

# **SORAFENIB TOSYLATE- sorafenib tablet, film coated**

## **Mylan Pharmaceuticals Inc.**

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### **HIGHLIGHTS OF PRESCRIBING INFORMATION**

**These highlights do not include all the information needed to use SORAFENIB TABLETS safely and effectively. See full prescribing information for SORAFENIB TABLETS.**

#### **SORAFENIB tablets, for oral use**

**Initial U.S. Approval: 2005**

### **INDICATIONS AND USAGE**

Sorafenib tablets are a kinase inhibitor indicated for the treatment of

- Unresectable hepatocellular carcinoma (1.1)
- Advanced renal cell carcinoma (1.2)
- Locally recurrent or metastatic, progressive, differentiated thyroid carcinoma (DTC) refractory to radioactive iodine treatment (1.3)

### **DOSAGE AND ADMINISTRATION**

- The recommended dosage is 400 mg orally twice daily without food. (2.1)

### **DOSAGE FORMS AND STRENGTHS**

Tablets: 200 mg (3)

### **CONTRAINDICATIONS**

- Sorafenib tablets are contraindicated in patients with known severe hypersensitivity to sorafenib or any other component of sorafenib tablets. (4)
- Sorafenib tablets in combination with carboplatin and paclitaxel are contraindicated in patients with squamous cell lung cancer. (4)

### **WARNINGS AND PRECAUTIONS**

- Cardiovascular Events: Consider temporary or permanent discontinuation of sorafenib tablets. (2.2, 5.1)
- Hemorrhage: Discontinue sorafenib tablets if needed. (5.2)
- Hypertension: Monitor blood pressure weekly during the first 6 weeks and periodically thereafter. Consider temporary or permanent discontinuation for severe or persistent hypertension despite antihypertensive therapy. (5.3)
- Dermatologic Toxicities: Interrupt and/or decrease dose. Discontinue for severe or persistent reactions, or if Stevens-Johnson syndrome and toxic epidermal necrolysis are suspected. (5.4)
- Gastrointestinal Perforation: Discontinue sorafenib tablets. (5.5)
- Risk of Impaired Wound Healing: Withhold sorafenib tablets for at least 10 days prior to elective surgery. Do not administer for at least 2 weeks following major surgery and until adequate wound healing. The safety of resumption of sorafenib tablets after resolution of wound healing complications has not been established. (5.7)
- QT Prolongation: Monitor electrocardiograms and electrolytes in patients at increased risk for ventricular arrhythmias. Correct electrolytes. Interrupt if QTc greater than 500 msec or increases greater than 60 msec from baseline. (2.2, 5.9, 12.2)
- Drug-Induced Liver Injury: Monitor liver function tests regularly; discontinue for unexplained transaminase elevations. (5.10)
- Embryo-Fetal Toxicity: Sorafenib may cause fetal harm. Advise patients of the potential risk to a fetus and to use effective contraception. (5.11, 8.1, 8.3)
- Impairment of Thyroid Stimulating Hormone Suppression (TSH) in DTC: Monitor TSH monthly and adjust thyroid replacement therapy in patients with thyroid cancer. (5.12)

### **ADVERSE REACTIONS**

The most common adverse reactions ( $\geq 20\%$ ) are diarrhea, fatigue, infection, alopecia, hand-foot skin reaction, rash, weight loss, decreased appetite, nausea, gastrointestinal and abdominal pains, hypertension, and hemorrhage. (6)

To report **SUSPECTED ADVERSE REACTIONS**, contact Mylan at 1-877-446-3679 (1-877-4-INFO-RX) or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

----- **DRUG INTERACTIONS** -----

- Strong CYP3A Inducers: Avoid strong CYP3A4 inducers. (7.1)

----- **USE IN SPECIFIC POPULATIONS** -----

- Lactation: Advise women not to breastfeed. (8.2)

**See 17 for PATIENT COUNSELING INFORMATION and FDA-approved patient labeling.**

**Revised: 12/2023**

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## **FULL PRESCRIBING INFORMATION**

### **1 INDICATIONS AND USAGE**

#### **1.1 Hepatocellular Carcinoma**

Sorafenib tablets are indicated for the treatment of patients with unresectable hepatocellular carcinoma (HCC).

#### **1.2 Renal Cell Carcinoma**

Sorafenib tablets are indicated for the treatment of patients with advanced renal cell carcinoma (RCC).

#### **1.3 Differentiated Thyroid Carcinoma**

Sorafenib tablets are indicated for the treatment of patients with locally recurrent or metastatic, progressive, differentiated thyroid carcinoma (DTC) that is refractory to radioactive iodine treatment.

### **2 DOSAGE AND ADMINISTRATION**

#### **2.1 Recommended Dosage**

The recommended dosage of sorafenib tablets is 400 mg orally twice daily without food (at least 1 hour before or 2 hours after a meal) until the patient is no longer clinically benefiting from therapy or until unacceptable toxicity.

## 2.2 Dosage Modifications for Adverse Reactions

### **Recommended Dosage Modifications**

The recommended dosage modifications for adverse reactions are provided in Tables 1, 2, and 3.

**Table 1: Recommended Dose Reductions for Adverse Reactions**

<b>Dose Reduction</b>	<b>Hepatocellular Carcinoma and Renal Cell Carcinoma</b>	<b>Differentiated Thyroid Carcinoma</b>
First Dose Reduction	400 mg orally once daily	400 mg orally in the morning and 200 mg orally in the evening about 12 hours apart OR 200 mg orally in the morning and 400 mg orally in the evening about 12 hours apart
Second Dose Reduction	200 mg orally once daily OR 400 every other day	200 mg orally twice daily
Third Dose Reduction	None	200 mg orally once daily

**Table 2: Recommended Dosage Modifications of Sorafenib Tablets for Adverse Reactions**

<b>Adverse Reaction</b>	<b>Severity*</b>	<b>Sorafenib Tablets Dosage Modification</b>
<b>Cardiovascular Events</b> [see Warnings and Precautions (5.1)]		
Cardiac Ischemia and/or Infarction	Grade 2 and above	Permanently discontinue.
Congestive Heart Failure	Grade 3	Interrupt <sup>†</sup> until Grade 1 or less, resume at reduced dose by 1 dose level. <sup>‡</sup>
	Grade 4	Permanently discontinue.
<b>Hemorrhage</b> [see Warnings and Precautions (5.2)]	Grade 2 and above requiring medical intervention	Permanently discontinue.
<b>Hypertension</b> [see Warnings and Precautions (5.3)]	Grade 2 (symptomatic/persistent) OR Grade 2 symptomatic increase by greater than 20 mm Hg (diastolic) or greater than 140/90 mm Hg if previously within normal limits OR	Interrupt until symptoms resolve and diastolic blood pressure less than 90 mm Hg, then resume at reduced dose by 1 dose level. <sup>‡</sup>
		If needed, reduce another dose level. <sup>‡</sup>

	Grade 3	
	Grade 4	Permanently discontinue.
<b>Gastrointestinal Perforation</b> [see Warnings and Precautions (5.5)]	Any grade	Permanently discontinue.
<b>QT Interval Prolongation</b> [see Warnings and Precautions (5.9)]	Greater than 500 milliseconds OR Increase from baseline of 60 milliseconds or greater	Interrupt and correct electrolyte abnormalities (magnesium, potassium, calcium). Use medical judgement before restarting.
<b>Drug-Induced Liver Injury</b> [see Warnings and Precautions (5.10)]	Grade 3 ALT or higher in the absence of another cause <sup>§</sup> OR AST/ALT greater than 3 x upper limit normal (ULN) with bilirubin greater than 2 x ULN in the absence of another cause <sup>§</sup>	Permanently discontinue.
<b>Non-hematological toxicities</b> [see Adverse Reactions (6.1)]	Grade 2	Continue treatment at reduced dose by 1 dose level.
	Grade 3	
	1 <sup>st</sup> occurrence	Interrupt until Grade 2 or less, then resume at reduced dose by 1 dose level.
	No improvement within 7 days OR 2 <sup>nd</sup> or 3 <sup>rd</sup> occurrence	Interrupt until Grade 2 or less, then resume at reduced dose by 2 dose levels.
	4 <sup>th</sup> occurrence	Interrupt until Grade 2 or less, then resume at reduced dose by 2 dose levels for HCC and RCC or 3 dose levels for DTC.
	Grade 4	Permanently discontinue.

\* Adverse reactions graded according to National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0 (NCI CTCAE v3.0).

† If no recovery after 30 day interruption, discontinue treatment unless the patient is deriving clinical benefit.

‡ If more than 2 dose reductions are required, permanently discontinue treatment.

§ In addition, any grade increased alkaline phosphatase in the absence of known bone pathology and Grade 2 or worse increased bilirubin; any 1 of the following: INR of 1.5 or greater, ascites and/or encephalopathy in the absence of underlying cirrhosis or other organ failure considered to be due to drug-induced liver injury.

**Table 3: Recommended Dosage Modifications for Dermatologic Toxicities**

Dermatologic Toxicity Grade	Occurrence	Sorafenib Tablets Dosage Modification	
		Hepatocellular and	Differentiated

		<b>Renal Cell Carcinoma</b>	<b>Thyroid Carcinoma</b>
Grade 2: Painful erythema and swelling of the hands or feet and/or discomfort affecting the patient's normal activities	1 <sup>st</sup> occurrence	Continue sorafenib tablets and consider topical therapy for symptomatic relief. If no improvement within 7 days, see below.	Decrease sorafenib tablets to 600 mg daily. If no improvement within 7 days, see below.
	No improvement within 7 days at reduced dose OR 2 <sup>nd</sup> and 3 <sup>rd</sup> occurrence	Interrupt sorafenib tablets until resolved or improved to Grade 0 to 1.	Interrupt sorafenib tablets until completely resolved or improved to Grade 1.
		When resuming treatment, decrease dose by 1 dose level.	When resuming treatment, decrease dose by 1 dose level for 2 <sup>nd</sup> occurrence and 2 dose levels for 3 <sup>rd</sup> occurrence.
	4 <sup>th</sup> occurrence	Discontinue sorafenib tablets treatment.	
Grade 3: Moist desquamation, ulceration, blistering, or severe pain of the hands or feet, resulting in inability to work or perform activities of daily living	1 <sup>st</sup> occurrence	Interrupt sorafenib tablets until resolved or improved to Grade 0 to 1.	Interrupt sorafenib tablets until completely resolved or improved to Grade 1.
		When resuming treatment, decrease dose by 1 dose level.	When resuming treatment, decrease dose by 1 dose level.
	2 <sup>nd</sup> occurrence	Interrupt sorafenib tablets until resolved or improved to Grade 0 to 1.	Interrupt sorafenib tablets until completely resolved or improved to Grade 1.
		When resuming treatment, decrease dose by 1 dose level.	When resuming treatment, decrease dose by 2 dose levels.
	3 <sup>rd</sup> occurrence	Discontinue sorafenib tablets treatment.	

Following improvement of Grade 2 or 3 dermatologic toxicity to Grade 0 or 1 for at least 28 days on a reduced dose of sorafenib tablets, the dose of sorafenib tablets may be increased 1 dose level from the reduced dose. Approximately 50% of patients requiring a dose reduction for dermatologic toxicity are expected to meet these criteria for

resumption of the higher dose and roughly 50% of patients resuming the previous dose are expected to tolerate the higher dose (that is, maintain the higher dose level without recurrent Grade 2 or higher dermatologic toxicity).

### 3 DOSAGE FORMS AND STRENGTHS

Sorafenib Tablets, USP are available containing 200 mg sorafenib equivalent to 274 mg sorafenib tosylate, USP.

- The 200 mg tablets are peach, film-coated, round, unscored tablets debossed with **200** on one side of the tablet and **NAT** on the other side.

### 4 CONTRAINDICATIONS

- Sorafenib tablets are contraindicated in patients with known severe hypersensitivity to sorafenib or any other component of sorafenib tablets.
- Sorafenib tablets in combination with carboplatin and paclitaxel are contraindicated in patients with squamous cell lung cancer [see *Warnings and Precautions* (5.8)].

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Cardiovascular Events

In the SHARP (HCC) study, the incidence of cardiac ischemia/infarction was 2.7% in sorafenib-treated patients compared with 1.3% in those receiving placebo; in the TARGET (RCC) study, the incidence of cardiac ischemia/infarction was higher in the sorafenib-treated group (2.9%) compared with patients receiving placebo (0.4%), and in the DECISION (DTC) study, the incidence of cardiac ischemia/infarction was 1.9% in the sorafenib-treated group compared with 0% in patients receiving placebo. Patients with unstable coronary artery disease or recent myocardial infarction were excluded from this study. In multiple clinical trials, congestive heart failure has been reported in 1.9% of sorafenib-treated patients (N = 2276) [see *Adverse Reactions* (6.2)].

Consider temporary or permanent discontinuation of sorafenib in patients who develop cardiovascular events [see *Dosage and Administration* (2.2)].

#### 5.2 Hemorrhage

An increased risk of bleeding may occur following sorafenib administration. In the SHARP (HCC) study, the rates of bleeding from esophageal varices (2.4% and 4%) and of bleeding with a fatal outcome from any site (2.4% and 4%) were similar in sorafenib-treated patients and those receiving placebo, respectively. In the TARGET (RCC) study, bleeding was reported in 15.3% of patients in the sorafenib-treated group and 8.2% of patients receiving placebo. The incidence of Grade 3 and 4 bleeding was 2% and 0%, respectively, in sorafenib-treated patients, and 1.3% and 0.2%, respectively, in those receiving placebo. There was one fatal hemorrhage in each treatment group in the TARGET (RCC) study. In the DECISION (DTC) study, bleeding was reported in 17.4% of sorafenib-treated patients and 9.6% of those receiving placebo; however, the incidence of Grade 3 bleeding was similar (1% and 1.4%) in sorafenib-treated patients and in those receiving placebo.

If any bleeding necessitates medical intervention, consider permanent discontinuation of sorafenib [see *Dosage and Administration (2.2)*]. Due to the potential risk of bleeding, treat tracheal, bronchial, and esophageal infiltration with local therapy prior to administering sorafenib tablets in patients with DTC.

### **5.3 Hypertension**

In the SHARP (HCC) study, hypertension was reported in 9.4% of sorafenib-treated patients and 4.3% of patients receiving placebo. In the TARGET (RCC) study, hypertension was reported in 16.9% of sorafenib-treated patients and 1.8% of patients receiving placebo. In the DECISION (DTC) study, hypertension was reported in 40.6% of sorafenib-treated patients and 12.4% of patients receiving placebo. Hypertension was usually mild to moderate, occurred early in the course of treatment, and was managed with standard antihypertensive therapy. Permanent discontinuation due to hypertension occurred in 1 of 297 sorafenib-treated patients in the SHARP (HCC) study, 1 of 451 sorafenib-treated patients in the TARGET (RCC) study, and 1 of 207 sorafenib-treated patients in the DECISION (DTC) study.

Monitor blood pressure weekly during the first 6 weeks of sorafenib. Thereafter, monitor blood pressure and treat hypertension, if required, in accordance with standard medical practice. In cases of severe or persistent hypertension despite institution of antihypertensive therapy, consider temporary or permanent discontinuation of sorafenib tablets [see *Dosage and Administration (2.2)*].

### **5.4 Dermatologic Toxicities**

Hand-foot skin reaction and rash represent the most common adverse reactions attributed to sorafenib. Rash and hand-foot skin reaction are usually Grade 1 and 2 and generally appear during the first six weeks of treatment with sorafenib. Permanent discontinuation of therapy due to hand-foot skin reaction occurred in 4 (1.3%) of 297 sorafenib-treated patients with HCC, 3 (0.7%) of 451 sorafenib-treated patients with RCC, and 11 (5.3%) of 207 sorafenib-treated patients with DTC.

Management of dermatologic toxicities may include topical therapies for symptomatic relief, temporary treatment interruption and/or dose reduction of sorafenib, or in severe or persistent cases, permanent discontinuation of sorafenib [see *Dosage and Administration (2.2)*].

There have been reports of severe dermatologic toxicities, including Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN). These cases may be life-threatening. Discontinue sorafenib if SJS or TEN are suspected.

### **5.5 Gastrointestinal Perforation**

Gastrointestinal perforation has been reported in less than 1% of patients taking sorafenib. In some cases this was not associated with apparent intra-abdominal tumor. In the event of a gastrointestinal perforation, permanently discontinue sorafenib.

### **5.6 Increased Risk of Bleeding with Concomitant Use of Warfarin**

Infrequent bleeding or elevations in the International Normalized Ratio (INR) have been reported in some patients taking warfarin while on sorafenib. Monitor patients taking concomitant warfarin regularly for changes in prothrombin time (PT), INR or clinical



bleeding episodes.

### **5.7 Risk of Impaired Wound Healing**

Impaired wound healing can occur in patients who receive drugs that inhibit the VEGF signaling pathway. Therefore, sorafenib has the potential to adversely affect wound healing.

Withhold sorafenib for at least 10 days prior to elective surgery. Do not administer for at least 2 weeks following major surgery and until adequate wound healing. The safety of resumption of sorafenib after resolution of wound healing complications has not been established.

### **5.8 Increased Mortality Observed with Sorafenib Administered in Combination with Carboplatin/Paclitaxel and Gemcitabine/Cisplatin in Squamous Cell Lung Cancer**

In a subset analysis of two randomized controlled trials in chemo-naïve patients with Stage IIIB-IV non-small cell lung cancer, patients with squamous cell carcinoma experienced higher mortality with the addition of sorafenib compared to those treated with carboplatin/paclitaxel alone (HR 1.81; 95% CI 1.19, 2.74) and gemcitabine/cisplatin alone (HR 1.22; 95% CI 0.82, 1.80). The use of sorafenib in combination with carboplatin/paclitaxel is contraindicated in patients with squamous cell lung cancer. Sorafenib in combination with gemcitabine/cisplatin is not recommended in patients with squamous cell lung cancer. The safety and effectiveness of sorafenib has not been established in patients with non-small cell lung cancer.

### **5.9 QT Interval Prolongation**

Sorafenib can prolong the QT/QTc interval. QT/QTc interval prolongation increases the risk for ventricular arrhythmias.

Avoid sorafenib in patients with congenital long QT syndrome. Monitor electrolytes and electrocardiograms in patients with congestive heart failure, bradyarrhythmias, drugs known to prolong the QT interval, including Class Ia and III antiarrhythmics. Correct electrolyte abnormalities (magnesium, potassium, calcium). Interrupt sorafenib if QTc interval is greater than 500 milliseconds or for an increase from baseline of 60 milliseconds or greater [see *Clinical Pharmacology* (12.2)].

### **5.10 Drug-Induced Liver Injury**

Sorafenib-induced hepatitis is characterized by a hepatocellular pattern of liver damage with significant increases of transaminases which may result in hepatic failure and death. Increases in bilirubin and INR may also occur. The incidence of severe drug-induced liver injury, defined as elevated transaminase levels above 20 times the upper limit of normal or transaminase elevations with significant clinical sequelae (for example, elevated INR, ascites, fatal, or transplantation), was two of 3,357 patients (0.06%) in a global monotherapy database.

Monitor liver function tests regularly. In case of significantly increased transaminases without alternative explanation, such as viral hepatitis or progressing underlying malignancy, discontinue sorafenib [see *Dosage and Administration* (2.2)].

### 5.11 Embryo-Fetal Toxicity

Based on its mechanism of action and findings in animals, sorafenib may cause fetal harm when administered to a pregnant woman. Sorafenib caused embryo-fetal toxicities in animals at maternal exposures that were significantly lower than the human exposures at the recommended dose of 400 mg twice daily. Advise pregnant women and females of reproductive potential of the potential risk to a fetus. Advise females of reproductive potential to use effective contraception during treatment and for 6 months following the last dose of sorafenib. Advise male patients with female partners of reproductive potential and pregnant partners to use effective contraception during treatment and for 3 months following the last dose of sorafenib *[see Use in Specific Populations (8.1, 8.3)]*.

### 5.12 Impairment of Thyroid Stimulating Hormone Suppression in Differentiated Thyroid Carcinoma

Sorafenib impairs exogenous thyroid suppression. In the DECISION (DTC) study, 99% of patients had a baseline thyroid stimulating hormone (TSH) level less than 0.5 mU/L. Elevation of TSH level above 0.5 mU/L was observed in 41% of sorafenib-treated patients as compared with 16% of those receiving placebo. For patients with impaired TSH suppression while receiving sorafenib, the median maximal TSH was 1.6 mU/L and 25% had TSH levels greater than 4.4 mU/L.

Monitor TSH levels monthly and adjust thyroid replacement medication as needed in patients with DTC.

## 6 ADVERSE REACTIONS

The following clinically significant adverse reactions are discussed elsewhere in the labeling:

- Cardiovascular events *[see Warnings and Precautions (5.1)]*
- Hemorrhage *[see Warnings and Precautions (5.2)]*
- Hypertension *[see Warnings and Precautions (5.3)]*
- Dermatologic toxicities *[see Warnings and Precautions (5.4)]*
- Gastrointestinal perforation *[see Warnings and Precautions (5.5)]*
- QT interval prolongation *[see Warnings and Precautions (5.9) and Clinical Pharmacology (12.2)]*
- Drug-induced liver injury *[see Warnings and Precautions (5.10)]*
- Impairment of TSH suppression in DTC *[see Warnings and Precautions (5.12)]*

### 6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

The data described reflect exposure to sorafenib in 955 patients who participated in placebo-controlled studies in hepatocellular carcinoma (N = 297), advanced renal cell carcinoma (N = 451), or differentiated thyroid carcinoma (N = 207). The most common adverse reactions ( $\geq 20\%$ ), which were considered to be related to sorafenib, in patients with HCC, RCC or DTC are diarrhea, fatigue, infection, alopecia, hand-foot skin reaction,

rash, weight loss, decreased appetite, nausea, gastrointestinal and abdominal pains, hypertension, and hemorrhage.

### **Hepatocellular Carcinoma**

Table 4 shows the percentage of patients in the SHARP (HCC) study experiencing adverse reactions that were reported in at least 10% of patients and at a higher rate in the sorafenib-treated group than in those receiving placebo.

**Table 4: Adverse Reactions Reported in at Least 10% of Patients and at a Higher Rate in Sorafenib Tablets Arm than the Placebo Arm - SHARP (HCC)**

	<b>Sorafenib Tablets N = 297</b>			<b>Placebo N = 302</b>		
<b>Adverse Reaction*</b>	<b>All Grades %</b>	<b>Grade 3 %</b>	<b>Grade 4 %</b>	<b>All Grades %</b>	<b>Grade 3 %</b>	<b>Grade 4 %</b>
<b>Any Adverse Reaction</b>	98	39	6	96	24	8
<b>Gastrointestinal</b>						
Diarrhea	55	10	< 1	25	2	0
Anorexia	29	3	0	18	3	< 1
Nausea	24	1	0	20	3	0
Vomiting	15	2	0	11	2	0
Constipation	14	0	0	10	0	0
<b>Constitutional symptoms</b>						
Fatigue	46	9	1	45	12	2
Weight loss	30	2	0	10	1	0
<b>Pain</b>						
Pain, abdomen	31	9	0	26	5	1
<b>Dermatology/skin</b>						
Hand-foot skin reaction	21	8	0	3	< 1	0
Rash/desquamation	19	1	0	14	0	0
Alopecia	14	0	0	2	0	0
Pruritus	14	< 1	0	11	< 1	0
Dry skin	10	0	0	6	0	0
<b>Hepatobiliary/pancreas</b>						
Liver dysfunction	11	2	1	8	2	1

\* Adverse reactions graded according to National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0 (NCI CTCAE v3.0).

Hypertension was reported in 9% of patients treated with sorafenib and 4% of those receiving placebo. Grade 3 hypertension was reported in 4% of sorafenib-treated patients and 1% of those receiving placebo.

Hemorrhage/bleeding was reported in 18% of those receiving sorafenib and 20% of patients receiving placebo. The rates of Grade 3 and 4 bleeding were also higher in patients receiving placebo (Grade 3 - 3% sorafenib and 5% placebo and Grade 4 - 2% sorafenib and 4% placebo).

Bleeding from esophageal varices was reported in 2.4% in sorafenib-treated patients and 4% of patients receiving placebo.

Renal failure was reported in < 1% of patients treated with sorafenib and 3% of patients receiving placebo. Clinical pancreatitis was reported in 1 of 297 sorafenib-treated patients (Grade 2).

The rate of adverse reactions (including those associated with progressive disease) resulting in permanent discontinuation was similar in both the sorafenib-treated patients and those receiving placebo (32% of sorafenib-treated patients and 35% of patients receiving placebo).

Laboratory test abnormalities reported in SHARP are presented in Table 5.

**Table 5: Laboratory Test Abnormalities Reported in SHARP (HCC)**

<b>Laboratory Parameter*</b>	<b>Sorafenib Tablets N = 297</b>		<b>Placebo N = 302</b>	
	<b>All Grades (%)</b>	<b>Grade 3 or 4 (%)</b>	<b>All Grades (%)</b>	<b>Grade 3 or 4 (%)</b>
Hypoalbuminemia	59	0	47	0
Elevated Lipase	40	9	37	9
Lymphopenia	47	NR	42	NR
Thrombocytopenia	46	4	41	< 1
Elevated INR	42	4	34	2
Hypophosphatemia	35	11	11	2
Elevated Amylase	34	2	29	2
Hypocalcemia	27	2.4	15	1
Hypokalemia	10	< 1	6	< 1

NR = not reported

\* Laboratory parameters graded according to National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0 (NCI CTCAE v3.0).

## **Renal Cell Carcinoma**

Table 6 shows the percentage of patients in the TARGET (RCC) study experiencing adverse reactions that were reported in at least 10% of patients and at a higher rate in sorafenib-treated patients arm than in those receiving placebo.

The rate of adverse reactions (including those associated with progressive disease) resulting in permanent discontinuation was similar in both the sorafenib-treated patients and patients receiving placebo (10% and 8%, respectively).

Clinical pancreatitis was reported in 3 of 451 sorafenib-treated patients (one Grade 2 and two Grade 4).

**Table 6: Adverse Reactions Reported in at Least 10% of Patients and at a Higher Rate in Sorafenib Tablets Arm than the Placebo Arm - TARGET (RCC)**

	<b>Sorafenib Tablets N = 451</b>			<b>Placebo N = 451</b>		
<b>Adverse Reaction*</b>	<b>All Grades %</b>	<b>Grade 3 %</b>	<b>Grade 4 %</b>	<b>All Grades %</b>	<b>Grade 3 %</b>	<b>Grade 4 %</b>
<b>Any Adverse Reactions</b>	95	31	7	86	22	6
<b>Gastrointestinal symptoms</b>						
Diarrhea	43	2	0	13	< 1	0
Nausea	23	< 1	0	19	< 1	0
Anorexia	16	< 1	0	13	1	0
Vomiting	16	< 1	0	12	1	0
Constipation	15	< 1	0	11	< 1	0
<b>Dermatology/skin</b>						
Rash/desquamation	40	< 1	0	16	< 1	0
Hand-foot skin reaction	30	6	0	7	0	0
Alopecia	27	< 1	0	3	0	0
Pruritus	19	< 1	0	6	0	0
Dry skin	11	0	0	4	0	0
<b>Constitutional symptoms</b>						
Fatigue	37	5	< 1	28	3	< 1
Weight loss	10	< 1	0	6	0	0
<b>Cardiovascular, General</b>						
Hypertension	17	3	< 1	2	< 1	0
<b>Hemorrhage/bleeding</b>						
Hemorrhage - all sites	15	2	0	8	1	< 1
<b>Pulmonary</b>						
Dyspnea	14	3	< 1	12	2	< 1
<b>Neurology</b>						
Neuropathy-sensory	13	< 1	0	6	< 1	0
<b>Pain</b>						
Pain, abdomen	11	2	0	9	2	0
Pain, headache	10	< 1	0	6	< 1	0
Pain, joint	10	2	0	6	< 1	0

\* Adverse reactions graded according to National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0 (NCI CTCAE v3.0).

Laboratory test abnormalities reported in TARGET are presented in Table 7.

**Table 7: Laboratory Test Abnormalities Reported in TARGET (RCC)**

<b>Laboratory Parameter*</b>	<b>Sorafenib Tablets N = 451</b>		<b>Placebo N = 451</b>	
	<b>All Grades (%)</b>	<b>Grade 3 or 4 (%)</b>	<b>All Grades (%)</b>	<b>Grade 3 or 4 (%)</b>
Hypophosphatemia	45	13	11	3

Anemia	44	2	49	4
Elevated Lipase	41	12	30	7
Elevated Amylase	30	1	23	3
Lymphopenia	23	13	13	7
Neutropenia	18	5	10	2
Thrombocytopenia	12	1	5	0
Hypocalcemia	12	2	8	<1
Hypokalemia	5	1	<1	<1

\* Laboratory parameters graded according to National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0 (NCI CTCAE v3.0).

### ***Differentiated Thyroid Carcinoma***

The safety of sorafenib was evaluated in DECISION in 416 patients with locally recurrent or metastatic, progressive differentiated thyroid carcinoma (DTC) refractory to radioactive iodine (RAI) treatment randomized to receive 400 mg twice daily sorafenib (n = 207) or matching placebo (n = 209) until disease progression or intolerable toxicity in a double-blind trial [see *Clinical Studies (14.3)*]. The data described below reflect a median exposure to sorafenib for 46 weeks (range 0.3 to 135). The population exposed to sorafenib was 50% male, and had a median age of 63 years.

Dose interruptions for adverse reactions were required in 66% of patients receiving sorafenib and dose reductions were required in 64% of patients. Adverse reactions that resulted in treatment discontinuation were reported in 14% of sorafenib-treated patients compared to 1.4% of patients receiving placebo.

Table 8 shows the percentage of DTC patients experiencing adverse reactions at a higher rate in sorafenib-treated patients than in patients receiving placebo in the double-blind phase of the DECISION study. Grade 3 adverse reactions occurred in 53% of sorafenib-treated patients compared to 23% of patients receiving placebo. Grade 4 adverse reactions occurred in 12% of sorafenib-treated patients compared to 7% of patients receiving placebo.

**Table 8: Selected Adverse Reactions Occurring at a Higher Incidence in Sorafenib-Treated Patients [Between Arm Difference of  $\geq 5\%$  (All Grades)\* or  $\geq 2\%$  (Grades 3 and 4)]**

Adverse Reaction	Sorafenib Tablets N = 207		Placebo N = 209	
	All Grades (%)	Grades 3 and 4 (%)	All Grades (%)	Grades 3 and 4 (%)
<b>Skin and subcutaneous tissue disorders</b>				
PPES <sup>†</sup>	69	19	8	0
Alopecia	67	0	8	0
Rash	35	5	7	0
Pruritus	20	0.5	11	0
Dry skin	13	0.5	5	0
Erythema	10	0	0.5	0
Hyperkeratosis	7	0	0	0

<b>Gastrointestinal disorders</b>				
Diarrhea	68	6	15	1
Stomatitis†	24	2	3	0
Nausea	21	0	12	0
Abdominal pain§	20	1	7	1
Constipation	16	0	8	0.5
Oral pain¶	14	0.5	6	0
Vomiting	11	0	3	0
<b>Investigations</b>				
Weight loss	49	6	14	1
<b>General disorders and administration site conditions</b>				
Fatigue	41	5	20	1
Asthenia	12	0	7	0
Pyrexia	11	1	5	0
<b>Vascular disorders</b>				
Hypertension#	41	10	12	2
<b>Metabolism and nutrition disorders</b>				
Decreased appetite	30	2	5	0
<b>Nervous system disorders</b>				
Headache	17	0	6	0
Dysgeusia	6	0	0	0
<b>Musculoskeletal and connective tissue disorders</b>				
Pain in extremity	15	1	7	0
Muscle spasms	10	0	3	0
<b>Respiratory, thoracic and mediastinal disorders</b>				
Dysphonia	13	0.5	3	0
Epistaxis	7	0	1	0
<b>Neoplasms benign, malignant and unspecified</b>				
Squamous cell carcinoma of skin	3	3	0	0

\* National Cancer Institute Common Terminology Criteria for Adverse Events Version 3.0

† Palmar-plantar erythrodysesthesia syndrome (Hand-foot skin reaction)

‡ Includes the following terms: stomatitis, aphthous stomatitis, mouth ulceration, mucosal inflammation

§ Includes the following terms: abdominal pain, abdominal discomfort, hepatic pain, esophageal pain, esophageal discomfort, abdominal pain lower, abdominal pain upper, abdominal tenderness, abdominal rigidity

¶ Includes the following terms: oral pain, oropharyngeal discomfort, glossitis, burning mouth syndrome, glossodynia

# Includes the following terms: hypertension, blood pressure increased, blood pressure systolic increased

The relative increase for the following laboratory abnormalities observed in sorafenib-treated patients as compared to patients receiving placebo in the DECISION study is similar to that observed in the RCC and HCC studies: lipase, amylase, hypokalemia, hypophosphatemia, neutropenia, lymphopenia, anemia, and thrombocytopenia. Hypocalcemia was more frequent and more severe in patients with DTC, especially those with a history of hypoparathyroidism, compared to patients with RCC or HCC. Other

laboratory test abnormalities reported in DECISION are presented in Table 9

**Table 9: Laboratory Test Abnormalities Reported in DECISION (DTC)**

<b>Laboratory Parameter*</b>	<b>Sorafenib Tablets N = 207</b>		<b>Placebo N = 209</b>	
	<b>All Grades (%)</b>	<b>Grade 3 or 4 (%)</b>	<b>All Grades (%)</b>	<b>Grade 3 or 4 (%)</b>
Elevated ALT	59	4	24	0
Elevated AST	54	2	15	0
Hypocalcemia	36	10	11	3

\* Laboratory parameters graded according to National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0 (NCI CTCAE v3.0).

### ***Additional Data from Multiple Clinical Trials***

The following additional drug-related adverse reactions and laboratory abnormalities were reported from clinical trials of sorafenib (very common 10% or greater, common 1 to less than 10%, uncommon 0.1% to less than 1%, rare less than 0.1%):

*Cardiovascular:* Common: congestive heart failure\*†, myocardial ischemia and/or infarction Uncommon: hypertensive crisis\* Rare: QT prolongation\*

*Dermatologic:* Very common: erythema Common: exfoliative dermatitis, acne, flushing, folliculitis, hyperkeratosis Uncommon: eczema, erythema multiforme

*Digestive:* Very common: increased lipase, increased amylase Common: mucositis, stomatitis (including dry mouth and glossodynia), dyspepsia, dysphagia, gastrointestinal reflux Uncommon: pancreatitis, gastritis, gastrointestinal perforations\*, cholecystitis, cholangitis

Note that elevations in lipase are very common (41%, see below); a diagnosis of pancreatitis should not be made solely on the basis of abnormal laboratory values

*General Disorders:* Very common: infection, hemorrhage (including gastrointestinal\* and respiratory tract\* and uncommon cases of cerebral hemorrhage\*), asthenia, pain (including mouth, bone, and tumor pain), pyrexia, decreased appetite Common: influenza-like illness

*Hematologic:* Very common: leukopenia, lymphopenia Common: anemia, neutropenia, thrombocytopenia Uncommon: INR abnormal

*Hepatobiliary Disorders:* Rare: drug-induced liver injury (including hepatic failure and death)

*Hypersensitivity:* Uncommon: hypersensitivity reactions (including skin reactions and urticaria), anaphylactic reaction

*Metabolic and Nutritional:* Very common: hypophosphatemia Common: transient increases in transaminases, hypocalcemia, hypokalemia, hyponatremia, hypothyroidism Uncommon: dehydration, transient increases in alkaline phosphatase, increased bilirubin (including jaundice), hyperthyroidism

*Musculoskeletal:* Very common: arthralgia Common: myalgia, muscle spasms



*Nervous System and Psychiatric:* Common: depression, dysgeusia Uncommon: tinnitus, reversible posterior leukoencephalopathy\*

*Renal and Genitourinary:* Common: renal failure, proteinuria Rare: nephrotic syndrome

*Reproductive:* Common: erectile dysfunction Uncommon: gynecomastia

*Respiratory:* Common: rhinorrhea Uncommon: interstitial lung disease-like events (includes reports of pneumonitis, radiation pneumonitis, acute respiratory distress, interstitial pneumonia, pulmonitis and lung inflammation)

In addition, the following medically significant adverse reactions were uncommon during clinical trials of sorafenib: transient ischemic attack, arrhythmia, and thromboembolism. For these adverse reactions, the causal relationship to sorafenib has not been established.

\* adverse reactions may have a life-threatening or fatal outcome.

† reported in 1.9% of patients treated with sorafenib (N = 2276).

## 6.2 Postmarketing Experience

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

***Blood and Lymphatic Disorders:*** Thrombotic microangiopathy (TMA)

***Dermatologic:*** Stevens-Johnson syndrome and toxic epidermal necrolysis (TEN)

***Hypersensitivity:*** Angioedema

***Musculoskeletal:*** Rhabdomyolysis, osteonecrosis of the jaw

***Respiratory:*** Interstitial lung disease-like events (which may have a life-threatening or fatal outcome)

***Vascular:*** Arterial (including aortic) aneurysms, dissections, and rupture

## 7 DRUG INTERACTIONS

### 7.1 Effect of Other Drugs on Sorafenib

#### ***Strong CYP3A4 Inducers***

The concomitant use of sorafenib with rifampin, a strong CYP3A4 inducer decreased the mean AUC of sorafenib, which may decrease the antitumor activity [see *Clinical Pharmacology* (12.3)]. Avoid concomitant use of sorafenib with strong CYP3A4 inducers, when possible, because these drugs can decrease the systemic exposure to sorafenib.

#### ***Neomycin***

The concomitant use of sorafenib with neomycin decreased the mean AUC of sorafenib, which may decrease the antitumor activity. Avoid concomitant use of sorafenib with

neomycin. The effects of other antibiotics on the pharmacokinetics of sorafenib have not been studied [see *Clinical Pharmacology* (12.3)].

## **7.2 Concomitant Use of Warfarin**

The concomitant use of sorafenib and warfarin may increase the risk of bleeding or increased the INR. Monitor INR and for clinical bleeding episodes in patients taking warfarin while receiving sorafenib [see *Warnings and Precautions* (5.6)].

## **7.3 Drugs That Prolong the QT Interval**

Sorafenib is associated with QTc interval prolongation. Avoid coadministration of sorafenib with medicinal products with a known potential to prolong QT/QTc interval [see *Warnings and Precautions* (5.9), *Clinical Pharmacology* (12.2)].

# **8 USE IN SPECIFIC POPULATIONS**

## **8.1 Pregnancy**

### ***Risk Summary***

Based on findings from animal studies and its mechanism of action [see *Clinical Pharmacology* (12.1)], sorafenib may cause fetal harm when administered to a pregnant woman. There are no available data in pregnant women to inform a drug-associated risk. In animal reproduction studies, oral administration of sorafenib to pregnant rats and rabbits during the period of organogenesis resulted in embryo-fetal toxicities at maternal exposures that were significantly lower than human exposures at the recommended dose of 400 mg twice daily (see *Data*). Advise pregnant women and females of reproductive potential of the potential risk to a fetus.

The background risk of major birth defects and miscarriage for the indicated population is unknown. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2% to 4% and 15% to 20%, respectively.

### ***Data***

#### **Animal Data**

In animal reproduction studies, sorafenib was teratogenic and induced embryo-fetal toxicity (including increased post-implantation loss, resorptions, skeletal retardations, and retarded fetal weight) when administered orally to pregnant rats and rabbits during the period of organogenesis. The effects occurred at doses considerably below the recommended human dose of 400 mg twice daily (approximately 500 mg/m<sup>2</sup>/day on a body surface area basis). Adverse intrauterine development effects were seen at doses > 0.2 mg/kg/day (1.2 mg/m<sup>2</sup>/day) in rats and ≥ 0.3 mg/kg/day (≥ 3.6 mg/m<sup>2</sup>/day) in rabbits. These doses result in exposures (AUC) that are approximately 0.008 times the AUC in patients at the recommended dose.

## **8.2 Lactation**

## ***Risk Summary***

There are no data on the presence of sorafenib or its metabolites in human milk, or its effects on the breast-fed child or on milk production. Sorafenib was present in milk of lactating rats (*see Data*). Because of the potential for serious adverse reactions in a breastfed child from sorafenib, advise women not to breastfeed during treatment with sorafenib and for 2 weeks after the last dose.

## ***Data***

### **Animal Data**

Following administration of radiolabeled sorafenib to lactating Wistar rats, approximately 27% of the radioactivity was secreted into milk. The milk to plasma AUC ratio was approximately 5:1.

## **8.3 Females and Males of Reproductive Potential**

Sorafenib may cause fetal harm when administered to a pregnant woman [*see Use in Specific Populations (8.1)*].

### ***Pregnancy Testing***

Verify the pregnancy status of females of reproductive potential prior to the initiation of sorafenib.

### ***Contraception***

#### ***Females***

Advise females of reproductive potential to use effective contraception during treatment and for 6 months following the last dose of sorafenib.

#### ***Males***

Based on genotoxicity and findings in animal reproduction studies, advise males with female partners of reproductive potential and pregnant partners to use effective contraception during treatment with sorafenib and for 3 months following the last dose of sorafenib [*see Use in Specific Populations (8.1), Nonclinical Toxicology (13.1)*].

### ***Infertility***

#### ***Males***

Based on findings in animal studies, sorafenib may impair fertility in males of reproductive potential [*see Nonclinical Toxicology (13.1)*].

## **8.4 Pediatric Use**

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

### ***Juvenile Animal Toxicity Data***

Repeat dosing of sorafenib to young and growing dogs resulted in irregular thickening

of the femoral growth plate at daily sorafenib doses  $\geq 600$  mg/m<sup>2</sup> (approximately 0.3 times the AUC at the recommended human dose), hypocellularity of the bone marrow adjoining the growth plate at 200 mg/m<sup>2</sup>/day (approximately 0.1 times the AUC at the recommended human dose), and alterations of the dentin composition at 600 mg/m<sup>2</sup>/day. Similar effects were not observed in adult dogs when dosed for 4 weeks or less.

### **8.5 Geriatric Use**

In total, 59% of HCC patients treated with sorafenib were age 65 years or older and 19% were 75 and older. In total, 32% of RCC patients treated with sorafenib were age 65 years or older and 4% were 75 and older. No differences in safety or efficacy were observed between older and younger patients, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

### **8.6 Renal Impairment**

No dose adjustment is necessary for patients with mild, moderate or severe renal impairment who are not on dialysis. The pharmacokinetics of sorafenib have not been studied in patients who are on dialysis [see *Clinical Pharmacology* (12.3)].

### **8.7 Hepatic Impairment**

No dose adjustment is necessary for patients with mild or moderate hepatic impairment. The pharmacokinetics of sorafenib have not been studied in patients with severe (Child-Pugh C) hepatic impairment [see *Clinical Pharmacology* (12.3)].

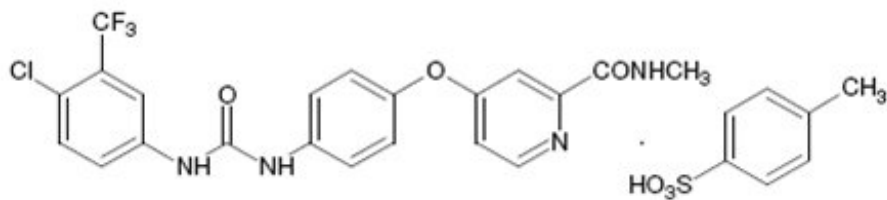
## **10 OVERDOSAGE**

The adverse reactions observed at a dose of 800 mg twice daily (2 times the recommended dose) were primarily diarrhea and dermatologic. No information is available on symptoms of acute overdose in animals because of the saturation of absorption in oral acute toxicity studies conducted in animals.

In cases of suspected overdose, withhold sorafenib and institute supportive care.

## **11 DESCRIPTION**

Sorafenib, a kinase inhibitor, is the tosylate salt of sorafenib. Sorafenib tosylate has the chemical name 4-[4-({[4-chloro-3-(trifluoromethyl)phenyl]carbamoyl}amino)phenoxy]-*N*-methylpyridine-2-carboxamide, tosylate. The molecular formula of sorafenib tosylate is C<sub>21</sub>H<sub>16</sub>ClF<sub>3</sub>N<sub>4</sub>O<sub>3</sub>·C<sub>7</sub>H<sub>8</sub>O<sub>3</sub>S and the molecular weight of sorafenib tosylate is 637.03 g/mole. Its structural formula is:



Sorafenib tosylate, USP is a cream to yellow crystalline powder. Sorafenib tosylate is practically insoluble in aqueous media, slightly soluble in ethanol and soluble in PEG 400.

Sorafenib tablets, USP for oral use are supplied as film-coated tablets containing 200 mg sorafenib equivalent to 274 mg sorafenib tosylate, USP and the following inactive ingredients: carboxymethylcellulose calcium, croscarmellose sodium, hypromellose, magnesium stearate, microcrystalline cellulose, polyethylene glycol, red iron oxide, sodium lauryl sulfate and titanium dioxide.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Sorafenib is a kinase inhibitor that decreases tumor cell proliferation *in vitro*. Sorafenib was shown to inhibit multiple intracellular (c-CRAF, BRAF and mutant BRAF) and cell surface kinases (KIT, FLT-3, RET, RET/PTC, VEGFR-1, VEGFR-2, VEGFR-3, and PDGFR-β). Several of these kinases are thought to be involved in tumor cell signaling, angiogenesis and apoptosis. Sorafenib inhibited tumor growth of HCC, RCC, and DTC human tumor xenografts in immunocompromised mice. Reductions in tumor angiogenesis were seen in models of HCC and RCC upon sorafenib treatment, and increases in tumor apoptosis were observed in models of HCC, RCC, and DTC.

### 12.2 Pharmacodynamics

#### ***Cardiac Electrophysiology***

The effect of sorafenib 400 mg twice daily on the QTc interval was evaluated in a multi-center, open-label, non-randomized trial in 53 patients with advanced cancer. No large changes in the mean QTc intervals (that is, > 20 ms) from baseline were detected in the trial. After one 28-day treatment cycle, the largest mean QTc interval change of 8.5 ms (upper bound of two-sided 90% confidence interval, 13.3 ms) was observed at 6 hours post-dose on day 1 of cycle 2 [see *Warnings and Precautions (5.9)*, *Drug Interactions (7.3)*].

### 12.3 Pharmacokinetics

Multiple doses of sorafenib for 7 days resulted in a 2.5- to 7-fold accumulation compared to a single dose. Steady-state plasma sorafenib concentrations were achieved within 7 days, with a peak-to-trough ratio of mean concentrations of less than 2.

The steady-state concentrations of sorafenib following administration of sorafenib 400 mg twice daily were evaluated in DTC, RCC and HCC patients. Patients with DTC have mean steady-state concentrations that are 1.8-fold higher than patients with HCC and 2.3-fold higher than those with RCC. The reason for increased sorafenib concentrations

in DTC patients is unknown.

Mean  $C_{max}$  and AUC increased less than proportionally beyond oral doses of 400 mg administered twice daily.

### ***Absorption***

After administration of sorafenib tablets, the mean relative bioavailability was 38-49% when compared to an oral solution. Following oral administration, sorafenib reached peak plasma levels in approximately 3 hours.

### ***Effects of Food***

With a moderate-fat meal (30% fat; 700 calories), bioavailability was similar to that in the fasted state. With a high-fat meal (50% fat; 900 calories), bioavailability was reduced by 29% compared to that in the fasted state.

### ***Distribution***

*In vitro* binding of sorafenib to human plasma proteins was 99.5%.

### ***Elimination***

The mean elimination half-life of sorafenib was approximately 25 to 48 hours.

### ***Metabolism***

Sorafenib undergoes oxidative metabolism by hepatic CYP3A4, as well as glucuronidation by UGT1A9.

### ***Excretion***

Sorafenib accounted for approximately 70–85% of the circulating analytes in plasma at steady-state. Eight metabolites of sorafenib have been identified, of which 5 have been detected in plasma. The main circulating metabolite of sorafenib, the pyridine N-oxide that comprises approximately 9–16% of circulating analytes at steady-state, showed *in vitro* potency similar to that of sorafenib.

Following oral administration of a 100 mg dose of a solution formulation of sorafenib, 96% of the dose was recovered within 14 days, with 77% of the dose excreted in feces and 19% of the dose excreted in urine as glucuronidated metabolites. Unchanged sorafenib, accounting for 51% of the dose, was found in feces but not in urine.

### ***Specific Populations***

A study of the pharmacokinetics of sorafenib indicated that the mean AUC of sorafenib in Asians (N = 78) was 30% lower than in Whites (N = 40). Sex and age do not have a clinically meaningful effect on the pharmacokinetics of sorafenib.

### ***Patients with Renal Impairment***

Mild (CL<sub>cr</sub> 50-80 mL/min), moderate (CL<sub>cr</sub> 30 - < 50 mL/min), and severe (CL<sub>cr</sub> < 30 mL/min) renal impairment do not affect the pharmacokinetics of sorafenib [see *Use in Specific Populations* (8.6)].

## ***Patients with Hepatic Impairment***

Mild (Child-Pugh A) and moderate (Child-Pugh B) hepatic impairment do not affect the pharmacokinetics of sorafenib [see *Use in Specific Populations* (8.7)].

## ***Drug Interactions Studies***

### ***Effect of Strong CYP3A4 Inhibitors on Sorafenib***

Ketoconazole, a strong inhibitor of CYP3A4 and P-glycoprotein, administered at a dose of 400 mg once daily for 7 days did not alter the mean AUC of a single oral dose of sorafenib 50 mg in healthy subjects.

### ***Effect of Strong CYP3A4 Inducers on Sorafenib***

Concomitant use of sorafenib with rifampin administered at a dose of 600 mg once daily for 5 days with a single oral dose of sorafenib 400 mg in healthy volunteers resulted in a 37% decrease in the mean AUC of sorafenib.

### ***Effect of Neomycin on Sorafenib***

Neomycin administered as an oral dose of 1 g three times daily for 5 days decreased the mean AUC of sorafenib by 54% in healthy subjects administered a single oral dose of sorafenib 400 mg.

### ***Effect of Sorafenib on Other Drugs***

Sorafenib 400 mg twice daily for 28 days did not increase the systemic exposure of concomitantly administered midazolam (CYP3A4 substrate), dextromethorphan (CYP2D6 substrate), and omeprazole (CYP2C19 substrate) [see *Clinical Pharmacology* (12.3)].

### ***Drugs that Increase Gastric pH***

The aqueous solubility of sorafenib is pH dependent, with higher pH resulting in lower solubility. However, omeprazole, a proton pump inhibitor, administered at a dose of 40 mg once daily for 5 days, did not result in a clinically meaningful change in sorafenib single dose exposure.

## ***In Vitro Studies***

Sorafenib competitively inhibited CYP2B6, CYP2C8, CYP2C9, CYP2C19, CYP2D6, and CYP3A4 *in vitro*. However, sorafenib 400 mg twice daily for 28 days with substrates of CYP3A4, CYP2D6 and CYP2C19 did not increase the systemic exposure of these substrates [see *Drug Interactions* (7.3)].

Sorafenib did not increase CYP1A2 and CYP3A4 activities, suggesting that sorafenib is unlikely to induce CYP1A2 or CYP3A4 in humans.

Sorafenib inhibits glucuronidation by UGT1A1 and UGT1A9 *in vitro*. Sorafenib could increase the systemic exposure of concomitantly administered drugs that are UGT1A1 or UGT1A9 substrates.

Sorafenib inhibited P-glycoprotein *in vitro*. Sorafenib could increase the concentrations of concomitantly administered drugs that are P-glycoprotein substrates.

## 13 NONCLINICAL TOXICOLOGY

### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Carcinogenicity studies have not been performed with sorafenib. Sorafenib was clastogenic when tested in an *in vitro* mammalian cell assay (Chinese hamster ovary) in the presence of metabolic activation. Sorafenib was not mutagenic in the *in vitro* Ames bacterial cell assay or clastogenic in an *in vivo* mouse micronucleus assay. One intermediate in the manufacturing process, which is also present in the final drug substance (< 0.15%), was positive for mutagenesis in an *in vitro* bacterial cell assay (Ames test) when tested independently.

No specific studies with sorafenib have been conducted in animals to evaluate the effect on fertility. However, results from the repeat-dose toxicity studies suggest there is a potential for sorafenib to impair reproductive function and fertility. Multiple adverse effects were observed in male and female reproductive organs, with the rat being more susceptible than mice or dogs. Typical changes in rats consisted of testicular atrophy or degeneration, degeneration of epididymis, prostate, and seminal vesicles, central necrosis of the corpora lutea and arrested follicular development. Sorafenib-related effects on the reproductive organs of rats were manifested at daily oral doses  $\geq 5$  mg/kg (30 mg/m<sup>2</sup>). This dose results in an exposure (AUC) that is approximately 0.5 times the AUC in patients at the recommended human dose. Dogs showed tubular degeneration in the testes at 30 mg/kg/day (600 mg/m<sup>2</sup>/day). This dose results in an exposure that is approximately 0.3 times the AUC at the recommended human dose. Oligospermia was observed in dogs at 60 mg/kg/day (1200 mg/m<sup>2</sup>/day) of sorafenib.

## 14 CLINICAL STUDIES

### 14.1 Hepatocellular Carcinoma

The SHARP (HCC) study (NCT00105443) was an international, multicenter, randomized, double blind, placebo-controlled trial in patients with unresectable hepatocellular carcinoma. Overall survival was the primary endpoint. A total of 602 patients were randomized; 299 to sorafenib 400 mg twice daily and 303 to matching placebo. All 602 randomized subjects were included in the ITT population for the efficacy analyses.

Demographics and baseline disease characteristics were similar between the sorafenib and placebo arms with regard to age, gender, race, performance status, etiology (including hepatitis B, hepatitis C and alcoholic liver disease), TNM stage (stage I: < 1% vs. < 1%; stage II: 10.4% vs. 8.3%; stage III: 37.8% vs. 43.6%; stage IV: 50.8% vs. 46.9%), absence of both macroscopic vascular invasion and extrahepatic tumor spread (30.1% vs. 30.0%), and Barcelona Clinic Liver Cancer stage (stage B: 18.1% vs. 16.8%; stage C: 81.6% vs. 83.2%; stage D: < 1% vs. 0%). Liver impairment by Child-Pugh score was comparable between the sorafenib and placebo arms (Class A: 95% vs. 98%; B: 5% vs. 2%). Only one patient with Child-Pugh class C was entered. Prior treatments included surgical resection procedures (19.1% vs. 20.5%), locoregional therapies (including radiofrequency ablation, percutaneous ethanol injection and transarterial chemoembolization; 38.8% vs. 40.6%), radiotherapy (4.3% vs. 5.0%) and systemic therapy (3.0% vs. 5.0%).

The trial was stopped for efficacy following a pre-specified second interim analysis for



survival showing a statistically significant advantage for sorafenib over placebo for overall survival (HR: 0.69,  $p = 0.00058$ ) (see Table 10 and Figure 1). This advantage was consistent across all subsets analyzed.

Final analysis of time to tumor progression (TTP) based on data from an earlier time point (by independent radiologic review) also was significantly longer in the sorafenib arm (HR: 0.58,  $p = 0.000007$ ) (see Table 10).

**Table 10: Efficacy Results from SHARP (HCC)**

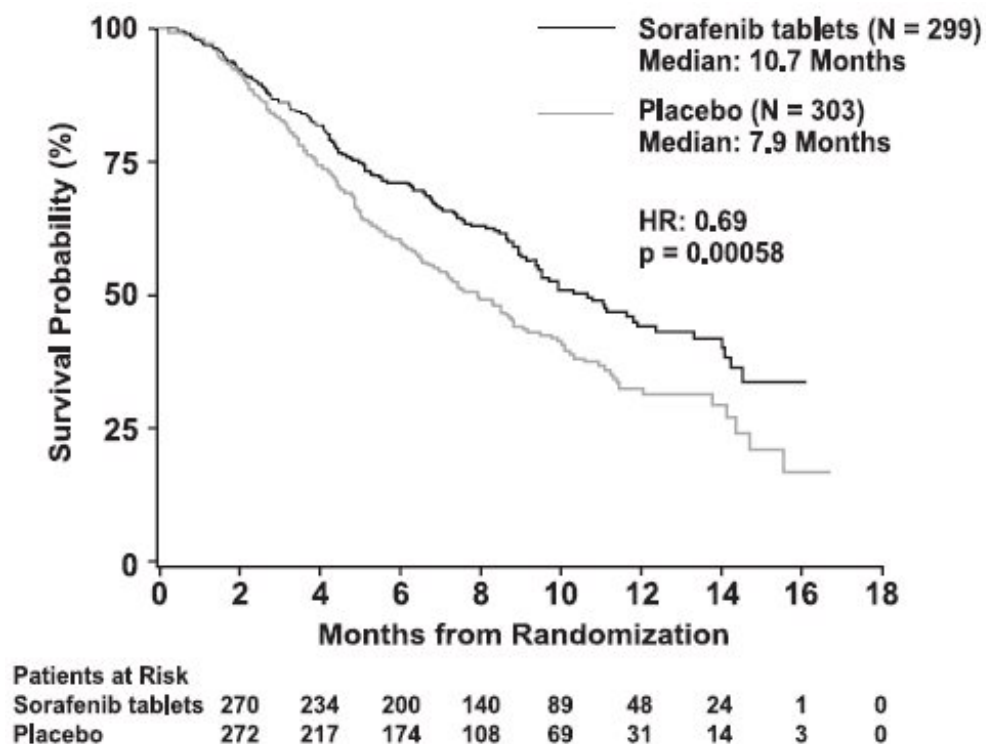
Efficacy Parameter	Sorafenib Tablets (N = 299)	Placebo (N = 303)
Overall Survival		
Number of Events	143	178
Median, months	10.7	7.9
(95% CI)	(9.4, 13.3)	(6.8, 9.1)
Hazard Ratio* (95% CI)	0.69 (0.55, 0.87)	
P-value (log-rank test†)	0.00058	
Time to Progression‡		
Number of Events	107	156
Median, months	5.5	2.8
(95% CI)	(4.1, 6.9)	(2.7, 3.9)
Hazard Ratio* (95% CI)	0.58 (0.45, 0.74)	
P-value (log-rank test†)	0.000007	

CI = Confidence interval

\* Hazard ratio, sorafenib/placebo, stratified Cox model

† Stratified log rank (for the interim analysis of survival, the stopping boundary one-sided  $\alpha = 0.0077$ )

‡ The time-to-progression (TTP) analysis, based on independent radiologic review, was based on data from an earlier time point than the survival analysis



**Figure 1: Kaplan-Meier Curve of Overall Survival in SHARP (HCC) (Intent-to-Treat Population)**

## 14.2 Renal Cell Carcinoma

The safety and efficacy of sorafenib in the treatment of advanced renal cell carcinoma (RCC) were studied in the following two randomized controlled clinical trials.

**TARGET:** TARGET (NCT00073307) was an international, multicenter, randomized, double blind, placebo-controlled trial in patients with advanced renal cell carcinoma who had received one prior systemic therapy. Primary study endpoints included overall survival and progression-free survival (PFS). Tumor response rate was a secondary endpoint. The PFS analysis included 769 patients, per protocol, stratified by MSKCC (Memorial Sloan Kettering Cancer Center) prognostic risk category (low or intermediate) and country and randomized to sorafenib 400 mg twice daily (N = 384) or to placebo (N = 385).

Table 11 summarizes the demographic and disease characteristics of the study population analyzed. Baseline demographics and disease characteristics were well balanced for both treatment groups. The median time from initial diagnosis of RCC to randomization was 1.6 and 1.9 years for the sorafenib and placebo arms, respectively.

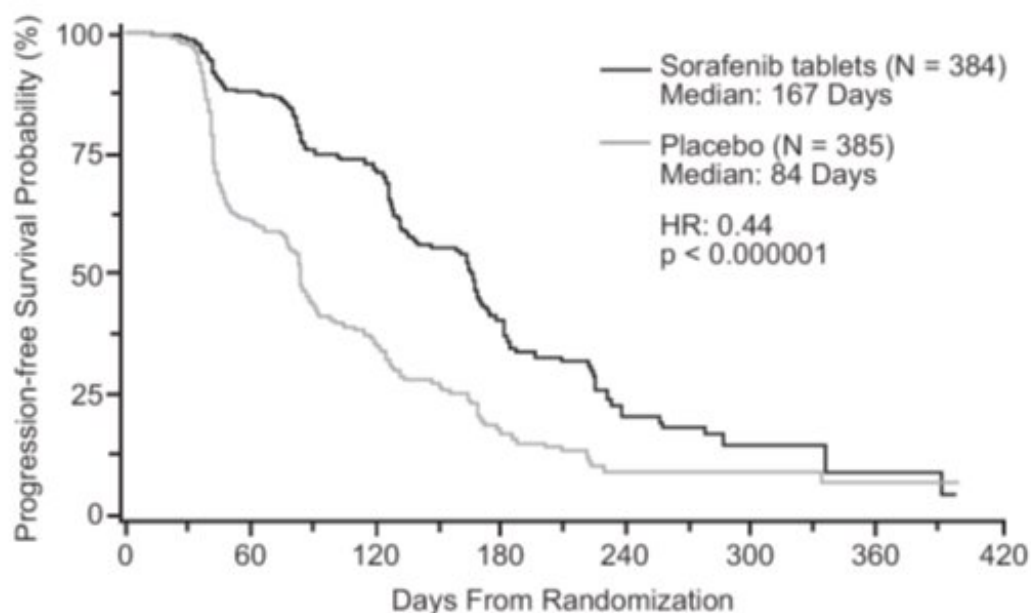
**Table 11: Demographic and Disease Characteristics - TARGET (RCC)**

Characteristics	Sorafenib Tablets N = 384		Placebo N = 385	
	N	(%)	N	(%)
<b>Gender</b>				
Male	267	(70)	287	(75)
Female	116	(30)	98	(25)
<b>Race</b>				

White	276	(72)	278	(73)
Black/Asian/Hispanic/Other	11	(3)	10	(2)
Not reported*	97	(25)	97	(25)
<b>Age group</b>				
< 65 years	255	(67)	280	(73)
≥ 65 years	127	(33)	103	(27)
<b>ECOG performance status at baseline</b>				
0	184	(48)	180	(47)
1	191	(50)	201	(52)
2	6	(2)	1	(< 1)
Not reported	3	(< 1)	3	(< 1)
<b>MSKCC prognostic risk category</b>				
Low	200	(52)	194	(50)
Intermediate	184	(48)	191	(50)
<b>Prior IL-2 and/or interferon</b>				
Yes	319	(83)	313	(81)
No	65	(17)	72	(19)

\* Race was not collected from the 186 patients enrolled in France due to local regulations. In 8 other patients, race was not available at the time of analysis.

Progression-free survival, defined as the time from randomization to progression or death from any cause, whichever occurred earlier, was evaluated by blinded independent radiological review using RECIST criteria. Figure 2 depicts Kaplan-Meier curves for PFS. The PFS analysis was based on a two-sided Log-Rank test stratified by MSKCC prognostic risk category and country.



**Figure 2: Kaplan-Meier Curves for Progression-free Survival - TARGET (RCC)**

NOTE: HR is from Cox regression model with the following covariates: MSKCC prognostic risk category and country. P-value is from two-sided Log-Rank test stratified by MSKCC prognostic risk category and country.

The median PFS for patients randomized to sorafenib was 167 days compared to 84 days for patients randomized to placebo. The estimated hazard ratio (immediate risk of progression or death with sorafenib compared to placebo) was 0.44 (95% CI: 0.35, 0.55).

A series of patient subsets were examined in exploratory univariate analyses of PFS. The subsets included age above or below 65 years, ECOG PS 0 or 1, MSKCC prognostic risk category, whether the prior therapy was for progressive metastatic disease or for an earlier disease setting and time from diagnosis of less than or greater than 1.5 years. The effect of sorafenib on PFS was consistent across these subsets, including patients with no prior IL-2 or interferon therapy (N = 137; 65 patients receiving sorafenib and 72 placebo), for whom the median PFS was 172 days in the sorafenib arm compared to 85 days in the placebo arm.

Tumor response was determined by independent radiologic review according to RECIST criteria. Overall, of 672 patients who were evaluable for response, 7 (2%) patients in the sorafenib and no (0%) patients in the placebo arms had a confirmed partial response. Thus the gain in PFS primarily reflects the stable disease population.

At the time of a planned interim survival analysis, based on 220 deaths, overall survival was longer for those randomized to sorafenib compared with placebo with a hazard ratio of 0.72. This analysis did not meet the prespecified criteria for statistical significance. Additional analyses are planned as the survival data mature.

**BAY43-9006:** BAY43-9006 (NCT00101413) was a randomized discontinuation trial in patients with metastatic malignancies, including RCC. The primary endpoint was the percentage of randomized patients remaining progression-free at 24 weeks. All patients received sorafenib for the first 12 weeks. Radiologic assessment was repeated at week 12. Patients with < 25% change in bi-dimensional tumor measurements from baseline were randomized to sorafenib or placebo for a further 12 weeks. Patients who were randomized to placebo were permitted to cross over to open-label sorafenib upon progression. Patients with tumor shrinkage  $\geq 25\%$  continued sorafenib, whereas patients with tumor growth  $\geq 25\%$  discontinued treatment.

A total of 202 patients with advanced RCC were enrolled into BAY43-9006, including patients who had received no prior therapy and patients with tumor histology other than clear cell carcinoma. After the initial 12 weeks of sorafenib, 79 patients with RCC continued on open-label sorafenib, and 65 patients were randomized to sorafenib or placebo. After an additional 12 weeks, at week 24, for the 65 randomized patients, the progression-free rate was significantly higher in patients randomized to sorafenib (16/32, 50%) than in patients randomized to placebo (6/33, 18%) ( $p = 0.0077$ ). Progression-free survival was significantly longer in the sorafenib arm (163 days) than in those randomized to placebo (41 days) ( $p = 0.0001$ , HR = 0.29).

### 14.3 Differentiated Thyroid Carcinoma

The safety and effectiveness of sorafenib was evaluated in a multicenter, randomized (1:1), double-blind, placebo-controlled trial (DECISION; NCT00984282) conducted in 417 patients with locally recurrent or metastatic, progressive differentiated thyroid

carcinoma (DTC) refractory to radioactive iodine (RAI) treatment. Randomization was stratified by age (< 60 years versus ≥ 60 years) and geographical region (North America, Europe, and Asia). All 417 subjects were included in the ITT population for the efficacy analyses.

All patients were required to have actively progressing disease defined as progression within 14 months of enrollment. RAI-refractory disease was defined based on four criteria that were not mutually exclusive. All RAI treatments and diagnostic scans were to be performed under conditions of a low iodine diet and adequate TSH stimulation. Following are the RAI-refractory criteria and the proportion of patients in the study that met each one: a target lesion with no iodine uptake on RAI scan (68%); tumors with iodine uptake and progression after RAI treatment within 16 months of enrollment (12%); tumors with iodine uptake and multiple RAI treatments with the last treatment greater than 16 months prior to enrollment, and disease progression after each of two RAI treatments administered within 16 months of each other (7%); cumulative RAI dose ≥ 600 mCi administered (34%). The major efficacy outcome measure was progression-free survival (PFS) as determined by a blinded, independent radiological review using a modified Response Evaluation Criteria in Solid Tumors v. 1.0 (RECIST). RECIST was modified by inclusion of clinical progression of bone lesions based on the need for external beam radiation (4.4% of progression events). Additional efficacy outcomes measures included overall survival (OS), tumor response rate, and duration of response.

Patients were randomized to receive sorafenib 400 mg twice daily (n = 207) or placebo (n = 210). Of the 417 patients randomized, 48% were male, the median age was 63 years, 61% were 60 years or older, 60% were white, 62% had an ECOG performance status of 0, and 99% had undergone thyroidectomy. The histological diagnoses were papillary carcinoma in 57%, follicular carcinoma (including Hürthle cell) in 25%, and poorly differentiated carcinoma in 10%, and other in 8% of the study population. Metastases were present in 96% of the patients: lungs in 86%, lymph nodes in 51%, and bone in 27%. The median cumulative RAI activity administered prior to study entry was 400 mCi.

A statistically significant prolongation of PFS was demonstrated for sorafenib-treated patients compared to those receiving placebo (Figure 3); no statistically significant difference was seen in the final overall survival (OS) analysis (Table 12). Crossover to open label sorafenib occurred in 161 (77%) patients randomized to placebo after investigator-determined disease progression.

**Table 12: Efficacy Results from DECISION in Differentiated Thyroid Carcinoma**

	Sorafenib Tablets N = 207	Placebo N = 210
<b>Progression-free Survival*</b>		
Number of Deaths or Progression	113 (55%)	136 (65%)
Median PFS in Months (95% CI)	10.8 (9.1, 12.9)	5.8 (5.3, 7.8)
Hazard Ratio (95% CI)	0.59 (0.46, 0.76)	
P-value†	< 0.001	
<b>Overall Survival‡</b>		
Number of Deaths	103 (49.8%)	109 (51.9%)
Median OS in Months (95% CI)	42.8 (34.6, 52.6)	39.4 (32.7, 51.4)
Hazard Ratio (95% CI)	0.92 (0.71, 1.21)	

P-value <sup>†</sup>	0.570	
<b>Objective Response</b>		
Number of Objective Responders <sup>§</sup>	24 (12%)	1 (0.5%)
(95% CI)	(7.6%, 16.8%)	(0.01%, 2.7%)
Median Duration of Response in Months (95% CI)	10.2 (7.4, 16.6)	NE

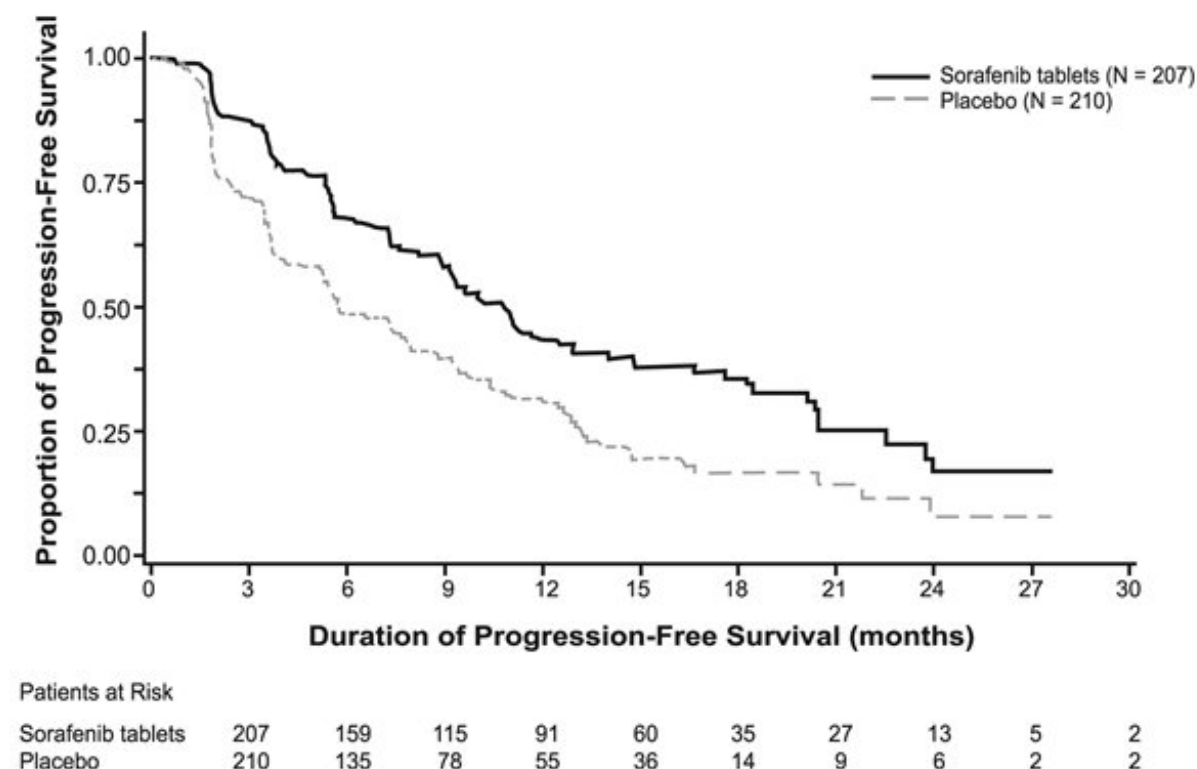
NR = Not Reached, CI = Confidence interval, NE = Not Estimable

\* Independent radiological review

† Two-sided log-rank test stratified by age (< 60 years, ≥ 60 years) and geographic region (North America, Europe, Asia)

‡ Conducted after 212 events, which occurred 36 months after the primary PFS analysis.

§ All objective responses were partial responses



**Figure 3: Kaplan-Meier Curve of Progression-Free Survival in DECISION (DTC)**

## 16 HOW SUPPLIED/STORAGE AND HANDLING

Sorafenib Tablets, USP are available containing 200 mg sorafenib equivalent to 274 mg sorafenib tosylate, USP.

The 200 mg tablets are peach, film-coated, round, unscored tablets debossed with **200** on one side of the tablet and **NAT** on the other side. They are available as follows:

NDC 0378-1201-78  
bottles of 120 tablets

**Store at 20° to 25°C (68° to 77°F). [See USP Controlled Room Temperature.]**  
Store in a dry place.

Dispense in a tight, light-resistant container as defined in the USP using a child-resistant closure.

## 17 PATIENT COUNSELING INFORMATION

Advise the patient to read FDA-approved patient labeling (Patient Information).

**Cardiovascular Events:** Discuss with patients that cardiac ischemia and/or infarction and congestive heart failure, have been reported during sorafenib treatment, and that they should immediately report any episodes of chest pain or other symptoms of cardiac ischemia or congestive heart failure [see *Warnings and Precautions* (5.1)].

**Bleeding:** Inform patients that sorafenib can increase the risk of bleeding and that they should promptly report any episodes of bleeding [see *Warnings and Precautions* (5.2)].

Inform patients that bleeding or elevations in the International Normalized Ratio (INR) have been reported in some patients taking warfarin while on sorafenib and that their INR should be monitored regularly [see *Warnings and Precautions* (5.6)].

**Hypertension:** Inform patients that hypertension can develop during sorafenib treatment, especially during the first six weeks of therapy, and that blood pressure should be monitored regularly during treatment [see *Warnings and Precautions* (5.3)].

**Skin Reactions:** Advise patients of the possible occurrence of hand-foot skin reaction and rash during sorafenib treatment and appropriate countermeasures [see *Warnings and Precautions* (5.4)].

**Gastrointestinal Perforation:** Advise patients that cases of gastrointestinal perforation have been reported in patients taking sorafenib [see *Warnings and Precautions* (5.5)].

**Risk of Impaired Wound Healing:** Advise patients that sorafenib may impair wound healing. Advise patients to inform their healthcare provider of any planned surgical procedure [see *Warnings and Precautions* (5.7)].

**QT Interval Prolongation:** Inform patients with a history of prolonged QT interval that sorafenib can worsen the condition [see *Warnings and Precautions* (5.9) and *Clinical Pharmacology* (12.2)].

**Drug-Induced Liver Injury:** Inform patients that sorafenib can cause hepatitis which may result in hepatic failure and death. Advise patients that liver function tests should be monitored regularly during treatment and to report signs and symptoms of hepatitis [see *Warnings and Precautions* (5.10)].

**Embryo-Fetal Toxicity:** Advise females to inform their healthcare provider if they are pregnant or become pregnant. Inform female patients of the risk to a fetus and potential loss of pregnancy [see *Use in Specific Populations* (8.1)]. Advise females of reproductive potential to use effective contraception during treatment with sorafenib and for 6 months after the last dose. Advise male patients with female partners of reproductive potential or who are pregnant to use effective contraception during treatment with sorafenib and for 3 months after receiving the last dose of sorafenib [see *Warnings and Precautions* (5.11), *Use in Specific Populations* (8.1, 8.3)].

**Lactation:** Advise patients not to breastfeed while taking sorafenib and for 2 weeks

after receiving the last dose of sorafenib [see *Use in Specific Populations* (8.2)].

**Missed Doses:** Instruct patients that if a dose of sorafenib is missed, the next dose should be taken at the regularly scheduled time, and not double the dose. Instruct patients to contact their healthcare provider immediately if they take too much sorafenib.

## Patient Information

### Sorafenib Tablets, USP (soe raf' e nib)

#### What are sorafenib tablets?

Sorafenib tablets are a prescription medicine used to treat:

- a type of liver cancer called hepatocellular carcinoma (HCC) that cannot be removed by surgery
- a type of kidney cancer called renal cell carcinoma (RCC)
- a type of thyroid cancer called differentiated thyroid carcinoma (DTC) that can no longer be treated with radioactive iodine and is progressing

It is not known if sorafenib tablets are safe and effective in children.

#### Do not take sorafenib tablets if you:

- are allergic to sorafenib or any of the other ingredients in sorafenib tablets. See the end of this leaflet for a complete list of ingredients in sorafenib tablets.
- have squamous cell lung cancer and receive carboplatin and paclitaxel.

#### Before taking sorafenib tablets, tell your healthcare provider about all of your medical conditions including if you:

- have heart problems including a condition called “congenital long QT syndrome”
- have chest pain
- have abnormal magnesium, potassium, or calcium blood levels
- have bleeding problems
- have high blood pressure
- plan to have surgery or have had a recent surgery. You should stop taking sorafenib tablets at least 2 weeks before planned surgery. See “**What are the possible side effects of sorafenib tablets?**”
- are pregnant or plan to become pregnant. Sorafenib may harm your unborn baby. Tell your healthcare provider right away if you become pregnant during treatment with sorafenib tablets.

**For females** who are able to become pregnant:

- o Your healthcare should do a pregnancy test before you start treatment with sorafenib tablets.
- o Use effective birth control (contraception) during your treatment with sorafenib tablets and for 6 months after the last dose of sorafenib tablets.



**For males** with female partners who are able to become pregnant:

- o Use effective birth control (contraception) during your treatment with sorafenib tablets and for 3 months after the last dose of sorafenib tablets.
- are breastfeeding or plan to breastfeed. It is not known if sorafenib passes into your breast milk. Do not breastfeed during treatment with sorafenib tablets and for 2 weeks after receiving the last dose of sorafenib tablets.

**Tell your healthcare provider about all the medicines you take**, including prescription and over-the-counter medicines, vitamins, and herbal supplements. Especially tell your healthcare provider if you take the medicine warfarin.

### **How should I take sorafenib tablets?**

- Take sorafenib tablets exactly as your healthcare provider tells you to take them.
- Take sorafenib tablets 2 times a day. Your healthcare provider may change your dose, temporarily stop treatment or completely stop treatment with sorafenib tablets if you have side effects.
- Take sorafenib tablets without food (at least 1 hour before or 2 hours after a meal).
- If you miss a dose of sorafenib tablets, skip the missed dose, and take your next dose at your regular time. Do not double your dose of sorafenib tablets.
- If you take too many sorafenib tablets call your doctor or go to the nearest hospital emergency room right away.

### **What are the possible side effects of sorafenib tablets?**

**Sorafenib tablets may cause serious side effects, including:**

- **decreased blood flow to the heart, heart attack and heart failure.** Get emergency help right away if you get symptoms such as chest pain, shortness of breath, racing heartbeat, swelling in lower legs, feet and abdomen, feel lightheaded or faint, tiredness, nausea, vomiting, or sweat a lot.
- **increased risk of bleeding. Bleeding is a common side effect of** sorafenib tablets that can be serious and can lead to death. Tell your healthcare provider right away if you have any signs of bleeding during treatment with sorafenib tablets.

- |   |                                       |
|---|---------------------------------------|
| o vomiting blood or if your vomit looks like coffee-grounds | o heavier than normal menstrual cycle |
| o pink or brown urine                                       | o unusual vaginal bleeding            |
| o red or black (looks like tar) stools                      | o frequent nose bleeds                |
| o coughing up blood or blood clots                          | o bruising                            |

- **high blood pressure.** High blood pressure is a common side effect of sorafenib tablets and can be serious. Your blood pressure should be checked every week during the first 6 weeks of starting sorafenib tablets. Your blood pressure should be checked regularly and any high blood pressure should be treated during treatment with sorafenib tablets.
- **skin problems.** A condition called hand-foot skin reactions and skin rash are common with sorafenib tablets treatment and can be severe. Sorafenib tablets may

also cause severe skin and mouth reactions that can be life-threatening. Tell your healthcare provider if you have any of the following symptoms:

- o skin rash
  - o skin redness
  - o pain or swelling
  - o blistering and peeling of your skin
  - o blistering and peeling on the inside of your mouth
  - o blisters on the palms of your hand or soles of your feet
- **an opening in the wall of your stomach or intestines (gastrointestinal perforation).** Tell your healthcare provider right away if you get fever, nausea, vomiting or severe stomach (abdominal) pain.
- **risk of wound healing problems.** Wounds may not heal properly during sorafenib tablets treatment. Tell your healthcare provider if you plan to have any surgery before starting or during treatment with sorafenib tablets.
  - o You should stop taking sorafenib tablets at least 10 days before planned surgery.
  - o Your healthcare provider should tell you when you may start taking sorafenib tablets again after surgery.
- **changes in the electrical activity of your heart called QT prolongation.** QT prolongation can cause irregular heartbeats that can be life-threatening. Your healthcare provider may do tests during your treatment with sorafenib tablets to check the levels of potassium, magnesium, and calcium in your blood, and check the electrical activity of your heart with an electrocardiogram (ECG). Tell your healthcare provider right away if you feel faint, lightheaded, dizzy or feel your heart beating irregularly or fast during your treatment with sorafenib tablets.
- **liver problems (drug-induced hepatitis).** Sorafenib tablets may cause liver problems that may lead to liver failure and death. Your healthcare provider will do blood tests to check your liver function regularly during your treatment with sorafenib tablets. Tell your healthcare provider right away if you develop any of the following symptoms:
  - o yellowing of your skin or the whites of your eyes
  - o dark “tea-colored” urine
  - o light-colored bowel movements (stools)
  - o worsening nausea or vomiting
  - o pain on the right side of your stomach area
  - o bleeding or bruising more easily than normal
  - o loss of appetite
- **change in thyroid hormone levels.** If you have differentiated thyroid cancer, you can have changes in your thyroid hormone levels during treatment with sorafenib tablets. Your healthcare provider may need to change your dose of thyroid medicine during treatment with sorafenib tablets. Your healthcare provider should check your thyroid hormone levels every month during treatment with sorafenib tablets.

**The most common side effects of sorafenib tablets include:**

- |  |   |
|--|---|
| o diarrhea (frequent or loose bowel movements) | o weight loss   |
| o tiredness                                    | o loss of appetite  |
| o infection                                    | o nausea  |
| o hair thinning or patchy hair loss            | o stomach area (abdomen) pain   |
| o rash   | o low blood calcium levels in people with differentiated thyroid cancer |

Sorafenib tablets may cause fertility problems in males. This may affect your ability to father a child. Talk to your healthcare provider if this is a concern for you.

These are not all of the possible side effects of sorafenib tablets. **Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.**

**How should I store sorafenib tablets?**

- Store sorafenib tablets at room temperature between 20° to 25°C (68° to 77°F).
- Store sorafenib tablets in a dry place.

**Keep sorafenib tablets and all medicines out of the reach of children.****General information about the safe and effective use of sorafenib tablets**

Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. Do not use sorafenib tablets for a condition for which they were not prescribed. Do not give sorafenib tablets to other people even if they have the same symptoms you have. They may harm them. You can ask your healthcare provider or pharmacist for information about sorafenib tablets that is written for health professionals.

**What are the ingredients in sorafenib tablets?**

**Active ingredient:** sorafenib tosylate

**Inactive ingredients:** carboxymethylcellulose calcium, croscarmellose sodium, hypromellose, magnesium stearate, microcrystalline cellulose, polyethylene glycol, red iron oxide, sodium lauryl sulfate and titanium dioxide.

Manufactured for: Mylan Pharmaceuticals Inc., Morgantown, WV 26505 U.S.A.  
For more information, call Mylan at 1-877-446-3679 (1-877-4-INFO-RX).

This Patient Information has been approved by the U.S. Food and Drug Administration.

Manufactured for:

**Mylan Pharmaceuticals Inc.**  
Morgantown, WV 26505 U.S.A.

Manufactured by:

**Natco Pharma Limited**  
Plot No.: 89 & 90, JNPC SEZ  
Ramky Pharma City  
Parawada, Visakhapatnam  
Andhra Pradesh, India - 531019

40500103

Revised: 12/2023

NPLV:SORA:R2

**PRINCIPAL DISPLAY PANEL - 200 mg**

**NDC 0378-1201-78**

**Sorafenib  
Tablets, USP  
200 mg**

**Rx only     120 Tablets**

Each film-coated tablet contains  
200 mg sorafenib equivalent to  
274 mg sorafenib tosylate, USP.

**Store at 20° to 25°C (68° to 77°F).**  
**[See USP Controlled Room**  
**Temperature.]** Store in a dry place.

**Usual Dosage:** See accompanying  
prescribing information.

Dispense in a tight, light-resistant  
container as defined in the USP  
using a child-resistant closure.

Keep container tightly closed.

**Keep this and all medication  
out of the reach of children.**

Manufactured for:  
**Mylan Pharmaceuticals Inc.**  
Morgantown, WV 26505 U.S.A.

Manufactured by:  
**Natco Pharma Limited**  
Visakhapatnam – 531019  
AP, India

**Mylan.com**

M.L.: 18/VSP/AP/2018/F/G

**40100226**

**RNPLV1201DA**

Each film-coated tablet contains 200 mg sorafenib equivalent to 274 mg sorafenib tosylate, USP.

Store at 20° to 25°C (68° to 77°F). [See USP Controlled Room Temperature.] Store in a dry place.

Usual Dosage: See accompanying prescribing information.

**NDC 0378-1201-78**

# Sorafenib

## Tablets, USP

200 mg




**Mylan®**

[Varnish free for serialization, Lot and Exp]

Dispense in a tight, light-resistant container as defined in the USP using a child-resistant closure. Keep container tightly closed. **Keep this and all medication out of the reach of children.**

Manufactured for:  
**Mylan Pharmaceuticals Inc.**  
Morgantown, WV 26505 U.S.A.

Manufactured by:  
**Natco Pharma Limited**  
Visakhapatnam - 531019  
AP, India

M.L.: 18/VSP/AP/2018/F/G

RNPLV1201DA  
40100226



N 0378-1201-78 0

**Rx only**

**120 Tablets**

## SORAFENIB TOSYLATE

sorafenib tablet, film coated

### Product Information

<b>Product Type</b>	HUMAN PRESCRIPTION DRUG	<b>Item Code (Source)</b>	NDC:0378-1201
<b>Route of Administration</b>	ORAL		

### Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
<b>SORAFENIB TOSYLATE</b> (UNII: 5T62Q3B36J) (SORAFENIB - UNII:9Z OQ3TZI87)	SORAFENIB	200 mg

### Inactive Ingredients

Ingredient Name	Strength
<b>CARBOXYMETHYLCELLULOSE CALCIUM</b> (UNII: UTY7PDF93L)	
<b>CROSCARMELLOSE SODIUM</b> (UNII: M28OL1HH48)	
<b>HYPROMELLOSE 2910 (5 MPA.S)</b> (UNII: R75537T0T4)	
<b>HYPROMELLOSE 2910 (6 MPA.S)</b> (UNII: 0WZ8WG20P6)	
<b>MAGNESIUM STEARATE</b> (UNII: 70097M6I30)	
<b>MICROCRYSTALLINE CELLULOSE 101</b> (UNII: 7T9FYH5QMK)	
<b>POLYETHYLENE GLYCOL 4000</b> (UNII: 4R4HFI6D95)	
<b>FERRIC OXIDE RED</b> (UNII: 1K09F3G675)	
<b>SODIUM LAURYL SULFATE</b> (UNII: 368GB5141J)	
<b>TITANIUM DIOXIDE</b> (UNII: 15FIX9V2JP)	

### Product Characteristics

Color	ORANGE (peach)	Score	no score	
Shape	ROUND	Size	10mm	
Flavor		Imprint Code	200;NAT	
Contains				
Packaging				
#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0378-1201-78	120 in 1 BOTTLE, PLASTIC; Type 0: Not a Combination Product	06/01/2022	
Marketing Information				
Marketing Category	Application Number or Monograph Citation		Marketing Start Date	Marketing End Date
ANDA	ANDA207012		06/01/2022	

**Labeler -** Mylan Pharmaceuticals Inc. (059295980)

Revised: 12/2023

Mylan Pharmaceuticals Inc.