNINGS AND PRECAUTIONS, Serotonin Toxicity/Neuroleptic Malignant Syndrome](#)).

For the most recent information in the management of a suspected drug overdose, contact your regional poison control centre or Health Canada's toll-free number, 1-844 POISON-X (1-844-764-7669).

## 6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING

**Table 1 – Dosage Forms, Strengths, Composition and Packaging**

| Route of Administration | Dosage Form / Strength / Composition                        | Non-medicinal Ingredients  |
|-------------------------|---|--|
| Oral                    | Tablets / 4 mg and 8 mg ondansetron base (as hydrochloride) | FD&C Yellow No. 5 / tartrazine aluminum lake, hypromellose, iron oxide red, iron oxide yellow, lactose anhydrous, magnesium stearate, microcrystalline cellulose, pregelatinized starch, titanium dioxide. |

## Description

### **JAMP Ondansetron Tablets 4 mg:**

Oval shaped, yellow, film-coated tablets, engraved '4' on one side and 'JP' on other side. Each tablet contains 4 mg ondansetron base (as ondansetron hydrochloride).

Available in a unit dosed blister pack of 10's (1 × 10's) and bottle pack of 30's and 100's tablets.

### **JAMP Ondansetron Tablets 8 mg:**

Oval shaped, yellow, film-coated tablets, engraved '8' on one side and 'JP' on other side. Each tablet contains 8 mg ondansetron base (as ondansetron hydrochloride).

Available in a unit dosed blister pack of 10's (1 × 10's) and bottle pack of 30's and 100's tablets.

Meets USP Dissolution Test 4.

## **7 WARNINGS AND PRECAUTIONS**

### **General**

JAMP Ondansetron Tablets (ondansetron hydrochloride) is not effective in preventing motion-induced nausea and vomiting.

### **Cardiovascular**

**QTc Interval Prolongation:** Ondansetron prolongs the QT interval (see [10.2 Pharmacodynamics, Electrocardiography](#)). The magnitude of QTc prolongation will depend on the peak serum ondansetron concentration ( $C_{max}$ ), which is substantially determined by the route of administration, the dose and the infusion rate of intravenous ondansetron. In addition, post-marketing cases of torsade de pointes have been reported in patients using ondansetron. Torsade de pointes is a polymorphic ventricular tachyarrhythmia. Generally, the risk of torsade de pointes increases with the magnitude of QTc prolongation produced by the drug. Torsade de pointes may be asymptomatic or experienced by the patient as dizziness, palpitations, syncope, or seizures. If sustained, torsade de pointes can progress to ventricular fibrillation and sudden cardiac death.

Avoid ondansetron in patients with congenital long QT syndrome. Ondansetron should be administered with caution to patients who have or may develop prolongation of QTc, including congestive heart failure, bradyarrhythmias or patients taking other medicinal products that lead to either QT prolongation or electrolyte abnormalities (see [9.4 Drug-Drug Interactions](#)).

Hypokalemia, hypocalcemia and hypomagnesemia should be corrected prior to ondansetron administration.

Additional risk factors for torsade de pointes in the general population include, but are not limited to, the following:

- female gender;
- age 65 years or older;

- baseline prolongation of the QT/QTc interval;
- presence of genetic variants affecting cardiac ion channels or regulatory proteins;
- family history of sudden cardiac death at <50 years;
- cardiac disease (e.g., myocardial ischemia or infarction, left ventricular hypertrophy, cardiomyopathy, conduction system disease);
- history of arrhythmias (especially ventricular arrhythmias, atrial fibrillation, or recent conversion from atrial fibrillation);
- bradycardia (<50 beats per minute);
- acute neurological events (e.g., intracranial or subarachnoid hemorrhage, stroke, intracranial trauma);
- nutritional deficits (e.g., eating disorders, extreme diets);
- diabetes mellitus;
- autonomic neuropathy.

**Myocardial Ischemia and Coronary Artery Spasm:** Ondansetron can cause coronary artery vasospasm and myocardial ischemia which may lead to myocardial infarction. In some cases, the symptoms appeared immediately after IV infusion, or shortly after oral administration, including after low doses in patients without significant known pre-existing cardiovascular disease or other risk factors. Caution is advised during and after ondansetron administration, and close monitoring is recommended in patients with known or suspected ischemic or vasospastic coronary artery disease or other significant underlying cardiovascular disease.

### **Driving and Operating Machinery**

In psychomotor testing ondansetron does not impair performance or cause sedation.

### **Gastrointestinal**

As ondansetron is known to increase large bowel transit time, patients with signs of subacute intestinal obstruction should be monitored following administration.

### **Hepatic/Biliary/Pancreatic**

Abnormal liver function test results have been reported, as well as liver failure in clinical trial cancer patients. See [8.2 Clinical Trial Adverse Reactions, Hepatic/Biliary/Pancreatic](#); and [8.5 Post-Market Adverse Reactions](#).

### **Immune**

Cross-reactive hypersensitivity has been reported between different 5-HT<sub>3</sub> antagonists. Patients who have experienced hypersensitivity reactions to one 5-HT<sub>3</sub> antagonist have experienced more severe reactions upon being challenged with another drug of the same class. The use of a different 5-HT<sub>3</sub> receptor antagonist is not recommended as a replacement in cases in which a patient has experienced even a mild hypersensitivity type reaction to another 5-HT<sub>3</sub> antagonist.

## Neurologic

### Serotonin Toxicity/Neuroleptic Malignant Syndrome:

On rare occasions, serotonin toxicity, also known as serotonin syndrome, has been reported with ondansetron, particularly during combined use with other serotonergic drugs (see [9.4 Drug-Drug Interactions](#)).

Serotonin toxicity is characterized by neuromuscular excitation, autonomic stimulation (e.g. tachycardia, flushing) and altered mental state (e.g. anxiety, agitation, hypomania). In accordance with the Hunter criteria, serotonin toxicity diagnosis is likely when, in the presence of at least one serotonergic agent, one of the following is observed:

- Spontaneous clonus
- Inducible clonus or ocular clonus with agitation or diaphoresis
- Tremor and hyperreflexia
- Hypertonia and body temperature > 38°C and ocular clonus or inducible clonus

Neuroleptic malignant syndrome has also been rarely reported with ondansetron, particularly during combined use with neuroleptic/antipsychotic drugs. The clinical manifestations of neuroleptic malignant syndrome often overlap with those of serotonin toxicity, including hyperthermia, hypertonia, altered mental status, and autonomic instability. In contrast to serotonin toxicity, patients with neuroleptic malignant syndrome may present with “lead pipe” muscle rigidity as well as hyporeflexia.

Ondansetron should be used with caution in patients receiving other serotonergic drugs or antipsychotics/neuroleptics. If concomitant treatment with ondansetron, and other serotonergic drugs and/or antipsychotics/neuroleptics is clinically warranted, careful observation of the patient is advised, particularly during treatment initiation and dose increases (see [9.4 Drug-Drug Interactions](#)). Serotonin toxicity and neuroleptic malignant syndrome may result in potentially life-threatening conditions. If serotonin toxicity or neuroleptic malignant syndrome is suspected, discontinuation of JAMP Ondansetron Tablets, should be considered.

### Reproductive Health: Female and Male Potential

Pregnancy status should be verified for females of reproductive potential prior to starting treatment with JAMP Ondansetron Tablets.

Females of reproductive potential should be advised of the possible harm that JAMP Ondansetron Tablets can cause to the developing foetus. Sexually active females of reproductive potential should use effective contraception (methods that result in less than 1% pregnancy rates) when using JAMP Ondansetron Tablets and for two days after stopping treatment with JAMP Ondansetron Tablets.

## **7.1 Special Populations**

### **7.1.1 Pregnant Women**

The use of ondansetron during pregnancy is not recommended. Ondansetron use during early pregnancy has been associated with a small increase in orofacial malformations. Despite some limitations in methodology, several human epidemiological studies have noted an increase in orofacial clefts in infants of women administered ondansetron during the first trimester of pregnancy. Regarding cardiac malformations, the epidemiological studies showed conflicting results.

Ondansetron is not teratogenic in animals (see 16 [NON-CLINICAL TOXICOLOGY, Reproductive and Developmental Toxicology](#)).

### **7.1.2 Breastfeeding**

Ondansetron is excreted in the milk of lactating rats. It is not known if it is excreted in human milk. However, breastfeeding is not recommended during treatment with ondansetron.

### **7.1.3 Pediatrics**

Insufficient information is available to inform dosage recommendations for children 3 years of age or younger. JAMP Ondansetron Tablets are not indicated for use in children less than 4 years of age (see [1.1 Pediatrics \(<18 years of age\)](#)).

### **7.1.4 Geriatrics**

Early Phase I studies in healthy elderly volunteers showed a slight age-related decrease in clearance, and an increase in half-life of ondansetron. A greater effect on QTcF is predicted in patients  $\geq 75$  years of age compared to young adults, based on exposure-response modelling. See [10.3 Pharmacokinetics, Geriatrics](#).

## **8 ADVERSE REACTIONS**

### **8.1 Adverse Reaction Overview**

The most frequent adverse events reported in controlled clinical trials were headache (11%) and constipation (4%). Other adverse events include sensations of flushing or warmth (<1%).

### **8.2 Clinical Trial Adverse Reactions**

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.

Ondansetron has been administered to over 2500 patients worldwide in controlled clinical trials and has been well tolerated.

**Cardiovascular:**

There have been rare reports of tachycardia, angina (chest pain), bradycardia, hypotension, syncope and electrocardiographic alterations.

**Central Nervous System:**

There have been rare reports of seizures. Movement disorders and dyskinesia have been reported in two large clinical trials of ondansetron at a rate of 0.1 – 0.3%.

**Dermatological:**

Rash has occurred in approximately 1% of patients receiving ondansetron.

**Eye Disorder:**

There have been reports of transient visual disturbances, including blurred vision and, in very rare cases, transient blindness, during or shortly after ondansetron treatment. These were observed generally within the recommended dosing range and predominantly during intravenous administration. The majority of blindness cases resolved within 20 minutes.

**Hepatic/Biliary/Pancreatic:**

There were transient increases of SGOT and SGPT of over twice the upper limit of normal in approximately 5% of patients. These increases did not appear to be related to dose or duration of therapy. There have been reports of liver failure and death in patients with cancer receiving concurrent medications including potentially hepatotoxic cytotoxic chemotherapy and antibiotics. The etiology of the liver failure is unclear.

**Hypersensitivity:**

Rare cases of immediate hypersensitivity reactions sometimes severe, including anaphylaxis, bronchospasm, urticaria and angioedema have been reported.

**Metabolic:**

There have been rare reports of hypokalemia.

**Other:**

There have been reports of abdominal pain, weakness and xerostomia.

## **8.5 Post-Market Adverse Reactions**

Over 250 million patient treatment days of ondansetron have been supplied since the launch of the product worldwide. The following events have been spontaneously reported during

post-approval use of ondansetron, although the link to ondansetron cannot always be clearly established.

The adverse event profiles in children and adolescents were comparable to that seen in adults.

**Cardiovascular Disorders:**

There have been rare reports (< 0.01%) of myocardial infarction, myocardial ischemia, angina, chest pain with or without ST segment depression, arrhythmias (including ventricular or supraventricular tachycardia, premature ventricular contractions, and atrial fibrillation), electrocardiographic alterations (including second degree heart block), palpitations and syncope.

Rarely and predominantly with intravenous ondansetron, transient ECG changes including QTc interval prolongation, Torsade de Pointes, ventricular fibrillation, coronary artery spasm, myocardial ischemia, cardiac arrest, and sudden death have been reported. (see [7 WARNINGS AND PRECAUTIONS, Cardiovascular](#)).

**Eye Disorder:**

There have been very rare cases of transient blindness following ondansetron treatment, generally within the recommended dosing range and predominantly during intravenous administration.

The majority of blindness cases reported resolved within 20 minutes. Although most patients had received chemotherapeutic agents, including cisplatin a few cases of transient blindness occurred following ondansetron administration for the treatment of post-operative nausea or vomiting and in the absence of cisplatin treatment. Some cases of transient blindness were reported as cortical in origin.

**Hepatic/Biliary/Pancreatic**

Occasional asymptomatic increases in liver function tests have been reported.

**Immune Disorders:**

Rare cases of hypersensitivity reactions, sometimes severe (e.g., laryngeal oedema, stridor, laryngospasm and cardiopulmonary arrest) have also been reported.

**Nervous System Disorders:**

Transient episodes of dizziness (< 0.1%) have been reported predominantly during or upon completion of IV infusion of ondansetron.

Uncommon reports (< 1%) suggestive of extrapyramidal reactions including oculogyric crisis/dystonic reactions (e.g., oro-facial dyskinesia, opisthotonos, tremor, etc.), movement disorders and dyskinesia have been reported without definitive evidence of persistent clinical sequelae.

Serotonin syndrome and neuroleptic malignant syndrome-like events have been reported with 5-HT<sub>3</sub> receptor antagonist antiemetics, including ondansetron, when given in combination with other serotonergic and/or neuroleptic drugs (see [7 WARNINGS AND PRECAUTIONS, Neurologic](#)).

#### **Respiratory, Thoracic and Mediastinal Disorders:**

There have also been rare reports of hiccups.

#### **Skin and Subcutaneous Tissue Disorders:**

Very rare reports have been received for bullous skin and mucosal reactions, including fatal cases. These reports include toxic skin eruptions, such as Stevens-Johnson syndrome and toxic epidermal necrolysis, and have occurred in patients taking other medications that can be associated with bullous skin and mucosal reactions.

## **9 DRUG INTERACTIONS**

### **9.1 Serious Drug Interactions**

#### **Serious Drug Interactions** (see [9.4 Drug-Drug Interactions](#))

- Apomorphine (see [2 CONTRAINDICATIONS](#))
- QTc-prolonging drugs
- Serotonergic agents

### **9.2 Drug Interactions Overview**

Ondansetron is extensively metabolised by multiple hepatic cytochrome P450 enzymes (predominantly CYP3A4, also CYP2D6 and CYP1A2), and clearance is reduced in hepatic insufficiency (see [10.3 Pharmacokinetics, Hepatic Insufficiency](#)). CYP 3A4 inducers can increase ondansetron clearance (see [9.4. Drug-Drug Interactions, CYP 3A4 Inducers](#)).

Ondansetron does not itself appear to induce or inhibit the cytochrome P450 drug-metabolizing enzyme system of the liver.

### **9.3 Drug-Behavioural Interactions**

Potential interactions, in terms of individual behavioral risks, have not been established.

### **9.4 Drug-Drug Interactions**

#### **CYP 3A4 inducers**

Patients treated with inducers of CYP3A4 (i.e. phenytoin, carbamazepine, and rifampicin) demonstrated an increase in clearance of oral ondansetron and a decrease in ondansetron blood concentrations.

In a pharmacokinetic study of 16 epileptic patients maintained chronically on carbamazepine



or phenytoin (CYP 3A4 inducers), reduction in AUC, C<sub>max</sub> and T<sub>½</sub> of ondansetron was observed. This resulted in a significant increase in clearance. However, on the basis of the inter-subject variability in the available data.

### **Cytochrome P450 Inhibitors**

No effect on ondansetron clearance secondary to enzyme inhibition or reduced activity (e.g. CYP2D6 genetic deficiency) has been identified, to date.

### **QTc-Prolonging Drugs**

The concomitant use of ondansetron with another QTc-prolonging drug should be carefully considered to determine that the therapeutic benefit outweighs the potential risk (see [7 WARNINGS AND PRECAUTIONS, Cardiovascular](#); [9.1 Serious Drug Interactions](#)). Drugs that have been associated with QTc interval prolongation and/or torsade de pointes include, but are not limited to, the examples in the following list.

Chemical/pharmacological classes are listed if some, although not necessarily all, class members have been implicated in QTc prolongation and/or torsade de pointes:

- Class IA antiarrhythmics (e.g., quinidine, procainamide, disopyramide);
- Class III antiarrhythmics (e.g., amiodarone, sotalol, ibutilide, dronedarone);
- Class 1C antiarrhythmics (e.g., flecainide, propafenone);
- antiemetics (e.g., dolasetron, palonosetron, granisetron, droperidol, chlorpromazine, prochlorperazine);
- tyrosine kinase inhibitors (e.g., vandetanib, sunitinib, nilotinib, lapatinib);
- antipsychotics (e.g., chlorpromazine, pimozide, haloperidol, ziprasidone);
- antidepressants (e.g., citalopram, fluoxetine, venlafaxine, tricyclic/tetracyclic, amitriptyline, imipramine, maprotiline);
- opioids (e.g., methadone);
- domperidone;
- macrolide antibiotics and analogues (e.g., erythromycin, clarithromycin, telithromycin, tacrolimus);
- quinolone antibiotics (e.g., moxifloxacin, levofloxacin, ciprofloxacin);
- antimalarials (e.g., quinine, chloroquine);
- azole antifungals (e.g., ketoconazole, fluconazole, voriconazole);
- histone deacetylase inhibitors (e.g., vorinostat);
- beta-2 adrenoceptor agonists (e.g., salmeterol, formoterol).

### **Drugs that Cause Electrolyte Abnormalities**

The use of JAMP Ondansetron Tablets with drugs that can disrupt electrolyte levels should be avoided. Such drugs include, but are not limited to, the following:

- loop, thiazide, and related diuretics;
- laxatives and enemas;
- amphotericin B;
- high dose corticosteroids.

### **Tramadol**

Data from small studies indicate that ondansetron may reduce the analgesic effect of tramadol.

### **Apomorphine**

Based on reports of profound hypotension and loss of consciousness when ondansetron was administered with apomorphine hydrochloride, concomitant use with apomorphine is contraindicated (see [2 CONTRAINDICATIONS](#); [9.1 Serious Drug Interactions](#)).

### **Serotonergic Drugs**

As with other serotonergic agents, serotonin syndrome/toxicity, a potentially life-threatening condition, may occur with 5-HT<sub>3</sub> receptor antagonist antiemetic treatment when given in combination with other agents that may affect the serotonergic neurotransmitter system, including triptans, selective serotonin reuptake inhibitors (SSRIs), serotonin and norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), other 5-HT<sub>3</sub> receptor antagonists, lithium, sibutramine, fentanyl and its analogues, dextromethorphan, tramadol, tapentadol, meperidine, methadone and pertazocine or St. John's Wort (*Hypericum perforatum*) and MAOIs, including phenelzine, moclobemide, tranylcypromine, linezolid (an antibiotic which is a reversible non-selective MAOI) and methylene blue (see [7 WARNINGS AND PRECAUTIONS, Neurologic](#); [9.1 Serious Drug Interactions](#)).

### **Antipsychotics/Neuroleptics**

Neuroleptic malignant syndrome has been rarely reported with ondansetron, particularly during combined use with neuroleptic/antipsychotic drugs (e.g. haloperidol, olanzapine, quetiapine, risperidone) (see [7 WARNINGS AND PRECAUTIONS, Neurologic](#)).

The above list of potential drug interactions is not comprehensive. Current information sources should be consulted for newly approved drugs that prolong the QTc interval, affect the serotonergic system, increase CYP 3A4 enzyme activity, or cause electrolyte disturbances, as well as for older drugs for which these effects have recently been established.

## **9.5 Drug-Food Interactions**

Interactions with food have not been established.

## **9.6 Drug-Herb Interactions**

Interactions with herbal products have not been established.

Exercise caution when using JAMP Ondansetron Tablets with herbal products that may alter serotonin levels or act as CYP3A4 inducers/inhibitors, such as St. John's wort, ginseng, L-tryptophan, valerian, and Ginkgo biloba.

## 9.7 Drug-Laboratory Test Interactions

Interactions with laboratory tests have not been established.

## 10 CLINICAL PHARMACOLOGY

### 10.1 Mechanism of Action

JAMP Ondansetron Tablets (ondansetron hydrochloride) is a selective antagonist of the serotonin receptor subtype, 5-HT<sub>3</sub>. Its precise mode of action in the control of chemotherapy induced nausea and vomiting is not known.

Cytotoxic chemotherapy and radiotherapy are associated with the release of serotonin (5-HT) from enterochromaffin cells of the small intestine, presumably initiating a vomiting reflex through stimulation of 5-HT<sub>3</sub> receptors located on vagal afferents. Ondansetron may block the initiation of this reflex. Activation of vagal afferents may also cause a central release of serotonin from the chemoreceptor trigger zone of the area postrema, located on the floor of the fourth ventricle. Thus, the antiemetic effect of ondansetron is probably due to the selective antagonism of 5-HT<sub>3</sub> receptors on neurons located in either the peripheral or central nervous systems, or both.

The mechanisms of ondansetron's antiemetic action in post-operative nausea and vomiting are not known.

### 10.2 Pharmacodynamics

Serotonin receptors of the 5-HT<sub>3</sub> type are present both peripherally and on vagal nerve terminals. Ondansetron probably acts by preventing activation of these receptors or receptors located in other regions of the central nervous system. Both the peripheral and central nervous systems appear to be involved since both abdominal vagotomy and microinjection of ondansetron and other 5-HT<sub>3</sub> antagonists directly into the area postrema eliminate cisplatin-induced emesis, while 5-HT<sub>1</sub>-like (methiothepin maleate) and 5-HT<sub>2</sub> (ketanserin) antagonists have no effect.

Ondansetron is highly selective for 5-HT<sub>3</sub> receptors and shows negligible binding to other receptors such as 5-HT<sub>1</sub>-like, 5-HT<sub>2</sub>,  $\alpha$ <sub>1</sub> and  $\alpha$ <sub>2</sub> adrenoceptors,  $\beta$ <sub>1</sub> and  $\beta$ <sub>2</sub> adrenoceptors, D<sub>1</sub> and D<sub>2</sub> muscarinic, nicotinic, GABAA, H<sub>1</sub> and H<sub>2</sub> receptors.

The pharmacological specificity of ondansetron may explain the observed lack of extrapyramidal side effects often seen following similar therapy with metoclopramide, which preferentially binds to dopamine receptors of the D<sub>2</sub> subtype.

*In vivo* pharmacodynamic studies have investigated the effects of ondansetron on gastric

emptying, small bowel transit time and oesophageal motility.

Both oral (16 mg tid) and intravenous (5 to 10 mg) doses of ondansetron failed to produce a significant effect on gastric emptying in both healthy volunteers and in patients suffering from delayed gastric emptying. However, in one study intravenous doses of 8 mg did increase gastric emptying in over half the volunteers tested.

Intravenous infusion of either 1 mg or 5 mg ondansetron tended to increase small bowel transit times and single intravenous doses of 10 mg ondansetron have been reported to decrease sphincter pressure in the lower oesophagus in some subjects.

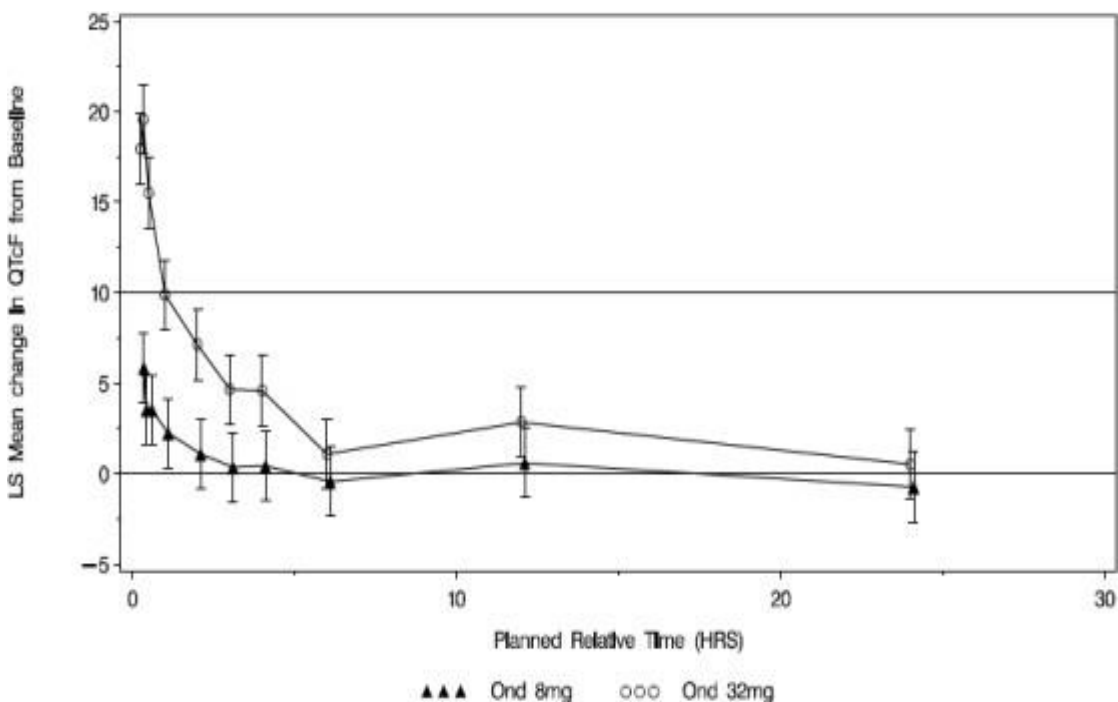
### **Electrocardiography**

A study in cloned human cardiac ion channels has shown ondansetron has the potential to affect cardiac repolarization via blockade of hERG potassium channels at clinically relevant concentrations. Dose-dependent QT prolongation has been observed in a thorough QT study in human volunteers.

The effect of ondansetron on the QTc interval was evaluated in a double blind, randomized, placebo and positive (moxifloxacin) controlled, crossover study in 58 healthy adult men and women. Ondansetron was tested at single doses of 8 mg and 32 mg infused intravenously over 15 minutes. At the highest tested dose of 32 mg, prolongation of the Fridericia-corrected QTc interval ( $QT/RR^{0.33}=QTcF$ ) was observed from 15 min to 4 h after the start of the 15 min infusion, with a maximum mean (upper limit of 90% CI) difference in QTcF from placebo after baseline-correction of 19.6 (21.5) msec at 20 min. At the lower tested dose of 8 mg, QTc prolongation was observed from 15 min to 1 h after the start of the 15 minute infusion, with a maximum mean (upper limit of 90% CI) difference in QTcF from placebo after baseline-correction of 5.8 (7.8) msec at 15 min. The magnitude of QTc prolongation with ondansetron is expected to be greater if the infusion rate is faster than 15 minutes. The 32 mg intravenous dose of ondansetron must not be administered.

No treatment-related effects on the QRS duration or the PR interval were observed at either the 8 or 32 mg dose.

### LS Mean Difference (90% CI) in QTcF Interval Between Treatment and Placebo Over Time



An ECG assessment study has not been performed for orally administered ondansetron. On the basis of pharmacokinetic-pharmacodynamic modelling, an 8 mg oral dose of ondansetron is predicted to cause a mean QTcF increase of 0.7 ms (90% CI -2.1, 3.3) at steady-state, assuming a mean maximal plasma concentration of 24.7 ng/mL (95% CI 21.1, 29.0).

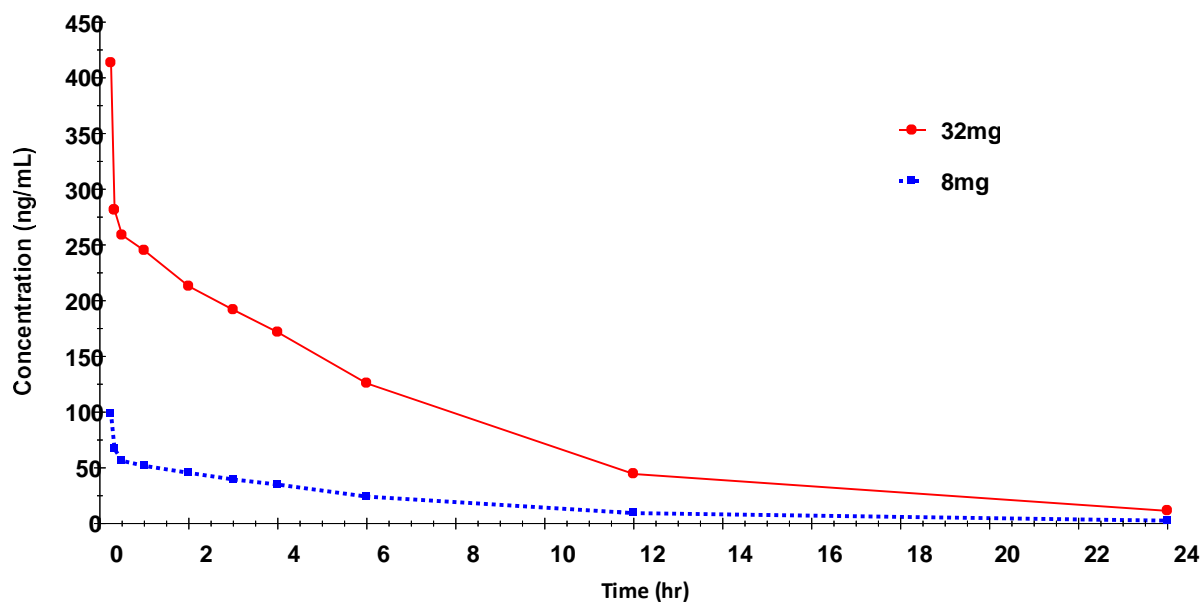
The magnitude of QTc prolongation at the recommended 5 mg/m<sup>2</sup> dose in pediatrics has not been studied, but pharmacokinetic-pharmacodynamic modelling predicts a mean increase of 6.6 ms (90% CI 2.8, 10.7) at maximal plasma concentrations.

### 10.3 Pharmacokinetics

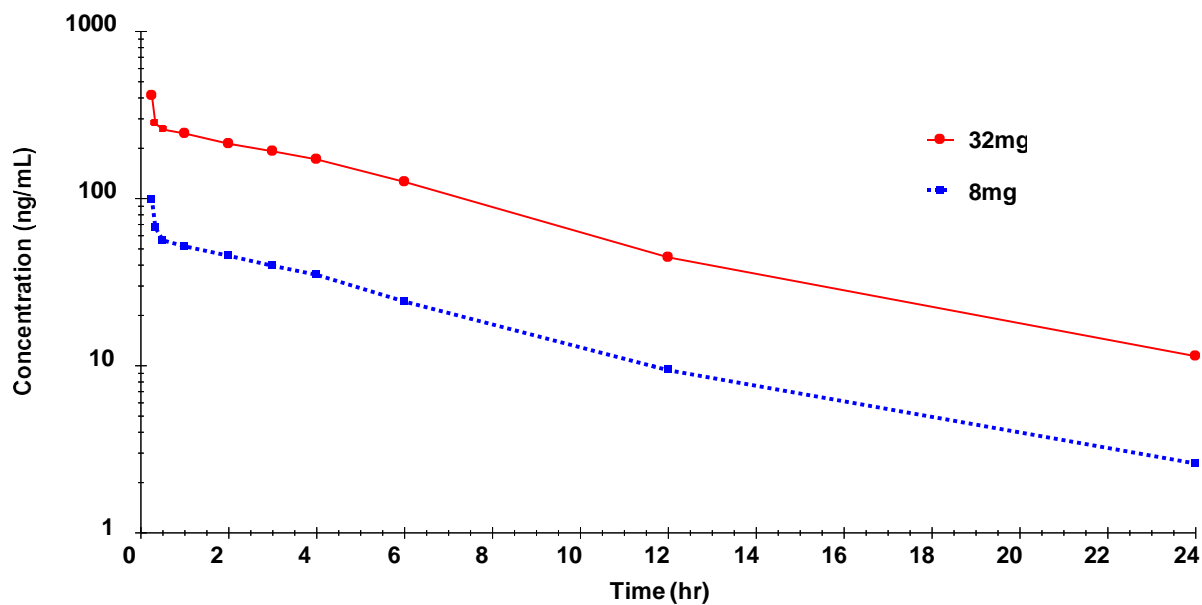
#### Absorption

Pharmacokinetic studies in human volunteers showed peak plasma levels of 20-30 ng/mL at around 1½ hours after an 8 mg oral dose of ondansetron. Repeat dosing of an 8 mg tablet every 8 hours for 6 days increased the peak plasma value to 40 ng/mL.

**Mean plasma concentration-time curves for ondansetron following 8 mg and 32 mg dose:  
Linear Scale**



**Semi-logarithmic Scale**



**Distribution**

The absolute bioavailability of ondansetron in humans was approximately 60% and the plasma protein binding was approximately 73%.

## Metabolism

*In vitro* metabolism studies have shown that ondansetron is a substrate for human hepatic cytochrome P<sub>450</sub> enzymes, including CYP1A2, CYP2D6 and CYP3A4. In terms of overall ondansetron turnover, CYP3A4 played the predominant role. Because of the multiplicity of metabolic enzymes capable of metabolising ondansetron, it is likely that inhibition or loss of one enzyme (e.g. CYP2D6 enzyme deficiency) will be compensated by others and may result in little change in overall rates of ondansetron clearance. CYP 3A4 inducers can increase clearance (see [9.4 Drug-Drug Interactions, CYP 3A4 inducers](#)).

## Elimination

Following extensive metabolism of an orally or intravenously administered dose, ondansetron is excreted in the urine and faeces. In humans, less than 10% of the dose is excreted unchanged in the urine. The major urinary metabolites are glucuronide conjugates (45%), sulphate conjugates (20%) and hydroxylation products (10%).

The half-life of ondansetron after either an 8 mg oral dose or intravenous dose was approximately 3 to 4 hours and may be extended to 6-8 hours in the elderly.

## Special Populations and Conditions

- **Geriatrics**

Early Phase I studies in healthy elderly volunteers showed a slight age-related decrease in clearance, and an increase in half-life of ondansetron. However, wide inter-subject variability resulted in considerable overlap in pharmacokinetic parameters between young (< 65 years of age) and elderly subjects (≥ 65 years of age) and there were no overall differences in safety or efficacy observed between young and elderly cancer patients enrolled in CINV clinical trials (see [4.2 Recommended Dose and Dosage Adjustment, Geriatrics](#)). There is limited data involving patients ≥75 years of age. Based on more recent ondansetron plasma concentrations and exposure-response modelling, a greater effect on QTcF is predicted in patients ≥75 years of age compared to young adults (see [4.2 Recommended Dose and Dosage Adjustment, Geriatrics](#)).

- **Genetic Polymorphism**

**CYP 2D6:** The elimination half-life and plasma levels of a single 8 mg intravenous dose of ondansetron did not differ between subjects classified as poor and extensive metabolisers of sparteine and debrisoquine (CYP 2D6 substrates). No alteration of daily dosage or frequency of ondansetron dosing is recommended for patients known to be CYP 2D6 poor metabolisers.

- **Hepatic Insufficiency**

Ondansetron is extensively metabolized by the liver. The clearance of an 8 mg intravenous dose of ondansetron hydrochloride dihydrate was significantly reduced and the serum half-life significantly prolonged in subjects with severe impairment of hepatic function. In patients

with moderate or severe impairment of hepatic function, reductions in dosage are therefore recommended (see [4.2 Recommended Dose and Dosage Adjustment](#)). There is no experience in patients who are clinically jaundiced.

- **Renal Insufficiency**

Renal impairment is not expected to significantly influence the total clearance of ondansetron, as renal clearance represents only 5% of the overall clearance. No dosage adjustment is required with impaired renal function (see [4.2 Recommended Dose and Dosage Adjustment](#)).

## **11 STORAGE, STABILITY AND DISPOSAL**

JAMP Ondansetron Tablets should be stored at room temperature 15-30°C. Protect from light.

Keep out of reach and sight of children.



## PART II: SCIENTIFIC INFORMATION

### 13 PHARMACEUTICAL INFORMATION

#### Drug Substance

Proper name: Ondansetron hydrochloride

Chemical name: 4*H*-Carbazol-4-one, 1,2,3,9-tetrahydro-9-methyl-3-[(2-methyl-1*H*-imidazol-1-yl) methyl]-, monohydrochloride, (±)-, dihydrate

and/or

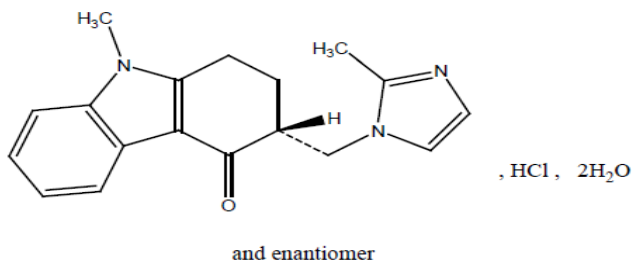
9-Methyl-3-[(2-methyl-1*H*-imidazol-1-yl) methyl]-1,2,3,9-tetrahydro-4*H*-carbazol-4-one hydrochloride dihydrate

Molecular formula and molecular mass:

$C_{18}H_{20}ClN_3O, 2H_2O$

365.9 g/mol

Structural formula:



Physicochemical properties:

Physical Characteristics: White or almost white powder

Solubility Profile: Soluble in Methanol

Sparingly soluble in water, ethanol (96%), aqueous buffer solution at pH 1.0, aqueous buffer solution at pH 4.0 and aqueous buffer solution at pH 7.0

Slightly soluble in methylene chloride

pH: 3.3 – 4.0

Dissociation Constant (pKa): 7.4

Partition Coefficient (Log P): 2.56

Melting Range: approximately 177°C

## 14 CLINICAL TRIALS

### 14.1 Clinical Trials by Indication

The clinical trial data on which the original indication was authorized is not available.

Clinical trial results showing the number and percentage of patients exhibiting a complete response to ondansetron (0 emetic episodes) are shown in the tables below for both post-operative and chemotherapy induced emesis.

#### Prevention of Chemotherapy Induced Emesis

| Table 2: Prevention of Chemotherapy Induced Emesis - Response Over 24 Hours* |  |                                |
|--|--|--------------------------------|
| Dose   | Ondansetron*<br>3 doses of<br>0.15 mg/kg | Placebo*<br>3 doses of placebo |
| # of patients  | 14                                       | 14                             |
| Treatment Response:<br>0 emetic episodes                                     | 2 (14%)                                  | 0 (0%)                         |
| 1-2 emetic episodes  | 8 (57%)                                  | 0 (0%)                         |

\*Results are from an initial study using a different dosing regimen.

#### Prevention of Post-Operative Emesis

| Table 3: Prevention of Post-Operative Emesis – Response Over 24 Hours* |                         |          |                |
|--|-------------------------|----------|----------------|
|  | Oral Prevention         |          |                |
| Dose   | Ondansetron<br>16 mg od | Placebo  | <i>p value</i> |
| # of patients  | 253                     | 250      |                |
| Treatment Response:<br>0 emetic episodes                               | 126 (50%)               | 79 (32%) | < 0.001        |

\* The majority of patients included in the prevention and treatment of post-operative nausea and vomiting studies using ondansetron have been adult women receiving balanced anaesthesia for gynaecological surgery.

### Prevention of Radiotherapy Induced Emesis

| <b>Table 4: Prevention of Radiotherapy Induced Emesis – Response Over 24 Hours*</b> |                             |                                 |                |
|---|-----------------------------|---------------------------------|----------------|
| <b>Oral Treatment</b>   |                             |                                 |                |
| Dose  | Ondansetron<br>8 mg PO tid* | Metoclopramide<br>10 mg PO tid* | <i>p value</i> |
| # of patients   | 38                          | 44                              |                |
| Treatment Response:<br>0 emetic episodes  | 37 (97%)                    | 20 (45%)                        | < 0.001        |

\*results from a study of adult male and female patients receiving single high dose radiotherapy (800 to 1,000 cGy) over an anterior or posterior field size of  $\geq 80$  cm<sup>2</sup> to the abdomen.

\*Patients received the first dose of ondansetron 8 mg tablets or metoclopramide (10 mg) 1-2 hours before radiotherapy. If radiotherapy was given in the morning, 2 additional doses of study treatment were given (1 tablet late afternoon and 1 tablet before bedtime). If radiotherapy was given in the afternoon, patients took only 1 further tablet that day before bedtime. Patients continued oral medication on a 3 times a day basis for 3-5 days.

### 14.3 Comparative Bioavailability Study

A double blinded, balanced, randomized, two treatment, two sequence, two period, two way cross-over, single oral dose bioequivalence study of JAMP Ondansetron 8 mg Tablets (JAMP Pharma Corporation), and PrZOFRAN® 8 mg tablets (Novartis Pharmaceuticals Canada Inc.) was conducted in healthy, adult, male subjects under fasting conditions. Comparative bioavailability data from 28 subjects that were included in the statistical analysis are presented in the following table:

## SUMMARY TABLE OF THE COMPARATIVE BIOAVAILABILITY DATA

| Ondansetron<br>(1 X 8 mg)<br>Geometric Mean<br>Arithmetic Mean (CV %) |                          |                          |                            |                          |
|---|--------------------------|--------------------------|----------------------------|--------------------------|
| Parameter   | Test <sup>1</sup>        | Reference <sup>2</sup>   | % Ratio of Geometric Means | 90 % Confidence Interval |
| AUC <sub>T</sub><br>(ng.h/mL)   | 262.34<br>280.54 (32.98) | 275.42<br>292.61 (33.40) | 95.2                       | 87.9 - 103.2             |
| AUC <sub>I</sub><br>(ng.h/mL)   | 275.55<br>295.45 (34.08) | 290.72<br>311.07 (36.76) | 94.8                       | 87.3 - 102.9             |
| C <sub>max</sub><br>(ng/mL)   | 41.73<br>43.13 (25.41)   | 41.16<br>42.65 (26.06)   | 101.4                      | 95.3 - 107.8             |
| T <sub>max</sub> <sup>3</sup><br>(h)                                  | 1.25<br>(0.75 - 3.00)    | 1.50 (1.00 - 3.50)       |                            |                          |
| T <sub>½</sub> <sup>4</sup><br>(h)                                    | 4.95 (23.49)             | 4.99 (24.13)             |                            |                          |

<sup>1</sup> JAMP Ondansetron (ondansetron as ondansetron hydrochloride) tablets, 8 mg (JAMP Pharma Corporation)

<sup>2</sup> PrZOFran® (ondansetron as ondansetron hydrochloride) tablets, 8 mg (Novartis Pharma Canada Inc.)

<sup>3</sup> Expressed as the median (range) only.

<sup>4</sup> Expressed as the arithmetic mean (CV%).

## 15 MICROBIOLOGY

No microbiological information is required for this product.

## 16 NON-CLINICAL TOXICOLOGY

### General Toxicology

- Acute Toxicity**

Single doses of ondansetron up to the LD<sub>50</sub> in mice and in rats were generally well tolerated. Reactions,

including tremor and convulsive behaviour, occurred only at near lethal levels.

**Table 5**

| Species | LD <sub>50</sub> (mg/kg) |
|---------|--------------------------|
| Mice    | Oral                     |
|         | 10-30                    |
|         | 100-150                  |

All deaths resulted from the acute effects of treatment, the observed clinical signs being consistent with the central nervous system effects associated with behavioural depression. These effects were not associated with any apparent histopathological changes in the brain. No target organ toxicity was identified.

- **Long-term Toxicity**

**Table 6 - Subacute Toxicity Studies**

| Species | Route | Dose (mg/kg/day) | Duration of Study | Results  |
|---------|-------|------------------|-------------------|--|
| Rats    | Oral  | 160              | 7 weeks           | Well tolerated   |
|         | IV    | 12               | 5 weeks           | Well tolerated   |
| Dogs    | Oral  | 7.5-25           | 5 weeks           | Transient post-dosing clinical reactions associated with behavioural depression (at highest dose levels) |
|         | IV    | 2-8              | 5 weeks           |  |

Maximum daily dose levels in rats were found to be higher when doses were gradually increased. Identical doses were rapidly lethal to rats not previously exposed to ondansetron. Post-dosing reactions, in both rats and dogs, included ataxia, exophthalmia, mydriasis, tremor and respiratory changes. Increases in liver enzymes (SGPT and SGOT) were noted at high dose levels. Dogs dosed at 6.75 mg/kg/day intravenously exhibited vein irritancy in the form of constriction and thickening, creating resistance to needle penetration. The changes were noted after seven days treatment but were reversed by decreasing the dose concentration.

**Table 7 - Chronic Toxicity**

| Species | Duration  | Max. no-effect Dose (mg/kg/day) | Effects  |
|---------|-----------|---------------------------------|--|
| Rat     | 18 months | 1                               | Usually transient and restricted to highest dose |
| Dog     | 12 months | 12                              |  |

### Genotoxicity

No evidence of mutagenicity was observed in microbial mutagen tests using mutant strains of *Salmonella typhimurium*, *Escherichia coli* or *Saccharomyces cerevisiae*, with or without a rat-liver post-mitochondrial metabolizing system.

There was also no evidence of damage to genetic material noted in in vitro V-79 mammalian cell mutation studies, in vitro chromosome aberration tests using human peripheral lymphocytes, or *in vivo* chromosome aberration assays in mouse bone marrow.

### Carcinogenicity

**Table 8 - Carcinogenicity Studies**

| Species      | Route        | Dose (mg/kg/day)         | Duration of Study | Results  |
|--------------|--------------|--------------------------|-------------------|--|
| Mice<br>Rats | Oral<br>Oral | 1-40 (max. oral dose 30) | 2 years           | No treatment related increases in tumour incidence.  |
|              |              | 1-25 (max. oral dose 10) | 2 years           | Proportion of benign/malignant tumours also remained Consistent with the pathological background of the Animals studied. |

There was no evidence of a tumourigenic effect of ondansetron in any tissue.

### Reproductive and Developmental Toxicology:

Ondansetron was not teratogenic in rats and rabbits at dosages up to the maximum non-convulsive level, (rat: 15 mg/kg/day, rabbit: 30 mg/kg/day; the maternal dose was approximately 6 and 24 times the maximum recommended human oral dose of 24 mg/day, respectively, based on body surface area). No adverse effects on pregnancy or foetal and post-natal development were detected in rats and no foetal abnormalities were observed in rabbits after oral administration of ondansetron.

A slight maternal toxicity was observed at the highest dose level in intravenous organogenesis (4.0 mg/kg/day) studies in the rabbit. Effects included maternal body weight loss and increased incidence of early foetal death. In a rat fertility study, there was a dose-related decrease in the proportion of surviving pups of the F2 generation; however, the significance of this is unclear.

Administration of ondansetron to pregnant rats and rabbits indicated there was foetal exposure to low levels of ondansetron and its metabolites. Ondansetron is retained in the

foetal eye presumably bound to melanin. In rats, the transfer of ondansetron and its metabolites into breast milk was extensive. The concentration of unchanged ondansetron in breast milk was higher than in corresponding plasma samples.

Daily administration of ondansetron at dosages up to 15 mg/kg/day to pregnant rats (a maternal dose of approximately 6 times the maximum recommended human oral dose of 24 mg / day, based on body surface area) from day 17 of pregnancy to litter day 22 had no effects on pregnancy of the parental generation or on post-natal development and mating of the F1 generation. Foetal development of the F2 generation was comparable to controls; however, the number of implantations and viable foetuses was reduced in the highest dosage group when compared with controls.

## **17 SUPPORTING PRODUCT MONOGRAPHS**

1. PrZOFRAN® (tablets, 4 mg and 8 mg; oral solution, 4 mg/5mL; injection, 2 mg/mL), PrZOFRAN® ODT (oral disintegrating tablets, 4mg and 8 mg), submission control 252778, Product Monograph, Novartis Pharmaceuticals Canada Inc. (November 09, 2021)
2. PrZOFRAN® ODT (oral disintegrating tablets, 4 mg and 8 mg), submission control 278769, Product Monograph, Sandoz Canada Incorporated (February 27, 2024)

## **PATIENT MEDICATION INFORMATION**

### **READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE**

#### **Pr JAMP Ondansetron Tablets**

#### **Ondansetron tablets, USP**

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

#### **What is JAMP Ondansetron Tablets used for?**

##### **Children (4 to 17 years of age):**

JAMP Ondansetron Tablets (ondansetron hydrochloride) is used to treat nausea and vomiting during certain types of chemotherapy.

##### **Adults (18 to 64 years of age):**

JAMP Ondansetron Tablets is used:

- to prevent nausea and vomiting during certain types of chemotherapy and radiotherapy, and
- to prevent nausea and vomiting after surgery.

##### **Patients (65 years of age and older):**

JAMP Ondansetron Tablets is used to prevent nausea and vomiting during chemotherapy and radiotherapy.

#### **How does JAMP Ondansetron Tablets work?**

JAMP Ondansetron Tablets is a medication known as an antiemetic.

Treatments such as cancer chemotherapy and radiotherapy are associated with the release of a natural substance (serotonin). The release of serotonin can make you feel sick and vomit. The way that JAMP Ondansetron Tablets works is not known, but it is thought to help stop the effects of serotonin to reduce the effects of nausea and vomiting.

#### **What are the ingredients in JAMP Ondansetron Tablets?**

- Medicinal ingredient: Ondansetron hydrochloride.
- Non-medicinal ingredients: FD&C Yellow no. 5 / tartrazine aluminum lake, hypromellose, iron oxide red, iron oxide yellow, lactose anhydrous, magnesium stearate, microcrystalline cellulose, pregelatinized starch, titanium dioxide.



**JAMP Ondansetron Tablets comes in the following dosage forms:**

- Tablets: 4 mg and 8 mg of ondansetron (as ondansetron hydrochloride).

**Do not use JAMP Ondansetron Tablets if:**

- you are allergic to ondansetron or ondansetron hydrochloride, or to any other ingredients in JAMP Ondansetron Tablets.
- you are taking a medicine called apomorphine (used to treat Parkinson's disease).

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

- have had an allergic reaction to medicines that are similar to JAMP Ondansetron Tablets such as medicines containing granisetron or palonosetron.
- are pregnant or planning to become pregnant. JAMP Ondansetron Tablets is not recommended for use during pregnancy.
- are breast feeding or planning to breastfeed. JAMP Ondansetron Tablets can pass into your breast milk and affect your baby.
- have liver problems.
- have signs of intestinal obstruction or blockage.
- have or have had heart or blood vessel problems, including if you are at a higher risk for these problems. Risk factors include, but are not limited to, if you:
  - have family members who have or have had heart or blood vessel problems,
  - smoke,
  - have high blood pressure,
  - have high cholesterol levels,
  - have diabetes, or
  - are overweight.
- are taking medications that affect the serotonin in your body (e.g., serotonergic and neuroleptic medications). If you are unsure, ask your healthcare professional.
- have QT / QTc prolongation (a heart rhythm condition) or a family history of QT / QTc prolongation.
- are taking medications that may lead to QT / QTc prolongation or electrolyte imbalances. If you are unsure, ask your healthcare professional.
- have low blood levels of potassium, magnesium, or calcium.

**Other warnings you should know about:**

**Serotonin toxicity (also known as Serotonin syndrome):** JAMP Ondansetron Tablets can cause serotonin toxicity, a rare but potentially life-threatening condition. It can cause serious changes in how your brain, muscles and digestive system work. You may develop serotonin

toxicity if you take JAMP Ondansetron Tablets with certain anti-depressants or migraine medications.

Serotonin syndrome symptoms include:

- fever, sweating, shivering, diarrhea, nausea, vomiting;
- muscle shakes, jerks, twitches or stiffness, overactive reflexes, loss of coordination;
- fast heartbeat, changes in blood pressure;
- confusion, agitation, restlessness, hallucinations, mood changes, unconsciousness, and coma.

**Myocardial ischemia (lack of blood flow to the heart):** Treatment with JAMP Ondansetron Tablets can cause myocardial ischemia which can lead to a heart attack. This may happen shortly after JAMP Ondansetron Tablets administration. Some symptoms of myocardial ischemia can include sudden chest pain, pressure or discomfort, feeling faint, feeling anxious, shortness of breath, irregular heartbeat, nausea, and sudden heavy sweating. Your healthcare professional will monitor your health during and after administration of JAMP Ondansetron Tablets. However, if you notice any symptoms of myocardial ischemia, tell your healthcare professional right away. They may reduce or stop your treatment, and may recommend another therapy.

**QT / QTc prolongation:** JAMP Ondansetron Tablets can affect the electrical activity of your heart known as QT / QTc prolongation. This effect can be measured with an electrocardiogram (ECG). In rare cases, QT / QTc prolongation can cause changes to the rhythm of your heart (e.g., fast, slow or irregular heartbeats). This can lead to dizziness, palpitations (sensation of rapid, pounding, or irregular heartbeat), fainting, or death. You are at a higher risk if you have a heart disease, are taking certain interacting medicines, are a female, or are over the age of 65 years. It is important to follow the instructions of your healthcare professional with regard to dosing or any special tests. If you experience any symptoms of a possible heart rhythm problem, you should seek immediate medical attention.

**Severe allergic reactions:** JAMP Ondansetron Tablets can cause allergic reactions in certain individuals. Symptoms of a severe allergic reaction can include wheezing, sudden chest pain, tightness of the chest, heart throbbing, swelling of eyelids, face or lips, or develop a skin rash, skin lumps or hives. If you notice any signs of a severe allergic reaction, **contact your healthcare professional immediately. Do not take any more medicine unless your healthcare professional tells you to do so.**

**Pregnancy:**

- If you are pregnant, there are specific risks for your unborn baby that you must discuss with your healthcare professional.
- If you are able to get pregnant, you may be asked to take a pregnancy test before starting your treatment with JAMP Ondansetron Tablets.
- You should use effective birth control while you are taking JAMP Ondansetron Tablets, and for at least 2 days after stopping JAMP Ondansetron Tablets. Ask your healthcare

professional about options of effective birth control.

- If you become pregnant while taking JAMP Ondansetron Tablets, tell your healthcare professional right away.

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

#### **Serious Drug Interactions**

- **Do not** take JAMP Ondansetron Tablets if you are taking apomorphine (a medicine used to treat Parkinson's Disease). This can cause serious side effects such as extremely high blood pressure and loss of consciousness.
- QTc-prolonging medicines (see examples below)
- Serotonergic medicines (see examples below)

**The following may interact with JAMP Ondansetron Tablets:**

- medicines called CYP3A4 inducers (e.g., phenytoin, carbamazepine, and rifampicin);
- medicines that can affect electrolyte levels (e.g., diuretics, laxatives, enemas, amphotericin B, and high doses of corticosteroids);
- herbal products (e.g. St. John's Wort (*Hypericum perforatum*), methylene, ginseng, L-tryptophan, valerian and Ginkgo biloba)

QTc prolonging medicines:

- medicines used to treat heart rhythm disorders (e.g., quinidine, procainamide, disopyramide, amiodarone, sotalol, ibutilide, dronedarone, flecainide, and propafenone);
- medicines used to treat vomiting and nausea called antiemetics (e.g., dolasetron, palonosetron, granisetron, droperidol, chlorpromazine, prochlorperazine, and domperidone);
- medicines called tyrosine kinase inhibitors (e.g., vandetanib, sunitinib, nilotinib, and lapatinib);
- medicines used to manage psychosis or schizophrenia called antipsychotics (e.g., chlorpromazine, pimozide, haloperidol, olanzapine, quetiapine, risperidone and ziprasidone);
- medicines used to treat depression called antidepressants (e.g., citalopram, fluoxetine, venlafaxine, tricyclic / tetracyclic antidepressants, amitriptyline, imipramine, and maprotiline);
- medicines used to treat pain called opioids (e.g., methadone and tramadol);
- medicines used to treat bacterial infections called antibiotics (e.g., erythromycin, clarithromycin, telithromycin, tacrolimus, moxifloxacin, levofloxacin, and ciprofloxacin);
- medicines used to treat malaria called antimalarials (e.g., quinine and chloroquine);
- medicines used to treat fungal infections called azole antifungals (e.g., ketoconazole,

- fluconazole, and voriconazole);
- medicines used to treat cancer (e.g., vorinostat);
- medicines called beta-2 adrenoceptor agonists (e.g., salmeterol and formoterol);

**Serotonergic medicines:**

- medicines used to treat migraines (e.g. triptans)
- medicines used to treat depression (e.g. Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin Noradrenalin Reuptake Inhibitors (SNRIs))
- medicines used to treat mood disorders (e.g. lithium)
- medicines used for weight loss (e.g. sibutramine)
- medicines used to treat pain (e.g. fentanyl and its analogues, tramadol, tapentadol, methadone, meperidine, pentazocine)
- medicines used to relieve cough caused by colds (e.g. dextromethorphan)
- monoamine oxidase inhibitors (MAOIs), including phenelzine, moclobemide, linezolid, and methylene blue.

If you are unsure about any medications you are taking, ask your healthcare professional.

**How to take JAMP Ondansetron Tablets:**

- Take JAMP Ondansetron Tablets exactly as your healthcare professional has told you. Talk to your healthcare professional if you are not sure.
- **Do not** take more doses, or take them more often than your healthcare professional prescribes. If, however, you vomit within one hour of taking your medicine, you should take the same amount of medicine again. If vomiting persists, consult your healthcare professional.
- JAMP Ondansetron Tablets should be swallowed whole with a liquid.

**Usual Dose:**

**Adults and Patients (65 years of age and older):**

Your healthcare professional will determine the dose that is right for you and how long you should take it. Your dose will depend on why you are prescribed JAMP Ondansetron Tablets, your age, current health and if you take certain other medications. Your healthcare professional may monitor your health throughout your treatment and may interrupt, reduce or stop your dose.

**Children (4 to 17 years of age):**

After chemotherapy, take 4 mg every 8 hours, for up to 5 days.

### Overdose:

If you think you, or a person you are caring for, have taken too much JAMP Ondansetron Tablets, contact a healthcare professional, hospital emergency department, regional poison control centre or Health Canada's toll-free number, 1-844 POISON-X (1-844-764-7669) immediately, even if there are no signs or symptoms.

### Missed Dose:

- If you miss a dose and do not feel sick, take the next dose when it is due. **Do not double the dose to make up for the one you missed.**
- If you forget to take your medicine and you feel sick or you vomit, take a dose as soon as possible.
- If your healthcare professional decides to stop the treatment, do not keep any leftover medicine unless your healthcare professional tells you to.

### What are possible side effects from using JAMP Ondansetron Tablets?

These are not all the possible side effects you may have when taking JAMP Ondansetron Tablets. If you experience any side effects not listed here, tell your healthcare professional.

Some side effects may include:

- feeling of flushing or warmth
- hiccups
- headache
- feeling tired
- constipation
- diarrhea

There is no need to stop taking your medicine, but you should tell your healthcare professional about these symptoms at your next visit.

If you feel unwell or have any symptoms that you do not understand, you should contact your healthcare professional immediately.

| Serious side effects and what to do about them   |                                      |              |   |
|--|--------------------------------------|--------------|---|
| Frequency/Side Effect/Symptom  | Talk to your healthcare professional |              | Stop taking drug and get immediate medical help |
|  | Only if severe                       | In all cases |   |
| UNCOMMON   |                                      |              |   |
| Heart problems (disorders affecting your heart muscle, valves or rhythm): chest pain, chest discomfort, high blood pressure, irregular heart |                                      |              | ✓   |

| Serious side effects and what to do about them  |                                      |              |   |
|---|--------------------------------------|--------------|---|
| Frequency/Side Effect/Symptom   | Talk to your healthcare professional |              | Stop taking drug and get immediate medical help |
|   | Only if severe                       | In all cases |   |
| rhythm, shortness of breath, or fainting.   |                                      |              |   |
| <b>Movement disorders</b> (including dyskinesia): loss of coordination or balance, speech or limb movements, muscle spasms, difficulty walking, tremor, upward rolling of the eyes, or abnormal muscular stiffness. |                                      |              | ✓   |
| <b>Seizures:</b> loss of consciousness with uncontrollable shaking, visual disturbances (e.g., blurred vision).   |                                      |              | ✓   |
| <b>RARE</b>   |                                      |              |   |
| Eye problems such as blurred vision   |                                      | ✓            |   |
| <b>Hypokalemia</b> (low level of potassium in the blood): muscle weakness, muscle spasms, cramping, constipation, feeling of skipped heartbeats or palpitations, fatigue, tingling, or numbness.                    |                                      |              | ✓   |
| <b>Hypotension</b> (low blood pressure): dizziness, fainting, lightheadedness, blurred vision, nausea, or vomiting.   |                                      |              | ✓   |
| <b>Immediate severe allergic reaction:</b> swelling of the mouth, throat, difficulty in breathing, rash, hives, or increased heart rate.  |                                      |              | ✓   |
| <b>Liver problems:</b> yellowing of your skin and eyes (jaundice), unusual dark urine and pale stools, pain or swelling in the right upper abdomen, unusual tiredness, nausea, or vomiting.                         |                                      |              | ✓   |

| Serious side effects and what to do about them  |                                      |              |   |
|---|--------------------------------------|--------------|---|
| Frequency/Side Effect/Symptom   | Talk to your healthcare professional |              | Stop taking drug and get immediate medical help |
|   | Only if severe                       | In all cases |   |
| <b>Myocardial ischemia</b> (lack of blood flow to the heart which can lead to heart attack): sudden chest pain, pressure or discomfort, feeling faint, feeling anxious, shortness of breath, irregular heartbeat, nausea, or sudden heavy sweating. |                                      |              | ✓   |
| <b>Prolongation of QT interval</b> (a heart rhythm condition): irregular heartbeat, palpitations, dizziness, fainting, loss of consciousness, or seizures.  |                                      |              | ✓   |
| <b>Serotonin syndrome:</b> a reaction which may cause feelings of agitation or restlessness, flushing, muscle twitching, involuntary eye movements, heavy sweating, high body temperature (> 38°C), or rigid muscles.                               |                                      |              | ✓   |
| <b>Neuroleptic Malignant Syndrome:</b> pronounced muscle stiffness or inflexibility with high fever, rapid or irregular heartbeat, sweating, state of confusion or reduced consciousness  |                                      |              | ✓   |
| <b>VERY RARE</b>  |                                      |              |   |
| Eye problems such as temporary blindness.   |                                      | ✓            |   |
| <b>Stevens-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN)</b> (severe skin reactions): redness, blistering or peeling of the skin and / or inside of the lips, eyes, mouth, nasal passages or genitals, fever,                         |                                      |              | ✓   |

| Serious side effects and what to do about them          |                                      |              |   |
|---|--------------------------------------|--------------|---|
| Frequency/Side Effect/Symptom                           | Talk to your healthcare professional |              | Stop taking drug and get immediate medical help |
|   | Only if severe                       | In all cases |   |
| chills, headache, cough, body aches, or swollen glands. |                                      |              |   |

If you have a troublesome symptom or side effect that is not listed here or becomes bad enough to interfere with your daily activities, tell your healthcare professional.

### Reporting Side Effects

You can report any suspected side effects associated with the use of health products to Health Canada by:

- Visiting the Web page on Adverse Reaction Reporting (<https://canada.ca/drug-device-reporting>) for information on how to report online, by mail or by fax; or
- Calling toll-free at 1-866-234-2345.

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

### Storage:

JAMP Ondansetron Tablets should be stored at room temperature 15-30°C.

Protect from light.

Keep out of reach and sight of children.

### If you want more information about JAMP Ondansetron Tablets:

- Talk to your healthcare professional.
- Find the full Product Monograph that is prepared for healthcare professionals and includes the Patient Medication Information by visiting the Health Canada Drug Product Database website (<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/drug-product-database.html>); or by calling 1-866-399-9091.

This leaflet was prepared by:

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