



KYTRIL®

(granisetron hydrochloride)

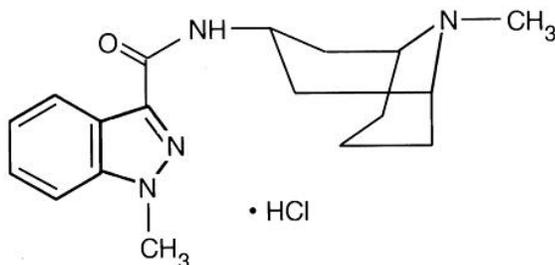
TABLETS

ORAL SOLUTION

R<sub>x</sub> only

### DESCRIPTION

KYTRIL Tablets and KYTRIL Oral Solution contain granisetron hydrochloride, an antiemetic and anti-nausea agent. Chemically it is *endo*-N-(9-methyl-9-azabicyclo[3.3.1]non-3-yl)-1-methyl-1H-indazole-3-carboxamide hydrochloride with a molecular weight of 348.9 (312.4 free base). Its empirical formula is C<sub>18</sub>H<sub>24</sub>N<sub>4</sub>O•HCl, while its chemical structure is:



granisetron hydrochloride

Granisetron hydrochloride is a white to off-white solid that is readily soluble in water and normal saline at 20°C.

### Tablets for Oral Administration

Each white, triangular, biconvex, film-coated KYTRIL Tablet contains 1.12 mg granisetron hydrochloride equivalent to granisetron, 1 mg. Inactive ingredients are: hydroxypropyl methylcellulose, lactose, magnesium stearate, microcrystalline cellulose, polyethylene glycol, polysorbate 80, sodium starch glycolate, and titanium dioxide.

### Oral Solution

Each 10 mL of clear, orange-colored, orange-flavored KYTRIL Oral Solution contains 2.24 mg of granisetron hydrochloride equivalent to 2 mg granisetron. Inactive ingredients: citric acid anhydrous, FD&C Yellow No. 6, orange flavor, purified water, sodium benzoate, and sorbitol.

27 **CLINICAL PHARMACOLOGY**

28 Granisetron is a selective 5-hydroxytryptamine<sub>3</sub> (5-HT<sub>3</sub>) receptor antagonist with little or  
29 no affinity for other serotonin receptors, including 5-HT<sub>1</sub>; 5-HT<sub>1A</sub>; 5-HT<sub>1B/C</sub>; 5-HT<sub>2</sub>; for  
30 alpha<sub>1</sub>-, alpha<sub>2</sub>-, or beta-adrenoreceptors; for dopamine-D<sub>2</sub>; or for histamine-H<sub>1</sub>;  
31 benzodiazepine; picrotoxin or opioid receptors.

32 Serotonin receptors of the 5-HT<sub>3</sub> type are located peripherally on vagal nerve terminals  
33 and centrally in the chemoreceptor trigger zone of the area postrema. During  
34 chemotherapy that induces vomiting, mucosal enterochromaffin cells release serotonin,  
35 which stimulates 5-HT<sub>3</sub> receptors. This evokes vagal afferent discharge, inducing  
36 vomiting. Animal studies demonstrate that, in binding to 5-HT<sub>3</sub> receptors, granisetron  
37 blocks serotonin stimulation and subsequent vomiting after emetogenic stimuli such as  
38 cisplatin. In the ferret animal model, a single granisetron injection prevented vomiting  
39 due to high-dose cisplatin or arrested vomiting within 5 to 30 seconds.

40 In most human studies, granisetron has had little effect on blood pressure, heart rate or  
41 ECG. No evidence of an effect on plasma prolactin or aldosterone concentrations has  
42 been found in other studies.

43 Following single and multiple oral doses, KYTRIL Tablets slowed colonic transit in  
44 normal volunteers. However, KYTRIL had no effect on oro-cecal transit time in normal  
45 volunteers when given as a single intravenous (IV) infusion of 50 mcg/kg or 200 mcg/kg.

46 **Pharmacokinetics**

47 In healthy volunteers and adult cancer patients undergoing chemotherapy, administration  
48 of KYTRIL Tablets produced mean pharmacokinetic data shown in **Table 1**.

49 **Table 1**                    **Pharmacokinetic Parameters (Median [range]) Following**  
50 **KYTRIL Tablets (granisetron hydrochloride)**

	<b>Peak Plasma Concentration (ng/mL)</b>	<b>Terminal Phase Plasma Half-Life (h)</b>	<b>Volume of Distribution (L/kg)</b>	<b>Total Clearance (L/h/kg)</b>
<b>Cancer Patients</b> 1 mg bid, 7 days (n=27)	5.99 [0.63 to 30.9]	N.D. <sup>1</sup>	N.D.	0.52 [0.09 to 7.37]
<b>Volunteers</b> single 1 mg dose (n=39)	3.63 [0.27 to 9.14]	6.23 [0.96 to 19.9]	3.94 [1.89 to 39.4]	0.41 [0.11 to 24.6]

<sup>1</sup> Not determined after oral administration; following a single intravenous dose of 40 mcg/kg, terminal phase half-life was determined to be 8.95 hours.  
N.D. Not determined.

52 A 2 mg dose of KYTRIL Oral Solution is bioequivalent to the corresponding dose of  
53 KYTRIL Tablets (1 mg x 2) and may be used interchangeably.

#### 54 Absorption

55 When KYTRIL Tablets were administered with food, AUC was decreased by 5% and  
56  $C_{max}$  increased by 30% in non-fasted healthy volunteers who received a single dose of 10  
57 mg.

#### 58 Distribution

59 Plasma protein binding is approximately 65% and granisetron distributes freely between  
60 plasma and red blood cells.

#### 61 Metabolism

62 Granisetron metabolism involves N-demethylation and aromatic ring oxidation followed  
63 by conjugation. In vitro liver microsomal studies show that granisetron's major route of  
64 metabolism is inhibited by ketoconazole, suggestive of metabolism mediated by the  
65 cytochrome P-450 3A subfamily. Animal studies suggest that some of the metabolites  
66 may also have 5-HT<sub>3</sub> receptor antagonist activity.

#### 67 Elimination

68 Clearance is predominantly by hepatic metabolism. In normal volunteers, approximately  
69 11% of the orally administered dose is eliminated unchanged in the urine in 48 hours.  
70 The remainder of the dose is excreted as metabolites, 48% in the urine and 38% in the  
71 feces.

#### 72 Subpopulations

##### 73 *Gender*

74 The effects of gender on the pharmacokinetics of KYTRIL Tablets have not been studied.  
75 However, after intravenous infusion of KYTRIL, no difference in mean AUC was found  
76 between males and females, although males had a higher  $C_{max}$  generally.

77 In elderly and pediatric patients and in patients with renal failure or hepatic impairment,  
78 the pharmacokinetics of granisetron was determined following administration of  
79 intravenous KYTRIL:

##### 80 *Elderly*

81 The ranges of the pharmacokinetic parameters in elderly volunteers (mean age 71 years),  
82 given a single 40 mcg/kg intravenous dose of KYTRIL Injection, were generally similar  
83 to those in younger healthy volunteers; mean values were lower for clearance and longer  
84 for half-life in the elderly.

##### 85 *Renal Failure Patients*

86 Total clearance of granisetron was not affected in patients with severe renal failure who  
87 received a single 40 mcg/kg intravenous dose of KYTRIL Injection.

88 *Hepatically Impaired Patients*

89 A pharmacokinetic study with intravenous KYTRIL in patients with hepatic impairment  
90 due to neoplastic liver involvement showed that total clearance was approximately halved  
91 compared to patients without hepatic impairment. Given the wide variability in  
92 pharmacokinetic parameters noted in patients and the good tolerance of doses well above  
93 the recommended dose, dosage adjustment in patients with possible hepatic functional  
94 impairment is not necessary.

95 *Pediatric Patients*

96 A pharmacokinetic study in pediatric cancer patients (2 to 16 years of age), given a single  
97 40 mcg/kg intravenous dose of KYTRIL Injection, showed that volume of distribution  
98 and total clearance increased with age. No relationship with age was observed for peak  
99 plasma concentration or terminal phase plasma half-life. When volume of distribution  
100 and total clearance are adjusted for body weight, the pharmacokinetics of granisetron are  
101 similar in pediatric and adult cancer patients.

102 **CLINICAL TRIALS**

103 **Chemotherapy-Induced Nausea and Vomiting**

104 KYTRIL Tablets prevent nausea and vomiting associated with initial and repeat courses  
105 of emetogenic cancer therapy, as shown by 24-hour efficacy data from studies using both  
106 moderately- and highly-emetogenic chemotherapy.

107 **Moderately Emetogenic Chemotherapy**

108 The first trial compared KYTRIL Tablets doses of 0.25 mg to 2 mg bid, in 930 cancer  
109 patients receiving, principally, cyclophosphamide, carboplatin, and cisplatin (20 mg/m<sup>2</sup>  
110 to 50 mg/m<sup>2</sup>). Efficacy was based on complete response (ie, no vomiting, no moderate or  
111 severe nausea, no rescue medication), no vomiting, and no nausea. **Table 2** summarizes  
112 the results of this study.

113 **Table 2**      **Prevention of Nausea and Vomiting 24 Hours Post-**  
114 **Chemotherapy<sup>1</sup>**

Efficacy Measures	Percentages of Patients			
	KYTRIL Tablet Dose			
	0.25 mg bid (n=229) %	0.5 mg bid (n=235) %	1 mg bid (n=233) %	2 mg bid (n=233) %
Complete Response <sup>2</sup>	61	70*	81*†	72*
No Vomiting	66	77*	88*	79*
No Nausea	48	57	63*	54

<sup>1</sup> Chemotherapy included oral and injectable cyclophosphamide, carboplatin, cisplatin (20 mg/m<sup>2</sup> to 50 mg/m<sup>2</sup>), dacarbazine, doxorubicin, epirubicin.

<sup>2</sup> No vomiting, no moderate or severe nausea, no rescue medication.

\*Statistically significant (P<0.01) vs. 0.25 mg bid.

†Statistically significant (P<0.01) vs. 0.5 mg bid.

115

116 Results from a second double-blind, randomized trial evaluating KYTRIL Tablets 2 mg  
117 qd and KYTRIL Tablets 1 mg bid were compared to prochlorperazine 10 mg bid derived  
118 from a historical control. At 24 hours, there was no statistically significant difference in  
119 efficacy between the two KYTRIL Tablet regimens. Both regimens were statistically  
120 superior to the prochlorperazine control regimen (see **Table 3**).

121 **Table 3**      **Prevention of Nausea and Vomiting 24 Hours Post-**  
122 **Chemotherapy<sup>1</sup>**

Efficacy Measures	Percentages of Patients		
	KYTRIL Tablets 1 mg bid (n = 354) %	KYTRIL Tablets 2 mg qd (n = 343) %	Prochlorperazine <sup>2</sup> 10 mg bid (n=111) %
Complete Response <sup>3</sup>	69*	64*	41
No Vomiting	82*	77*	48
No Nausea	51*	53*	35
Total Control <sup>4</sup>	51*	50*	33

<sup>1</sup> Moderately emetogenic chemotherapeutic agents included cisplatin (20 mg/m<sup>2</sup> to 50 mg/m<sup>2</sup>), oral and intravenous cyclophosphamide, carboplatin, dacarbazine, doxorubicin.

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<sup>2</sup> Historical control from a previous double-blind KYTRIL trial.

<sup>3</sup> No vomiting, no moderate or severe nausea, no rescue medication.

<sup>4</sup> No vomiting, no nausea, no rescue medication.

\*Statistically significant (P<0.05) vs. prochlorperazine historical control.

123

124 Results from a KYTRIL Tablets 2 mg qd alone treatment arm in a third double-blind,  
125 randomized trial, were compared to prochlorperazine (PCPZ), 10 mg bid, derived from a  
126 historical control. The 24-hour results for KYTRIL Tablets 2 mg qd were statistically  
127 superior to PCPZ for all efficacy parameters: complete response (58%), no vomiting  
128 (79%), no nausea (51%), total control (49%). The PCPZ rates are shown in **Table 3**.

### 129 Cisplatin-Based Chemotherapy

130 The first double-blind trial compared KYTRIL Tablets 1 mg bid, relative to placebo  
131 (historical control), in 119 cancer patients receiving high-dose cisplatin (mean dose 80  
132 mg/m<sup>2</sup>). At 24 hours, KYTRIL Tablets 1 mg bid was significantly (P<0.001) superior to  
133 placebo (historical control) in all efficacy parameters: complete response (52%), no  
134 vomiting (56%) and no nausea (45%). The placebo rates were 7%, 14%, and 7%,  
135 respectively, for the three efficacy parameters.

136 Results from a KYTRIL Tablets 2 mg qd alone treatment arm in a second double-blind,  
137 randomized trial, were compared to both KYTRIL Tablets 1 mg bid and placebo  
138 historical controls. The 24-hour results for KYTRIL Tablets 2 mg qd were: complete  
139 response (44%), no vomiting (58%), no nausea (46%), total control (40%). The efficacy  
140 of KYTRIL Tablets 2 mg qd was comparable to KYTRIL Tablets 1 mg bid and  
141 statistically superior to placebo. The placebo rates were 7%, 14%, 7%, and 7%,  
142 respectively, for the four parameters.

143 No controlled study comparing granisetron injection with the oral formulation to prevent  
144 chemotherapy-induced nausea and vomiting has been performed.

### 145 Radiation-Induced Nausea and Vomiting

#### 146 Total Body Irradiation

147 In a double-blind randomized study, 18 patients receiving KYTRIL Tablets, 2 mg daily,  
148 experienced significantly greater antiemetic protection compared to patients in a  
149 historical negative control group who received conventional (non-5-HT<sub>3</sub> antagonist)  
150 antiemetics. Total body irradiation consisted of 11 fractions of 120 cGy administered  
151 over 4 days, with three fractions on each of the first 3 days, and two fractions on the  
152 fourth day. KYTRIL Tablets were given one hour before the first radiation fraction of  
153 each day.

154 Twenty-two percent (22%) of patients treated with KYTRIL Tablets did not experience  
155 vomiting or receive rescue antiemetics over the entire 4-day dosing period, compared to  
156 0% of patients in the historical negative control group (P<0.01).

157 In addition, patients who received KYTRIL Tablets also experienced significantly fewer  
158 emetic episodes during the first day of radiation and over the 4-day treatment period,  
159 compared to patients in the historical negative control group. The median time to the first  
160 emetic episode was 36 hours for patients who received KYTRIL Tablets.

### 161 Fractionated Abdominal Radiation

162 The efficacy of KYTRIL Tablets, 2 mg daily, was evaluated in a double-blind, placebo-  
163 controlled randomized trial of 260 patients. KYTRIL Tablets were given 1 hour before  
164 radiation, composed of up to 20 daily fractions of 180 to 300 cGy each. The exceptions  
165 were patients with seminoma or those receiving whole abdomen irradiation who initially  
166 received 150 cGy per fraction. Radiation was administered to the upper abdomen with a  
167 field size of at least 100 cm<sup>2</sup>.

168 The proportion of patients without emesis and those without nausea for KYTRIL Tablets,  
169 compared to placebo, was statistically significant (P<0.0001) at 24 hours after radiation,  
170 irrespective of the radiation dose. KYTRIL was superior to placebo in patients receiving  
171 up to 10 daily fractions of radiation, but was not superior to placebo in patients receiving  
172 20 fractions.

173 Patients treated with KYTRIL Tablets (n=134) had a significantly longer time to the first  
174 episode of vomiting (35 days vs. 9 days, P<0.001) relative to those patients who received  
175 placebo (n=126), and a significantly longer time to the first episode of nausea (11 days  
176 vs. 1 day, P<0.001). KYTRIL provided significantly greater protection from nausea and  
177 vomiting than placebo.

## 178 INDICATIONS AND USAGE

179 KYTRIL (granisetron hydrochloride) is indicated for the prevention of:

- 180 • Nausea and vomiting associated with initial and repeat courses of emetogenic cancer  
181 therapy, including high-dose cisplatin.
- 182 • Nausea and vomiting associated with radiation, including total body irradiation and  
183 fractionated abdominal radiation.

## 184 CONTRAINDICATIONS

185 KYTRIL is contraindicated in patients with known hypersensitivity to the drug or any of  
186 its components.

## 187 PRECAUTIONS

188 KYTRIL is not a drug that stimulates gastric or intestinal peristalsis. It should not be used  
189 instead of nasogastric suction. The use of KYTRIL in patients following abdominal  
190 surgery or in patients with chemotherapy-induced nausea and vomiting may mask a  
191 progressive ileus and/or gastric distention.

## 192 Drug Interactions

193 Granisetron does not induce or inhibit the cytochrome P-450 drug-metabolizing enzyme  
194 system in vitro. There have been no definitive drug-drug interaction studies to examine  
195 pharmacokinetic or pharmacodynamic interaction with other drugs; however, in humans,

196 KYTRIL Injection has been safely administered with drugs representing  
197 benzodiazepines, neuroleptics, and anti-ulcer medications commonly prescribed with  
198 antiemetic treatments. KYTRIL Injection also does not appear to interact with  
199 emetogenic cancer chemotherapies. Because granisetron is metabolized by hepatic  
200 cytochrome P-450 drug-metabolizing enzymes, inducers or inhibitors of these enzymes  
201 may change the clearance and, hence, the half-life of granisetron. No specific interaction  
202 studies have been conducted in anesthetized patients. In addition, the activity of the  
203 cytochrome P-450 subfamily 3A4 (involved in the metabolism of some of the main  
204 narcotic analgesic agents) is not modified by KYTRIL in vitro.

205 In in vitro human microsomal studies, ketoconazole inhibited ring oxidation of KYTRIL.  
206 However, the clinical significance of in vivo pharmacokinetic interactions with  
207 ketoconazole is not known. In a human pharmacokinetic study, hepatic enzyme induction  
208 with phenobarbital resulted in a 25% increase in total plasma clearance of intravenous  
209 KYTRIL. The clinical significance of this change is not known.

### 210 **Carcinogenesis, Mutagenesis, Impairment of Fertility**

211 In a 24-month carcinogenicity study, rats were treated orally with granisetron 1, 5 or 50  
212 mg/kg/day (6, 30 or 300 mg/m<sup>2</sup>/day). The 50 mg/kg/day dose was reduced to 25  
213 mg/kg/day (150 mg/m<sup>2</sup>/day) during week 59 due to toxicity. For a 50 kg person of  
214 average height (1.46 m<sup>2</sup> body surface area), these doses represent 4, 20, and 101 times the  
215 recommended clinical dose (1.48 mg/m<sup>2</sup>, oral) on a body surface area basis. There was a  
216 statistically significant increase in the incidence of hepatocellular carcinomas and  
217 adenomas in males treated with 5 mg/kg/day (30 mg/m<sup>2</sup>/day, 20 times the recommended  
218 human dose based on body surface area) and above, and in females treated with 25  
219 mg/kg/day (150 mg/m<sup>2</sup>/day, 101 times the recommended human dose based on body  
220 surface area). No increase in liver tumors was observed at a dose of 1 mg/kg/day (6  
221 mg/m<sup>2</sup>/day, 4 times the recommended human dose based on body surface area) in males  
222 and 5 mg/kg/day (30 mg/m<sup>2</sup>/day, 20 times the recommended human dose based on body  
223 surface area) in females. In a 12-month oral toxicity study, treatment with granisetron  
224 100 mg/kg/day (600 mg/m<sup>2</sup>/day, 405 times the recommended human dose based on body  
225 surface area) produced hepatocellular adenomas in male and female rats while no such  
226 tumors were found in the control rats. A 24-month mouse carcinogenicity study of  
227 granisetron did not show a statistically significant increase in tumor incidence, but the  
228 study was not conclusive.

229 Because of the tumor findings in rat studies, KYTRIL (granisetron hydrochloride) should  
230 be prescribed only at the dose and for the indication recommended (see **INDICATIONS**  
231 **AND USAGE**, and **DOSAGE AND ADMINISTRATION**).

232 Granisetron was not mutagenic in in vitro Ames test and mouse lymphoma cell forward  
233 mutation assay, and in vivo mouse micronucleus test and in vitro and ex vivo rat  
234 hepatocyte UDS assays. It, however, produced a significant increase in UDS in HeLa  
235 cells in vitro and a significant increased incidence of cells with polyploidy in an in vitro  
236 human lymphocyte chromosomal aberration test.

237 Granisetron at oral doses up to 100 mg/kg/day (600 mg/m<sup>2</sup>/day, 405 times the  
238 recommended human dose based on body surface area) was found to have no effect on  
239 fertility and reproductive performance of male and female rats.

## 240 **Pregnancy**

### 241 **Teratogenic Effects**

#### 242 *Pregnancy Category B.*

243 Reproduction studies have been performed in pregnant rats at oral doses up to 125  
244 mg/kg/day (750 mg/m<sup>2</sup>/day, 507 times the recommended human dose based on body  
245 surface area) and pregnant rabbits at oral doses up to 32 mg/kg/day (378 mg/m<sup>2</sup>/day, 255  
246 times the recommended human dose based on body surface area) and have revealed no  
247 evidence of impaired fertility or harm to the fetus due to granisetron. There are, however,  
248 no adequate and well-controlled studies in pregnant women. Because animal  
249 reproduction studies are not always predictive of human response, this drug should be  
250 used during pregnancy only if clearly needed.

### 251 **Nursing Mothers**

252 It is not known whether granisetron is excreted in human milk. Because many drugs are  
253 excreted in human milk, caution should be exercised when KYTRIL is administered to a  
254 nursing woman.

### 255 **Pediatric Use**

256 Safety and effectiveness in pediatric patients have not been established.

### 257 **Geriatric Use**

258 During clinical trials, 325 patients 65 years of age or older received KYTRIL Tablets;  
259 298 were 65 to 74 years of age, and 27 were 75 years of age or older. Efficacy and safety  
260 were maintained with increasing age.

## 261 **ADVERSE REACTIONS**

### 262 **Chemotherapy-Induced Nausea and Vomiting**

263 Over 3700 patients have received KYTRIL Tablets in clinical trials with emetogenic  
264 cancer therapies consisting primarily of cyclophosphamide or cisplatin regimens.

265 In patients receiving KYTRIL Tablets 1 mg bid for 1, 7 or 14 days, or 2 mg qd for 1 day,  
266 adverse experiences reported in more than 5% of the patients with comparator and  
267 placebo incidences are listed in **Table 4**.

268

**Table 4 Principal Adverse Events in Clinical Trials**

	Percent of Patients With Event			
	<b>KYTRIL<sup>1</sup> Tablets 1 mg bid (n=978)</b>	<b>KYTRIL<sup>1</sup> Tablets 2 mg qd (n=1450)</b>	<b>Comparator<sup>2</sup> (n=599)</b>	<b>Placebo (n=185)</b>
Headache <sup>3</sup>	21%	20%	13%	12%
Constipation	18%	14%	16%	8%
Asthenia	14%	18%	10%	4%
Diarrhea	8%	9%	10%	4%
Abdominal pain	6%	4%	6%	3%
Dyspepsia	4%	6%	5%	4%

<sup>1</sup> Adverse events were recorded for 7 days when KYTRIL Tablets were given on a single day and for up to 28 days when KYTRIL Tablets were administered for 7 or 14 days.

<sup>2</sup> Metoclopramide/dexamethasone; phenothiazines/dexamethasone; dexamethasone alone; prochlorperazine.

<sup>3</sup> Usually mild to moderate in severity.

269

270 Other adverse events reported in clinical trials were:

271 *Gastrointestinal:* In single-day dosing studies in which adverse events were collected for  
272 7 days, nausea (20%) and vomiting (12%) were recorded as adverse events after the 24-  
273 hour efficacy assessment period.

274 *Hepatic:* In comparative trials, elevation of AST and ALT (>2 times the upper limit of  
275 normal) following the administration of KYTRIL Tablets occurred in 5% and 6% of  
276 patients, respectively. These frequencies were not significantly different from those seen  
277 with comparators (AST: 2%; ALT: 9%).

278 *Cardiovascular:* Hypertension (1%); hypotension, angina pectoris, atrial fibrillation, and  
279 syncope have been observed rarely.

280 *Central Nervous System:* Dizziness (5%), insomnia (5%), anxiety (2%), somnolence  
281 (1%). One case compatible with, but not diagnostic of, extrapyramidal symptoms has  
282 been reported in a patient treated with KYTRIL Tablets.

283 *Hypersensitivity:* Rare cases of hypersensitivity reactions, sometimes severe (eg,  
284 anaphylaxis, shortness of breath, hypotension, urticaria) have been reported.

285 *Other:* Fever (5%). Events often associated with chemotherapy also have been reported:  
286 leukopenia (9%), decreased appetite (6%), anemia (4%), alopecia (3%),  
287 thrombocytopenia (2%).

288 Over 5000 patients have received injectable KYTRIL in clinical trials.

289 **Table 5** gives the comparative frequencies of the five commonly reported adverse events  
290 ( $\geq 3\%$ ) in patients receiving KYTRIL Injection, 40 mcg/kg, in single-day chemotherapy  
291 trials. These patients received chemotherapy, primarily cisplatin, and intravenous fluids  
292 during the 24-hour period following KYTRIL Injection administration.

293 **Table 5 Principal Adverse Events in Clinical Trials — Single-Day**  
294 **Chemotherapy**

	Percent of Patients with Event	
	KYTRIL Injection <sup>1</sup> 40 mcg/kg (n=1268)	Comparator <sup>2</sup> (n=422)
Headache	14%	6%
Asthenia	5%	6%
Somnolence	4%	15%
Diarrhea	4%	6%
Constipation	3%	3%

<sup>1</sup> Adverse events were generally recorded over 7 days post-KYTRIL Injection administration.

<sup>2</sup> Metoclopramide/dexamethasone and phenothiazines/dexamethasone.

295

296 In the absence of a placebo group, there is uncertainty as to how many of these events  
297 should be attributed to KYTRIL, except for headache, which was clearly more frequent  
298 than in comparison groups.

### 299 **Radiation-Induced Nausea and Vomiting**

300 In controlled clinical trials, the adverse events reported by patients receiving KYTRIL  
301 Tablets and concurrent radiation were similar to those reported by patients receiving  
302 KYTRIL Tablets prior to chemotherapy. The most frequently reported adverse events  
303 were diarrhea, asthenia, and constipation. Headache, however, was less prevalent in this  
304 patient population.

### 305 **OVERDOSAGE**

306 There is no specific treatment for granisetron hydrochloride overdose. In case of  
307 overdose, symptomatic treatment should be given. Overdosage of up to 38.5 mg of

308 granisetron hydrochloride injection has been reported without symptoms or only the  
309 occurrence of a slight headache.

## 310 **DOSAGE AND ADMINISTRATION**

### 311 **Emetogenic Chemotherapy**

312 The recommended adult dosage of oral KYTRIL (granisetron hydrochloride) is 2 mg  
313 once daily or 1 mg twice daily. In the 2 mg once-daily regimen, two 1 mg tablets or 10  
314 mL of KYTRIL Oral Solution (2 teaspoonfuls, equivalent to 2 mg of granisetron) are  
315 given up to 1 hour before chemotherapy. In the 1 mg twice-daily regimen, the first 1 mg  
316 tablet or one teaspoonful (5 mL) of KYTRIL Oral Solution is given up to 1 hour before  
317 chemotherapy, and the second tablet or second teaspoonful (5 mL) of KYTRIL Oral  
318 Solution, 12 hours after the first. Either regimen is administered only on the day(s)  
319 chemotherapy is given. Continued treatment, while not on chemotherapy, has not been  
320 found to be useful.

321 **Use in the Elderly, Pediatric Patients, Renal Failure Patients or Hepatically**  
322 **Impaired Patients**

323 No dosage adjustment is recommended (see **CLINICAL PHARMACOLOGY:**  
324 **Pharmacokinetics**).

### 325 **Radiation (Either Total Body Irradiation or Fractionated Abdominal** 326 **Radiation)**

327 The recommended adult dosage of oral KYTRIL is 2 mg once daily. Two 1 mg tablets or  
328 10 mL of KYTRIL Oral Solution (2 teaspoonfuls, equivalent to 2 mg of granisetron) are  
329 taken within 1 hour of radiation.

### 330 **Pediatric Use**

331 There is no experience with oral KYTRIL in the prevention of radiation-induced nausea  
332 and vomiting in pediatric patients.

### 333 **Use in the Elderly**

334 No dosage adjustment is recommended.

## 335 **HOW SUPPLIED**

### 336 **Tablets**

337 White, triangular, biconvex, film-coated tablets; tablets are debossed K1 on one face.

338 1 mg Unit of Use 2's: NDC 0004-0241-33

339 1 mg Single Unit Package 20's: NDC 0004-0241-26 (intended for institutional use only)

### 340 **Storage**

341 Store between 15° and 30°C (59° and 86°F). Keep container closed tightly. Protect from  
342 light.

343 **Oral Solution**

344 Clear, orange-colored, orange-flavored, 2 mg/10 mL, in 30 mL amber glass bottles with  
345 child-resistant closures: NDC 0004-0237-09

346 **Storage**

347 Store at 25°C (77°F); excursions permitted to 15° to 30°C (59° to 86°F) [see USP  
348 Controlled Room Temperature]. Keep bottle closed tightly and stored in an upright  
349 position. Protect from light.

350

351 Distributed by:



**Pharmaceuticals**

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