

PRODUCT MONOGRAPH  
INCLUDING PATIENT MEDICATION INFORMATION

**P<sup>r</sup>BALVERSA<sup>®</sup>**  
Erdafitinib tablets  
tablet, 3 mg, 4 mg and 5 mg, oral  
Protein Kinase Inhibitor, (ATC code: L01EN01)

BALVERSA<sup>®</sup> (erdafitinib), indicated for:

- the treatment of adult patients with locally advanced or metastatic urothelial carcinoma (UC), whose tumors have susceptible fibroblast growth factor receptor (FGFR)2 or FGFR3 genetic alterations and who have disease progression during or following at least one line of prior chemotherapy, including within 12 months of neoadjuvant or adjuvant chemotherapy

has been issued marketing authorization with conditions, pending the results of trials to verify its clinical benefit. Patients should be advised of the nature of the authorization. For further information for BALVERSA<sup>®</sup> please refer to Health Canada's Notice of Compliance with conditions - drug products web site: <http://www.hc-sc.gc.ca/dhp-mps/prodpharma/notices-avis/conditions/index-eng.php>

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## **NOTICE OF COMPLIANCE WITH CONDITIONS**

### **What is a Notice of Compliance with Conditions (NOC/c)?**

*An NOC/c is a form of market approval granted to a product on the basis of promising evidence of clinical effectiveness following review of the submission by Health Canada. Products authorized under Health Canada's NOC/c policy are intended for the treatment, prevention or diagnosis of a serious, life-threatening or severely debilitating illness. They have demonstrated promising benefit, are of high quality and possess an acceptable safety profile based on a benefit/risk assessment. In addition, they either respond to a serious unmet medical need in Canada or have demonstrated a significant improvement in the benefit/risk profile over existing therapies. Health Canada has provided access to this product on the condition that sponsors carry out additional clinical trials to verify the anticipated benefit within an agreed upon time frame.*

## RECENT MAJOR LABEL CHANGES

<a href="#">4 Dosage and Administration, 4.2 Recommended Dose and Dosage Adjustment, Hepatic impairment</a>	04/2023
<a href="#">7 Warnings and Precautions, Endocrine and Metabolism, Hyperphosphatemia</a>	04/2023

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## PART I: HEALTH PROFESSIONAL INFORMATION

### 1 INDICATIONS

BALVERSA® (erdafitinib) is indicated for the treatment of adult patients with locally advanced or metastatic urothelial carcinoma (UC):

- whose tumors have susceptible fibroblast growth factor receptor (FGFR)2 or FGFR3 genetic alterations and
- who have disease progression during or following at least one line of prior chemotherapy, including within 12 months of neoadjuvant or adjuvant chemotherapy.

Clinical effectiveness of BALVERSA® is based on objective response rates (ORR) and duration of response (DoR) from a single-arm Phase 2 trial in patients with specific genetic alterations in FGFR2 or FGFR3 (see [14 CLINICAL TRIALS](#)).

Treatment with BALVERSA® should be initiated following confirmation of a susceptible FGFR genetic alteration using a validated test (see [14 CLINICAL TRIALS](#)).

#### 1.1 Pediatrics

**Pediatrics (<18 years of age):** No data are available to Health Canada; therefore, Health Canada has not authorized an indication for pediatric use (see [7 WARNINGS AND PRECAUTIONS](#), [7.1 Special Populations](#)).

#### 1.2 Geriatrics

**Geriatrics (≥65 years of age):** Of the 87 patients treated with BALVERSA® in Study BLC2001, 53 (61%) were 65 years of age or older. No overall differences in safety or effectiveness were observed between elderly and younger patients.

### 2 CONTRAINDICATIONS

BALVERSA® is contraindicated in patients who are hypersensitive to this drug or to any ingredient in the formulation, including any non-medicinal ingredient, or component of the container. For a complete listing, see [6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING](#).

### 4 DOSAGE AND ADMINISTRATION

#### 4.1 Dosing Considerations

**BALVERSA® (erdafitinib) should be prescribed and managed by a qualified health professional who is experienced in the use of anti-cancer agents.**

Before taking BALVERSA®, patients must have confirmation of susceptible FGFR2 or FGFR3 gene alterations by a validated test (see [7 WARNINGS AND PRECAUTIONS](#), **General** and [14 CLINICAL TRIALS](#)).

## 4.2 Recommended Dose and Dosage Adjustment

The recommended starting dose of BALVERSA® is 8 mg orally once daily, with a dose increase to 9 mg once daily based on serum phosphate levels and tolerability, as assessed between 14 and 21 days after initiating BALVERSA® treatment (see [4.4 Administration](#) and **Dose Modifications** section below).

### Dose increase based on serum phosphate concentrations

Assess serum phosphate concentrations between 14 and 21 days after initiating treatment. Increase the dose of BALVERSA® to 9 mg once daily if that serum phosphate concentration is <5.5 mg/dL, and there is no drug-related toxicity. Avoid co-administration of serum phosphate level-altering agents with BALVERSA® before initial dose increase period based on serum phosphate levels.

### **Dose modifications**

For possible dose reductions and management of adverse reactions see Tables 1 to 4.

**Table 1: BALVERSA® dose reduction schedule**

Dose	1 <sup>st</sup> dose reduction	2 <sup>nd</sup> dose reduction	3 <sup>rd</sup> dose reduction	4 <sup>th</sup> dose reduction	5 <sup>th</sup> dose reduction
9 mg →	8 mg	6 mg	5 mg	4 mg	Stop
8 mg →	6 mg	5 mg	4 mg	Stop	

An increase in serum phosphate concentration is an expected effect of BALVERSA®; therefore, subsequent to the serum phosphate assessment performed between 14 and 21 days after treatment initiation, serum phosphate concentrations in patients should be monitored monthly. (see [10 CLINICAL PHARMACOLOGY](#), [10.2 Pharmacodynamics](#)). For all patients, phosphate intake should be restricted to 600-800 mg daily (see [7 WARNINGS AND PRECAUTIONS](#), **Hyperphosphatemia**). For elevated phosphate concentrations (≥7.0 mg/dL) in patients treated with BALVERSA®, follow the dose modification guidelines in Table 2, and addition of a non-calcium containing phosphate binder (e.g., sevelamer carbonate) should be considered.

**Table 2: Recommended dose modifications based on serum phosphate concentrations with use of BALVERSA® after up-titration**

<b>Serum phosphate concentration</b>	<b>BALVERSA® Dose Management<sup>a</sup></b>
<6.9 mg/dL (<2.2 mmol/L)	Continue BALVERSA® at current dose.
7.0-9.0 mg/dL (2.3-2.9 mmol/L)	Withhold BALVERSA® and reassess phosphate concentrations weekly until concentration returns to <5.5 mg/dL. Re-start BALVERSA® at the same dose level. A dose reduction may be implemented for persistent <sup>b</sup> hyperphosphatemia
>9.0 mg/dL (>2.9 mmol/L)	Withhold BALVERSA® for up to 28 days, with weekly reassessments until concentration returns to < 5.5 mg/dL (or baseline). Then restart BALVERSA® at 1 dose level below the current dose.
>10.0 mg/dL (>3.2 mmol/L) and/or significant alteration in baseline renal function or Grade 3 hypocalcemia	Withhold BALVERSA® with weekly reassessments until level returns to <5.5 mg/dL (or baseline). Then restart BALVERSA® at 2 dose levels below the current dose.

<sup>a</sup> For all patients, restrict phosphate intake to 600-800 mg/day.

<sup>b</sup> Persistent hyperphosphatemia is considered to be more than 1 sequential (at least 1 week apart) phosphate value of >7 mg/dL.

#### Eye disorder management

Ocular disorders, including central serous retinopathy/retinal pigment epithelial detachment (CSR/RPED), may occur with the administration of BALVERSA®. Prior to initiating BALVERSA®, perform a baseline ophthalmological exam including an Amsler grid test, fse fundoscopy, visual acuity and, if available, an optical coherence tomography (OCT) (see [7 WARNINGS AND PRECAUTIONS, Monitoring and Laboratory Tests](#)). Examine patients monthly thereafter using an Amsler grid test, and if abnormal or if any visual abnormality is observed, follow the management guidelines in Table 3.

To prevent and treat dry eyes, use artificial tear substitutes, hydrating or lubricating eye gels or ointments frequently, at least every 2 hours during waking hours. Severe treatment-related dry eye should be evaluated by an eye care professional (optometrist or ophthalmologist).

**Table 3: Guideline for management of eye disorders with use of BALVERSA®**

<b>Severity Grading</b>	<b>BALVERSA® Dose Management</b>
<p><b>Grade 1:</b> Asymptomatic or mild symptoms; clinical or diagnostic observations only, or abnormal Amsler grid test.</p>	<p>Refer for an ophthalmologic examination (OE). If an OE cannot be performed within 7 days, withhold BALVERSA® until an OE can be performed.</p> <p>If no evidence of drug-related corneal or retinal pathology on OE, continue BALVERSA® at same dose level.</p> <p>If diagnosis from OE is keratitis or retinal abnormality (i.e., CSR<sup>a</sup>/RPED<sup>b</sup>), withhold BALVERSA® until resolution. If reversible in 4 weeks on OE, resume at next lower dose. Monitor for recurrence weekly for a month. Consider re-escalation if no recurrence.</p>
<p><b>Grade 2:</b> Moderate; limiting age appropriate instrumental activities of daily living (ADL).</p>	<p>Immediately withhold BALVERSA® and refer for an OE. If no drug-related corneal or retinal pathology on OE, withhold BALVERSA® until resolution, then resume BALVERSA® at the next lower dose level.</p> <p>If diagnosis from OE is keratitis or retinal abnormality (i.e. CSR/RPED), withhold BALVERSA® until resolution.</p> <p>If resolved (complete resolution and asymptomatic) within 4 weeks on OE, resume BALVERSA® at the next lower dose level. Monitor for recurrence every 1 to 2 weeks for a month.</p>
<p><b>Grade 3:</b> Severe or medically significant but not immediate sight-threatening; limiting self-care ADL.</p>	<p>Immediately withhold BALVERSA® until resolution. If resolved (complete resolution and asymptomatic) within 4 weeks, then BALVERSA® may be resumed at 2 dose levels lower. Monitor for recurrence every 1 to 2 weeks for a month. If there is recurrence, consider permanent discontinuation of BALVERSA®.</p>
<p><b>Grade 4:</b> Sight-threatening consequences; blindness (20/200 or worse).</p>	<p>Permanently discontinue BALVERSA®.</p>

<sup>a</sup> CSR-central serous retinopathy

<sup>b</sup> RPED-retinal pigment epithelium detachment

Educational materials to assist healthcare professionals with the diagnosis and management of central serous retinopathy (CSR) are available through the manufacturer.



### Dose modification for other adverse reactions

**Table 4: Recommended dose modifications for other adverse reactions with use of BALVERSA®**

<b>Severity of Adverse Reaction<sup>a</sup></b>	<b>BALVERSA® Dose Management</b>
Grade 1	Continue at current dose.
Grade 2 <sup>b</sup>	Continue at current dose.
Grade 3	Withhold BALVERSA® When resolves to ≤ Grade 1 or baseline, restart BALVERSA® at 1 dose level below.
Grade 4	Permanently discontinue BALVERSA®.

<sup>a</sup> Dose adjustment graded using the National Cancer Institute Common Terminology Criteria for Adverse Events (NCI CTCAE).

<sup>b</sup> For Grade 2 skin disorders and mucositis consider withholding if no improvement in 1 week. When resolves to ≤ Grade 1 or baseline, restart BALVERSA® at same or 1 dose level below.

**Pediatrics (<18 years of age):** Health Canada has not authorized an indication for pediatric use.

**Geriatrics (≥65 years of age):** No overall differences in safety and effectiveness were observed between elderly and younger patients. No specific dose adjustments are considered necessary for elderly patients (see [10 CLINICAL PHARMACOLOGY, 10.3 Pharmacokinetics](#)).

**Renal impairment:** Based on population pharmacokinetic (PK) analyses, no dose adjustment is required for patients with mild (eGFR-MDRD 60 to 89 mL/min/1.73 m<sup>2</sup>) or moderate renal impairment (eGFR-MDRD 30 to 59 mL/min/1.73 m<sup>2</sup>) (see [10 CLINICAL PHARMACOLOGY, 10.3 Pharmacokinetics](#)). No data are available in patients with severe renal impairment; therefore, caution should be used in these patients.

**Hepatic impairment:** Based on PK analyses, no dose adjustment is required for patients with mild (Child-Pugh A) or moderate (Child-Pugh B) hepatic impairment (see [10 CLINICAL PHARMACOLOGY, 10.3 Pharmacokinetics](#)). Limited data are available in patients with severe (Child-Pugh C) hepatic impairment; therefore, caution should be used in these patients.

#### **4.4 Administration**

The tablets should be swallowed whole with or without food, at approximately the same time every day (see [10 CLINICAL PHARMACOLOGY, 10.3 Pharmacokinetics](#)).

#### **4.5 Missed Dose**

If a dose of BALVERSA® is missed, it can be taken as soon as possible, on the same day. Resume the regular daily dose schedule for BALVERSA® the next day. Extra tablets should not be taken to make up for the missed dose.

If vomiting occurs any time after taking BALVERSA®, the next dose should be taken at the next scheduled time.

## 5 OVERDOSAGE

There is no information on overdose with BALVERSA®. There is no known specific antidote for BALVERSA® overdose. The treatment of overdose of BALVERSA® should consist of general supportive measures.

For management of a suspected drug overdose, contact your regional poison control centre.

## 6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING

**Table 5: Dosage Forms, Strengths, Composition and Packaging**

Route of Administration	Dosage Form / Strength/Composition	Non-medicinal Ingredients
oral	tablet 3 mg, 4 mg, 5 mg	<p><b>Tablet Core:</b> Croscarmellose sodium, Magnesium stearate (from vegetable source), Mannitol, Meglumine, and Microcrystalline cellulose.</p> <p><b>Film coating:</b> Ferrosoferric oxide/iron oxide black (for the brown tablets only), Glycerol monocaprylocaprate Type I, Iron oxide yellow, Iron oxide red (for the orange and brown tablets only), Polyvinyl alcohol partially hydrolyzed, Sodium lauryl sulfate, Talc, Titanium dioxide</p>

BALVERSA® 3 mg tablets are yellow, round biconvex shaped, film-coated tablets, debossed with “3” on one side; and “EF” on the other side.

BALVERSA® 4 mg tablets are orange, round biconvex shaped, film-coated tablets, debossed with “4” on one side; and “EF” on the other side.

BALVERSA® 5 mg tablets are brown, round biconvex shaped, film-coated tablets, debossed with “5” on one side; and “EF” on the other side.

**Packaging:** BALVERSA® (erdafitinib) tablets are supplied in child-resistant blisters packs and bottles in 28 days or 7 days supply as follows:

- 3 mg tablets:
  - Bottle of 56-tablets [28 days supply of 6 mg daily dose]
  - Bottle of 84-tablets [28 days supply of 9 mg daily dose]
  - Blister packs of 28 tablets, two blisters per box (56 tablets total) [28 days supply of 6 mg daily dose]
  - Blister packs of 42 tablets, two blisters per box (84 tablets total) [28 days supply of 9 mg daily dose]
- 4 mg tablets:
  - Bottle of 28-tablets [28 days supply of 4 mg daily dose]
  - Bottle of 56-tablets [28 days supply of 8 mg daily dose]
  - Blister pack of 14 tablets (Starter pack) [7 days supply of 8 mg daily dose]

- Blister pack of 28 tablets [28 days supply of 4 mg daily dose]
- Blister packs of 28 tablets, two blisters per box (56 tablets total) [28 days supply of 8 mg daily dose]
- 5 mg tablets:
  - Bottle of 28-tablets [28 days supply of 5 mg daily dose]
  - Blister pack of 28 tablets [28 days supply of 5 mg daily dose]

## 7 WARNINGS AND PRECAUTIONS

### General

Before taking BALVERSA<sup>®</sup>, patients must have confirmation of susceptible FGFR gene alterations by a validated test. Patients enrolled in Study BLC2001 were required to have confirmation of at least one of the following genetic alterations in tumour tissues:

- FGFR3 Mutations: FGFR3-S249C, FGFR3-Y373C, FGFR3-R248C, FGFR3-G370C,
- FGFR2 or FGFR3 Fusions: FGFR3-TACC3\_V1, FGFR3-TACC3\_V3, FGFR3-BAIAP2L1, FGFR2-CASP7, FGFR2-BICC1

(see [14 CLINICAL TRIALS](#))

### Driving and Operating Machinery

No studies to establish the effects of erdafitinib on the ability to drive and use machines have been conducted. However, eye disorders such as central serous retinopathy or keratitis have been noted with FGFR inhibitors and with BALVERSA<sup>®</sup> treatment. If patients experience symptoms affecting their vision, it is recommended that they do not drive or use machines until the effect subsides.

### Endocrine and Metabolism

#### ***Hyperphosphatemia and soft tissue mineralization***

BALVERSA<sup>®</sup> can cause hyperphosphatemia leading to soft tissue mineralization, cutaneous calcinosis, non-uremic calciphylaxis and vascular calcification. Increase in phosphate levels are a pharmacodynamics effect of BALVERSA<sup>®</sup> (see [10 CLINICAL PHARMACOLOGY, 10.2 Pharmacodynamics](#)). Hyperphosphatemia was reported as an adverse event in 76% of patients treated with BALVERSA<sup>®</sup>. The median time to onset for any grade event of hyperphosphatemia was 20 days (range: 8-116 days) after initiating BALVERSA<sup>®</sup>. No serious events of hyperphosphatemia were reported. Hyperphosphatemia was managed by dose modification and treatment with phosphate binders. Dose interruption was reported for 24% of patients, dose reduction for 7% of patients, and 34% of patients received phosphate binders during treatment with BALVERSA<sup>®</sup>.

Patients should adhere to a low phosphate diet (600 to 800 mg/day) while taking BALVERSA<sup>®</sup>, and the use of drugs that can increase serum phosphate levels (such as potassium phosphate supplements, vitamin D supplements, antacids, and phosphate-containing enemas and laxatives) should be avoided. Serum phosphate concentrations in patients should be monitored monthly. Follow the dose modification guidelines when required (see [4.2 Recommended Dose and Dosage Adjustment](#) and [4.4 Administration](#)).

## **Gastrointestinal**

### **Stomatitis**

Stomatitis was reported by 56% of patients treated with BALVERSA® in study BLC2001, with Grade 3 events reported by 8% of patients. Dose interruptions and dose reductions were reported for 17% and 15% of patients, respectively.

If stomatitis is experienced, follow [4.2 Recommended Dose and Dosage Adjustment](#) and [4.4 Administration](#)).

## **Monitoring and Laboratory Tests**

### **Serum Phosphate**

Phosphate concentrations should be assessed 14 to 21 days after initiating BALVERSA® treatment and monitored monthly thereafter. For elevated phosphate concentrations in patients treated with BALVERSA®, follow dose modification guidelines in Table 2 (see [4.2 Recommended Dose and Dosage Adjustment](#) and [4.4 Administration](#)).

### **Ocular Monitoring**

Screen patients for eye disorders prior to initiating treatment with BALVERSA® using an Amsler grid test, fundoscopy, visual acuity and, if available, an OCT. Examine patients monthly thereafter, using an Amsler grid test, and if abnormal or if any visual abnormality is observed, follow the management guidelines in Table 3 (see [4.2 Recommended Dose and Dosage Adjustment](#) and [4.4 Administration](#)). Patients should also be provided instructions to self-administer the Amsler grid test to detect visual abnormalities between physician visits.

## **Ophthalmologic**

Ocular disorders, including central serous retinopathy/retinal pigment epithelial detachment (CSR/RPED) resulting in visual field defect, were reported in patients receiving BALVERSA® in clinical studies.

CSR was observed in 25% of patients treated with BALVERSA® in study BLC2001 at the 8 mg daily dose, with a median time to first onset of 50 days. The most commonly reported CSR events were chorioretinopathy (9%), retinal detachment (6%), and detachment of retinal pigment epithelium (6%). An abnormal Amsler grid test result was identified in the majority (70%) of patients who developed CSR. In clinical studies, CSR was primarily managed by dose modification, and led to dose interruptions and reductions in 9% and 14% of patients, respectively. Three percent of patients discontinued BALVERSA® due to CSR. Ocular disorders other than CSR occurred in 53% of patients, including dry eye (20%) and vision blurred (17%).

Screen patients for eye disorders prior to initiating treatment with BALVERSA® using an Amsler grid test, fundoscopy, visual acuity and, if available, an optical coherence tomography (OCT). Examine patients monthly thereafter, using an Amsler grid test, and if abnormal or if any visual abnormality is observed, follow the management guidelines in Table 3 (see [4.2 Recommended Dose and Dosage Adjustment](#), [4.4 Administration](#) and [7 WARNINGS AND PRECAUTIONS, Monitoring and Laboratory Tests](#)).

To prevent and treat dry eyes, use artificial tear substitutes, hydrating or lubricating eye gels or

ointments frequently, at least every 2 hours during waking hours. Refer severe treatment-related dry eye to an eye care professional (optometrist or ophthalmologist) for evaluation.

Educational materials to assist healthcare professionals with the diagnosis and management of central serous retinopathy (CSR) are available through the manufacturer.

## **Reproductive Health: Female and Male Potential**

- **Fertility**

No human data on the effect of BALVERSA® on fertility are available. Based on findings from animal studies, BALVERSA® may impair fertility of females of reproductive potential (see [16 NON-CLINICAL TOXICOLOGY, Reproductive and Developmental Toxicology](#)).

- **Teratogenic Risk**

BALVERSA® can cause fetal harm when administered to pregnant women (see [7 WARNINGS AND PRECAUTIONS, 7.1 Special Populations](#)). Advise female patients of reproductive potential to use highly effective contraception prior to and during treatment, and for 3 months after the last dose of BALVERSA®. Male patients must use effective contraception (e.g., condom) and not donate or store semen during treatment and for 3 months after the last dose of BALVERSA®.

Pregnancy testing with a highly sensitive assay is recommended for females of reproductive potential prior to initiating BALVERSA®.

### **7.1 Special Populations**

#### **7.1.1 Pregnant Women**

There are no available human data informing the erdafitinib-associated risk. In a study with pregnant rats, erdafitinib was embryo-fetal toxic and teratogenic in the absence of maternal toxicity (see [16 NON-CLINICAL TOXICOLOGY, Reproductive and Developmental Toxicology](#)). Based on findings in animal studies and its mechanism of action, BALVERSA® can cause fetal harm when administered to a pregnant woman.

BALVERSA® should not be used during pregnancy and in women of childbearing potential not using effective contraception. If BALVERSA® is used during pregnancy, or if the patient becomes pregnant while taking BALVERSA®, advise the patient of the potential hazard to the fetus and counsel the patient about her clinical and therapeutic options. Advise patients to contact their healthcare professional if they become pregnant or pregnancy is suspected while being treated with BALVERSA® and up to 3 months afterwards.

#### **7.1.2 Breast-feeding**

There are no data on the presence of erdafitinib in human milk, or the effects of BALVERSA® on the breast-fed infant, or on milk production. Because of the potential for serious adverse reactions from BALVERSA® in breast-fed infants, advise women not to breast-feed during treatment with BALVERSA® and for 3 months following the last dose of BALVERSA®.

### 7.1.3 Pediatrics

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

In repeat-dose toxicology studies in rats and dogs, toxicities in bone and teeth were observed at exposures less than the human exposures at the maximum recommended clinical dose (see [16 NON-CLINICAL TOXICOLOGY, General Toxicology](#)). Chondroid dysplasia/metaplasia were reported in multiple bones in both species, and tooth abnormalities included abnormal/irregular dentin in rats and dogs and discoloration and degeneration of odontoblasts in rats.

### 7.1.4 Geriatrics

Of the 87 patients treated with BALVERSA® in Study BLC2001, 53 (61%) were 65 years of age or older. No overall differences in safety and effectiveness were observed between elderly and younger patients.

## 8 ADVERSE REACTIONS

### 8.1 Adverse Reaction Overview

The safety of BALVERSA® was evaluated in 87 patients from the Phase 2 Study BLC2001. All patients experienced at least one treatment-emergent adverse event (TEAE). The most commonly reported TEAEs ( $\geq 20\%$ ) were hyperphosphatemia, stomatitis, diarrhea, dry mouth, decreased appetite, dysgeusia, dry skin, fatigue, constipation, alopecia, palmar-plantar erythrodysesthesia syndrome, asthenia, nausea, onycholysis, dry eye, and anemia. Serious TEAES occurred in 41% of patients, including eye disorders in 10% of patients.

Grade 3-4 TEAEs were experienced by 67% of patients. The most common Grade 3-4 adverse reactions ( $\geq 2\%$ ) were: stomatitis, nail dystrophy, palmar-plantar erythrodysesthesia syndrome, paronychia, nail disorder, keratitis, onycholysis, and hyperphosphatemia.

Dose interruptions and dose reductions due to TEAEs occurred in 68% and 53% of patients, respectively. The TEAEs most commonly leading to dose modifications (interruptions and/or reductions) included hyperphosphatemia, stomatitis, eye disorders, and palmar-plantar erythrodysesthesia syndrome.

An adverse event with a fatal outcome, acute myocardial infarction, occurred in 1 patient.

### 8.2 Clinical Trial Adverse Reactions

*Clinical trials are conducted under very specific conditions. The adverse reaction rates observed in the clinical trials; therefore, may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse reaction information from clinical trials may be useful in identifying and approximating rates of adverse drug reactions in real-world use.*

The safety data described below reflect exposure to BALVERSA® in Study BLC2001. This was a Phase 2 study that included 87 patients with locally advanced or metastatic urothelial carcinoma, whose tumours had susceptible FGFR2 or FGFR3 gene fusions, or FGFR3 gene

mutations, and who had disease progression during or following at least one line of prior therapy, including within 12 months of neoadjuvant or adjuvant chemotherapy. Patients were treated with BALVERSA® at 8 mg orally once daily, with a dose increase to 9 mg in patients with phosphate concentrations <5.5 mg/dL on Cycle 1 Day 14. Median duration of treatment was 5.3 months (range: 0 to 17 months).

Table 6 presents TEAEs reported in ≥ 10% of patients treated with BALVERSA® at 8 mg once daily in study BLC2001.

**Table 6: Treatment Emergent Adverse Events reported in ≥ 10% (All Grades) treated with BALVERSA®**

MedDRA system organ class (SOC) Adverse reaction	8 mg daily (n = 87)	
	All grades (%)	Grade 3-4 (%)
<b>Gastrointestinal disorders</b>		
Stomatitis	49 (56%)	8 (9%)
Diarrhea	41 (47%)	2 (2%)
Dry mouth	39 (45%)	0
Constipation	24 (28%)	1 (1%)
Nausea	18 (21%)	1 (1%)
Vomiting	11 (13%)	2 (2%)
Dyspepsia	10 (11%)	0
<b>Metabolism and nutrition disorders</b>		
Hyperphosphatemia	66 (76%)	1 (1%)
Decreased appetite	33 (38%)	0
Hyponatremia*	10 (11 %)	9 (10%)
Hypomagnesemia	9 (10%)	0
<b>Skin and subcutaneous tissue disorders</b>		
Dry skin	30 (34%)	0
Alopecia	23 (26%)	0
Palmar-plantar erythrodysesthesia syndrome	23 (26%)	5 (6%)
Onycholysis	17 (19%)	1 (1%)
Nail dystrophy	12 (14%)	4 (5%)
Nail discolouration	10 (11%)	0
<b>General disorders and administration site conditions</b>		
Fatigue	29 (33%)	2 (2%)
Asthenia	20 (23%)	7 (8%)
Pyrexia	12 (14%)	0
Oedema peripheral	9 (10%)	1 (1%)
<b>Eye disorders</b>		
Dry eye	17 (19%)	1 (1%)
Vision blurred	15 (17%)	0
Lacrimation increased	9 (10%)	0
<b>Nervous system disorders</b>		

MedDRA system organ class (SOC) Adverse reaction	8 mg daily (n = 87)	
	All grades (%)	Grade 3-4 (%)
Dysgeusia	32 (37%)	1 (1%)
<b>Infections and infestations</b>		
Paronychia	15 (17%)	3 (3%)
Urinary tract infection	15 (17%)	5 (6%)
Conjunctivitis	10 (11%)	0
<b>Investigations</b>		
Alanine aminotransferase increased	15 (17%)	1 (1%)
Weight decreased	14 (16%)	0
Blood creatinine increased	10 (11%)	0
<b>Respiratory, thoracic and mediastinal disorders</b>		
Oropharyngeal pain	10 (11%)	1 (1%)
<b>Renal and urinary disorders</b>		
Hematuria	10 (11%)	2 (2%)
<b>Musculoskeletal and connective tissue disorders</b>		
Pain in extremity	11 (13%)	0
<b>Blood and lymphatic system disorders</b>		
Anemia	17 (19%)	4 (5%)

Note: \* indicates at least 1 patient had a Grade 4 adverse event

The following adverse reactions (ARs) were reported with the administration of BALVERSA® in BLC2001 and, in some cases, other studies:

### Central serous retinopathy (CSR)

Adverse reactions of CSR have been reported in 25% of patients treated with BALVERSA®. CSR included chorioretinopathy, retinal detachment, detachment of macular retinal pigment epithelium, detachment of retinal pigment epithelium, retinal edema, retinopathy and vitreous detachment (see [7 WARNINGS AND PRECAUTIONS, Ophthalmologic](#)).

### Nail disorders

Nail disorders were reported in 56% of patients and included onycholysis, paronychia, nail dystrophy, nail discoloration, onychalgia, nail ridging, onychoclasia, onychomadesis, nail bed bleeding and nail discomfort. The incidence of nail disorders increased with increased exposure. The median time to onset for any grade nail disorder was 63 days.

### Skin disorders

Skin disorders were reported in 52% of patients and included dry skin and palmar-plantar erythrodysesthesia syndrome, pruritus, skin fissures, eczema, hyperkeratosis, skin exfoliation, skin lesion, xeroderma, skin atrophy, eczema nummular and skin toxicity. The median time to onset for any grade skin disorder was 37 days.



### Hyperphosphatemia and soft tissue mineralization

BALVERSA® can cause hyperphosphatemia leading to soft tissue mineralization, cutaneous calcinosis, non-uremic calciphylaxis and vascular calcification. Increases in phosphate concentrations are an expected laboratory abnormality in patients treated with BALVERSA® (see [10 CLINICAL PHARMACOLOGY](#), [10.2 Pharmacodynamics](#)). Hyperphosphatemia was reported as an adverse event in 76% of patients treated with BALVERSA®. No event of hyperphosphatemia was reported as serious. The median onset time for any grade event of hyperphosphatemia was 20 days. Mean phosphate elevations peaked approximately 6 weeks after the start of BALVERSA® and subsequently decreased to below 4.5 mg/dL by approximately month 5. Cutaneous calcinosis, non-uremic calciphylaxis and vascular calcification have been observed in 0.3% of patients treated with BALVERSA® in pooled clinical trials.

### 8.3 Less Common Clinical Trial Adverse Reactions

The following are clinically significant adverse reactions reported in less than 10% of patients receiving BALVERSA®:

**Skin and subcutaneous tissue disorders:** Nail disorder, Onychalgia, Pruritus, Skin fissures, Nail ridging, Onychoclasia, Onychomadesis, Eczema, Hyperkeratosis, Skin exfoliation, Skin lesion

**Eye disorders:** Conjunctivitis, Chorioretinopathy, Detachment of retinal pigment epithelium, Keratitis, Retinal detachment, Retinal edema, Xerophthalmia, Retinopathy, Ulcerative keratitis, Vitreous detachment

**Respiratory, thoracic and mediastinal disorders:** Nasal dryness

**General disorders and administration site conditions:** Mucosal dryness

### 8.4 Abnormal Laboratory Findings: Hematologic, Clinical Chemistry and Other Quantitative Data

Table 7 presents laboratory abnormality in study BLC2001.

**Table 7: Laboratory Abnormalities Reported in ≥ 10% (All Grades) of patients treated with BALVERSA®**

Laboratory Abnormality	8 mg (N=86 <sup>a</sup> )	
	All Grades (%)	Grade 3-4 (%)
<b>Hematology</b>		
Anemia	35	3
Thrombocytopenia	19	1
Leukopenia	17	0
Neutropenia	10	2
<b>Chemistry</b>		
Hyperphosphatemia <sup>b</sup>	76	1
Creatinine increased	52	5
Alanine aminotransferase increased	41	1
Alkaline phosphatase increased	41	1
Hyponatremia	40	16

Hypoalbuminemia	37	0
Aspartate aminotransferase increased	30	0
Hypomagnesemia	30	1
Hypophosphatemia	24	9
Hypercalcemia	22	3
Hyperkalemia	16	0
Hypoglycemia	10	0

<sup>a</sup> One of the 87 patients had no laboratory tests.

<sup>b</sup> Grade 3 hyperphosphatemia is defined as 9mg/dl<PO<sub>4</sub><10mg/dl; Grade 4 hyperphosphatemia is defined as PO<sub>4</sub>>10mg/dl or significant alteration in baseline renal function or with Grade 3 hypocalcemia.

## 9 DRUG INTERACTIONS

### 9.2 Drug Interactions Overview

Erdafitinib is primarily metabolized in humans by CYP2C9 and CYP3A4 to form the O-demethylated major metabolite. The contribution of CYP2C9 and CYP3A4 in the total clearance of erdafitinib is estimated to be 39% and 20% respectively. Unchanged erdafitinib was the major drug-related moiety in plasma, there were no circulating metabolites.

#### CYP2C9 or CYP3A4 inhibitors

Co-administration of moderate CYP2C9 or strong CYP3A4 inhibitors is predicted to increase the steady-state exposure of erdafitinib. Co-administration of BALVERSA<sup>®</sup> with moderate CYP2C9 or strong CYP3A4 inhibitors should be avoided.

#### CYP3A4 or CYP2C9 inducers

Co-administration of strong CYP2C9 or CYP3A4 inducers on the pharmacokinetics of erdafitinib have not been evaluated *in vivo*. Co-administration of strong CYP3A4 or CYP2C9 inducers are predicted to decrease the steady-state exposure of erdafitinib. Avoid co-administration of strong inducers of CYP2C9 or CYP3A4 with BALVERSA<sup>®</sup> and consider alternative agents with no or minimal enzyme induction potential.

#### Acid lowering agents

Erdafitinib exhibits adequate solubility across the pH range of 1 to 7.4. Acid lowering agents (e.g., antacids, H<sub>2</sub>-antagonists, or proton pump inhibitors) are not expected to affect the bioavailability of erdafitinib.

#### Drugs affecting transporters

Erdafitinib is a substrate for P-gp but not for BCRP, OATP1B1, and OATP1B3. P-gp inhibitors are not expected to affect the PK of erdafitinib in a clinically relevant manner.

#### Sevelamer

No clinically meaningful differences in the pharmacokinetics of erdafitinib were observed in patients taking sevelamer (non-calcium, phosphate scavenger).

#### Drug metabolizing enzymes

Erdafitinib is a time dependent inhibitor and inducer of CYP3A4 *in vitro*. The effect of erdafitinib on a sensitive CYP3A4 substrate is unknown. Erdafitinib is not an inhibitor of other major CYP isozymes at clinically relevant concentrations.

#### Drug transporters

Erdafitinib is an inhibitor of OCT2 and P-Glycoprotein (P-gp) *in vitro*. Erdafitinib does not inhibit BCRP, OATP1B1, OATP1B3, OAT1, OAT3, OCT1, MATE1 or MATE-2K at clinically relevant concentrations.

### 9.4 Drug-Drug Interactions

The drugs listed in Table 8 below are based on either drug interaction studies, or potential interactions due to the expected magnitude and seriousness of the interaction.

**Table 8: Established or Potential Drug-Drug Interactions**

Drug name	Source of Evidence	Effect	Clinical comment
<b>Effect of moderate CYP2C9 or strong CYP3A4 inhibitors on erdafitinib such as:</b>			
Fluconazole (moderate CYP2C9 and CYP3A4 inhibitor)	CT	↑ erdafitinib exposure <ul style="list-style-type: none"> <li>• mean ratio (90% CI) for <math>C_{max}</math> was 121% (99.9, 147)</li> <li>• mean ratio (90% CI) for <math>AUC_{\infty}</math> was 148% (120, 182)</li> </ul> May lead to increased drug-related toxicity	Co-administration of BALVERSA® with moderate CYP2C9 or strong CYP3A4 inhibitors should be avoided. If co-administration of a moderate CYP2C9 or strong CYP3A4 inhibitor is unavoidable, monitor closely for adverse reactions, and reduce the BALVERSA® dose as recommended in Table 4 (see <a href="#">4.2 Recommended Dose and Dosage Adjustment</a> and <a href="#">4.4 Administration</a> ). If the moderate CYP2C9 or strong CYP3A4 inhibitor is discontinued, the BALVERSA® dose may be adjusted, in the absence of drug-related toxicity.
Itraconazole (strong CYP3A4 inhibitor and P-gp inhibitor)	CT	↑ erdafitinib exposure <ul style="list-style-type: none"> <li>• mean ratio (90% CI) for <math>C_{max}</math> was 105% (86.7, 127)</li> <li>• mean ratio (90% CI) for <math>AUC_{\infty}</math> was 134% (109, 164)</li> </ul> May lead to increased drug-related toxicity	

Drug name	Source of Evidence	Effect	Clinical comment
<b>Effect of CYP2C9 or CYP3A4 inducers on erdafitinib such as:</b>			
Rifampin (strong CYP3A4 inducer and moderate CYP2C9 inducer)	T	↓ erdafitinib exposure May lead to decreased activity	Avoid co-administration and consider alternative agents with no or minimal enzyme induction potential. If BALVERSA® is co-administered with a moderate CYP2C9 or CYP3A4 inducer, the dose might be cautiously increased up to 9 mg based on clinical monitoring for adverse reactions and serum phosphate. If the inducer is discontinued, the BALVERSA® dose may be adjusted as tolerated.
<b>Effect of erdafitinib on substrates of CYP3A4 such as:</b>			
Alprazolam, Cyclosporine, Dihydroergotamine	T	CYP3A4 substrate plasma concentration may be altered.	Avoid co-administration of BALVERSA® with sensitive substrates of CYP3A4 with narrow therapeutic indices.
<b>Effect of erdafitinib on substrates of OCT2 such as:</b>			
metformin	T	OCT2 substrate plasma concentration may be altered.	Consider alternative therapies that are not OCT2 substrates.
<b>Effect of erdafitinib on substrates of P-Glycoprotein(P-gp) such as:</b>			
Digoxin	T	P-gp substrates systemic exposure may be increased.	Oral narrow therapeutic index P-gp substrates should be taken at least 6 hours before or after erdafitinib to minimize the potential for interactions.

Legend: CT = Clinical Trial; T = Theoretical (simulation)

## 9.5 Drug-Food Interactions

BALVERSA® can be administered with or without food (see [10 CLINICAL PHARMACOLOGY, 10.3 Pharmacokinetics](#)).

## 9.6 Drug-Herb Interactions

Drug-herb interactions have not been studied (see [9.4 Drug-Drug Interactions](#)). Avoid concomitant use of St. John's Wort, as this herb is a strong inducer of CYP3A.

## 9.7 Drug-Laboratory Test Interactions

Interactions with laboratory test have not been established.

# 10 CLINICAL PHARMACOLOGY

## 10.1 Mechanism of Action

Erdafitinib is an oral pan-fibroblast growth factor receptor (FGFR) tyrosine kinase inhibitor that binds to and inhibits all FGFR family members, FGFR 1, 2, 3 and 4. Erdafitinib inhibited FGFR phosphorylation and signaling and decreased cell viability in cancer cell lines expressing activating FGFR genetic alterations, including point mutations, amplifications, and fusions. In FGFR pathway activated cancer cell lines, the concentration required for 50% tumor growth inhibition (IC<sub>50</sub>) is in the low nanomolar range 0.1 to 129.2 nM.

Erdafitinib demonstrated antitumor activity in FGFR-driven cell lines and xenograft models derived from multiple tumor types, including bladder cancer.

## 10.2 Pharmacodynamics

### Cardiac electrophysiology

Based on evaluation of QTc interval in an open-label, dose escalation and dose expansion study in 187 patients with cancer, erdafitinib had no large effect (i.e., >20 ms) on the QTc interval.

*In vitro*, erdafitinib was demonstrated to be an intrinsic human ether-a-go-go-related gene (hERG) blocker with an IC<sub>50</sub> of 183 ng/mL, and to have a potential to induce arrhythmia in rabbit ventricular wedge preparations starting at 44.7 ng/mL. In animal studies, erdafitinib increased QTc intervals after single intravenous dosing in anesthetized dogs and guinea pigs and after single oral dosing in conscious dogs. Idioventricular rhythm, ventricular escape rhythm, and decreased heart rate were also observed in conscious dogs. The unbound C<sub>max</sub> values for erdafitinib after single doses in animals were at least 2.4 times higher than the human unbound exposures at the maximum recommended clinical dose.

### Serum phosphate

A population pharmacokinetic/pharmacodynamic (Pop PK/PD) model demonstrated that erdafitinib increased serum phosphate concentration, a pharmacodynamic biomarker of FGFR inhibition. Continuous daily dosing of BALVERSA® within the recommended dose range should be used to achieve target serum phosphate concentrations of 5.5 – 7.0 mg/dL, as assessed between 14 and 21 days after initiation of therapy (see [4 DOSAGE AND ADMINISTRATION](#), [4.2 Recommended Dose and Dosage Adjustment](#)).

### 10.3 Pharmacokinetics

**Table 9: Arithmetic Mean (SD) Pharmacokinetic Parameters of Erdafitinib at Steady-State Following Administration of 8 mg QD BALVERSA® in Patients with Cancer**

Moiety	C <sub>max</sub> (µg/mL)	AUC <sub>tau</sub> (µg.h/mL)	t <sub>max</sub> (h) <sup>a</sup>	Peak-to-trough ratio	Vd/F (L)	CL/F (L/h)	Effective t <sub>1/2</sub> (h)
Erdafitinib	1.4 (0.71)	29 (18)	2.5 (2-6)	1.47 (0.34)	28.8	0.362	58.9

<sup>a</sup> Median and range for t<sub>max</sub>, under fasting conditions

Following single and repeat once daily dosing, erdafitinib exposure (maximum observed plasma concentration [C<sub>max</sub>] and area under the plasma concentration time curve [AUC]) increased in a dose-proportional manner across the dose range of 0.5 to 12 mg. Steady state was achieved after 2 weeks with once daily dosing and the mean accumulation ratio was 4-fold relative to a single dose.

#### Food Effect

Administration of erdafitinib to healthy subjects under fasting conditions and with a high-fat meal did not result in clinically relevant changes in C<sub>max</sub> and AUC. Median time to reach t<sub>max</sub> was delayed about 1.5 hours with food.

#### Absorption

After single dose oral administration, median time to achieve peak plasma concentration (t<sub>max</sub>) was 2.5 hours (range: 2 to 6 hours).

#### Distribution

The mean apparent volume of distribution of erdafitinib in subjects with cancer was 28.8 L, demonstrating limited distribution outside the extravascular space. In patients with cancer, erdafitinib was 99.76% bound to human plasma proteins, preferentially to α1-acid glycoprotein AGP.

#### Metabolism

Metabolism is the main route of elimination for erdafitinib. Erdafitinib is primarily metabolized in human by CYP2C9 and CYP3A4 to form the O-demethylated major metabolite. The contribution of CYP2C9 and CYP3A4 in the total clearance of erdafitinib is estimated to be 39% and 20% respectively. Unchanged erdafitinib was the major drug-related moiety in plasma, there were no circulating metabolites.

#### Elimination

Mean total apparent clearance (CL/F) of erdafitinib was 0.362 L/h in patients. The mean effective half-life of erdafitinib in patients was 58.9 hours.

Up to 16 days following a single oral administration of radiolabeled [14C]-erdafitinib, 69% of the dose was recovered in feces (14-21% as unchanged erdafitinib) and 19% in urine (13% as

unchanged erdafitinib).

### Special Populations and Conditions

No clinically meaningful differences in the pharmacokinetics of erdafitinib were observed based on age (21 to 88 years), sex, race (Hispanic or Asian), body weight (36 to 132 kg), mild or moderate renal impairment and mild or moderate hepatic impairment.

- **Pediatrics (<18 years of age)**

Pharmacokinetics of erdafitinib has not been studied in pediatric patients.

- **Geriatrics (≥65 years of age)**

In the population PK analysis, no statistically significant effect of age (range 21 to 88 years) on key PK parameters was evident.

- **Sex**

In the population PK analysis, no clinically meaningful differences in the pharmacokinetics of erdafitinib were observed based on sex.

- **Genetic Polymorphism**

  - CYP2C9 poor metabolizer

  - Simulation suggested that the exposure of erdafitinib is predicted to increase in subjects of CYP2C9 \*3/\*3 genotype. Patients known to have this genotype should be monitored for increased adverse reactions.

- **Ethnic Origin**

The potential effects of race/ethnicity on the PK of erdafitinib were investigated as part of the population PK analysis and in clinical studies. In the population PK analysis dataset, most erdafitinib-treated subjects were White (Caucasian, Hispanic or Latino, 79.4%). Hispanic accounted for 9.9%, and Asian 10.2%. No statistically significant association between race/ethnicity (Hispanic, Asian) and PK parameters of erdafitinib was observed.

- **Hepatic Insufficiency**

Based on PK analysis, no clinically meaningful differences in the pharmacokinetics of erdafitinib were observed in subjects with mild (Child-Pugh A) or moderate (Child-Pugh B) hepatic impairment and subjects with normal hepatic function. Limited data are available in patients with severe (Child-Pugh C) hepatic impairment; therefore, BALVERSA® should be administered with caution when used in these patients. Monitor closely for adverse reactions and reduce the BALVERSA® dose as recommended in Table 4 (see [4 DOSAGE AND ADMINISTRATION, 4.4 Administration](#)).

- **Renal Insufficiency**

Based on population PK analysis, no clinically meaningful differences in the pharmacokinetics of erdafitinib were observed between subjects with normal renal function (eGFR-MDRD [estimated glomerular filtration rate modification of diet in renal disease] ≥90

mL/min/1.73 m<sup>2</sup>), and subjects with mild (eGFR-MDRD 60 to 89 mL/min/1.73 m<sup>2</sup>) and moderate renal impairment (eGFR-MDRD 30 to 59 mL/min/1.73 m<sup>2</sup>). No data are available in patients with severe renal impairment; therefore BALVERSA® should be administered with caution in these patients. Monitor closely for adverse reactions and reduce the BALVERSA® dose as recommended in Table 4 ([4 DOSAGE AND ADMINISTRATION, 4.4 Administration](#)).

- **Obesity**

In population PK analysis, no clinically meaningful differences in the pharmacokinetics of erdafitinib were observed based on body weight (range 36 to 132 kg).

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

Store at room temperature (15°C - 30°C).  
Keep out of sight and reach of children.

## **12 SPECIAL HANDLING INSTRUCTIONS**

There are no special handling instructions.



## PART II: SCIENTIFIC INFORMATION

### 13 PHARMACEUTICAL INFORMATION

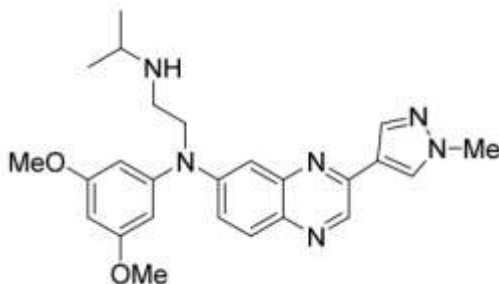
#### Drug Substance

Proper/Common name: erdafitinib

Chemical name: N-(3,5-dimethoxyphenyl)-N'-(1-methylethyl)-N-[3-(1-methyl-1H-pyrazol-4-yl)quinoxalin-6-yl]ethane-1,2-diamine

Molecular formula and molecular mass: C<sub>25</sub>H<sub>30</sub>N<sub>6</sub>O<sub>2</sub>; 446.56

Structural formula:



Physicochemical properties: The drug substance is a yellow powder. It is in a crystalline form and does not exhibit polymorphism. The drug substance is practically insoluble, or insoluble to freely soluble in organic solvents and slightly soluble to practically insoluble, or insoluble in aqueous media over the physiological pH range. The drug substance has 2 dissociation constants, a pK<sub>a1</sub> of 9.2 (basic amine moiety) and a pK<sub>a2</sub> of 1.9 (basic pyrazole moiety).

### 14 CLINICAL TRIALS

#### 14.1 Clinical Trials by Indication

##### Locally Advanced or Metastatic Urothelial Carcinoma with select FGFR Genetic Alterations

Study BLC2001 was a multicenter, open-label Phase 2 study designed to evaluate the efficacy and safety of BALVERSA® in patients with locally advanced or metastatic urothelial carcinoma. All patients were enrolled based on investigator assessment of measurable disease and were required to have tumor tissues with at least 1 of the following FGFR3 gene mutations: R248C, S249C, G370C, Y373C or 1 of the following FGFR gene fusions: FGFR3-TACC3, FGFR3-BAIAP2L1, FGFR2-BICC1, FGFR2-CASP7, as determined by a clinical trial assay performed at a central laboratory.

The efficacy analysis was based on 87 patients whose disease progressed on or after at least one prior chemotherapy. Patients received a starting dose of BALVERSA® at 8 mg once daily with a dose increase to 9 mg once daily in patients whose serum phosphate levels, measured between days 14 and 17, were below the target of 5.5 mg/dL. This dose increase occurred in 41% of patients. BALVERSA® was administered until disease progression or unacceptable toxicity.

The summary of key patient demographics and baseline disease characteristics is provided in Table 10 below.

**Table 10: Key Demographics and Baseline Disease Characteristics: Chemo-relapsed/refractory urothelial carcinoma patients in the 8-mg daily regimen in BLC2001**

<b>Patient Demographics and Baseline Disease Characteristics</b>	<b>BALVERSA®</b>
N	87
<b>Age (years)</b>	
Mean	65
Median (range)	67 (36, 87)
< 65	34 (39.1%)
>= 65	53 (60.9%)
<b>Sex</b>	
Female	18 (20.7%)
Male	69 (79.3%)
<b>Race</b>	
White	64 (73.6%)
Non-white	7 (8.0%)
Unknown/Not reported	16(18.4%)
<b>ECOG Performance Status Score</b>	
0	44 (50.6%)
1	36 (41.4%)
2	7 (8.0%)
<b>Hemoglobin Level</b>	
< 10 g/dL	14 (16.1%)
>= 10 g/dL	73 (83.9%)
<b>Creatinine Clearance (mL/min)</b>	
< 60	41 (47.1%)
>= 60	46 (52.9%)
<b>Primary Tumour Location</b>	
Upper tract (renal pelvis, ureter)	22 (25.3%)
Lower tract (bladder, urethra, prostatic urethra)	65 (74.7%)
<b>Visceral Metastases (lung, liver and bone)</b>	
Present	69 (79.3%)
Liver	18 (20.7%)
Lung	49 (56.3%)
Bone	18 (20.7%)
Absent	18 (20.7%)
<b>Number of Lines of Prior Systemic Therapies*</b>	
1	44 (50.6%)
2	29 (33.3%)
>=3	14 (16.0%)

Note: \* Prior therapies include gemcitabine/gemcitabine HCl, cisplatin, carboplatin, anti-PD-(L)1's.

## Study Results

The major efficacy outcome measures were objective response rate (ORR) and duration of response (DoR), as determined by the investigator using Response Evaluation Criteria in Solid Tumors (RECIST) v1.1. Efficacy outcomes were also assessed by independent radiologic review committee (IRRC).

The median duration of therapy was 5.3 months, and the median duration of efficacy follow-up was 11.3 months.

The reported efficacy results are summarized in Table 11 and Table 12 below.

**Table 11: Efficacy results for study BLC2001**

Endpoint	Investigator assessment
	N=87
Objective response rate (ORR) (%)	40.2
95% CI (%)	(29.9, 50.5)
Complete response (CR) (%)	3.4
Partial response (PR) (%)	36.8
Median Duration of Response (months)	5.6
95% CI (months)	(4.2, 7.0)

ORR = CR+PR

CI = Confidence Interval

IRRC assessment was supportive, with an ORR of 32.2% (95% CI: 22.4, 42.0), including CRs in 2.3% of patients. IRRC-assessed DoR was determined to be 5.4 months (95% CI: 4.2, 6.9).

**Table 12: Efficacy results by FGFR Genetic Alteration**

	Investigator assessment
FGFR3 mutation <sup>a</sup> (N=64) <b>ORR (95% CI)</b>	48.4% (36.2, 60.7)
FGFR3 fusion <sup>b</sup> (N=18) <b>ORR (95% CI)</b>	22.2% (3, 41.4)
FGFR2 fusion <sup>c</sup> (N=6) <b>ORR (95% CI)</b>	0

<sup>a</sup> FGFR3-S249C, FGFR3-Y373C, FGFR3-R248C, FGFR3-G370C

<sup>b</sup> FGFR3-TACC3\_V1, FGFR3-TACC3\_V3, FGFR3-BAIAP2L1, FGFR2-CASP7/FGFR3\_TACC3\_V3

<sup>c</sup> FGFR2-CASP7, FGFR2-BICC1, FGFR2-CASP7/FGFR3\_TACC3\_V3

## 15 MICROBIOLOGY

No microbiological information is required for this drug product.

## 16 NON-CLINICAL TOXICOLOGY

### General Toxicology

Repeated-dose toxicity studies were conducted in rats and dogs for up to 3 months. The highest doses tested in rats (32 mg/kg, intermittent dosing schedule 7 days on/7 days off) and dogs (1.5 mg/kg, intermittent dosing schedule 7 days on/7 days off) were approximately 1.4 and 1.3 times the maximum recommended clinical dose based on unbound AUC comparisons, respectively. In both species, disturbance of phosphate homeostasis, characterized by elevated serum concentrations of mainly phosphate, FGF-23 and 1,25 dihydroxyvitamin D3 were observed. Chondroid dysplasia/metaplasia and soft tissue mineralization, associated with hyperphosphatemia, were observed as primary drug-related toxicities in rats and dogs.

Chondroid dysplasia/metaplasia was evident in growth plates or synchondroses of multiple bones (sternum, femur) causing clinical signs of limping and sternum/tail deformations (rats). Soft tissue mineralizations were observed in multiple organs and tissues, including heart, aorta, and stomach. The death of a male rat at 32 mg/kg (intermittent dosing schedule 7 days on/7 days off) was due to aorta and myocardial mineralizations.

Tooth abnormalities were observed, including abnormal/irregular dentin in rats and dogs and discoloration and degeneration of odontoblasts in rats. Eye-related findings notably atrophy (thinning) of the corneal epithelium (rats) and lacrimal gland atrophy (rats and dogs) were seen. Additional atrophy of glandular tissues (mammary, salivary, and Harderian gland) and epithelial structures (tongue and oral mucosa) and changes in haircoat (piloerection, rough, thin or local hair loss) and nails (malformed, discolored or broken) were observed in rats or dogs.

Soft tissue mineralizations (except for the aorta mineralization in dogs) and chondroid dysplasia in rats and dogs and mammary gland atrophy in rats were partially to fully recovered at the end of a 4-week drug-free recovery period. In a mechanistic study, when rats were given a diet supplemented with the phosphate scavenger sevelamer, the soft tissue mineralizations were reduced.

In a 1-month rat oral toxicity study that included assessment of neurofunctional integrity by the modified Irwin's test after single dose, erdafitinib induced minimal neurofunctional aberrations (impaired wire maneuvers and flaccid body tone) at  $\geq 8$  mg/kg. At the dose level of 8 mg/kg, the  $C_{max}$  of erdafitinib was less than the human exposures at the recommended clinical dose.

### **Carcinogenicity**

Long-term animal studies have not been conducted to evaluate the carcinogenic potential of erdafitinib.

### **Genotoxicity**

Erdafitinib did not induce mutations in the bacterial reverse mutation (Ames) assay and was not genotoxic in either in vitro micronucleus or the in vivo rat bone marrow micronucleus assay.

### **Reproductive and Developmental Toxicology**

#### **Fertility**

Dedicated animal fertility studies have not been conducted with erdafitinib. However, in the 3-month repeat-dose rat toxicity study, erdafitinib showed effects on female reproductive organs (necrosis of the corpora lutea) in rats at an exposure approximating 7.3 times the unbound AUC in patients at the maximum recommended clinical dose.

**Embryo-fetal toxicity**

Erdafitinib was teratogenic and embryo-fetal toxic in rats, in the absence of maternal toxicity. Pregnant rats were administered erdafitinib at oral doses of 1, 4, or 8 mg/kg/day during the period of organogenesis. No maternal toxicity was observed, but a significant decrease in fetal survival and reduced fetal weight were observed at 8 mg/kg/day. Doses  $\geq$  4 mg/kg/day were associated with increased fetal malformations and variations, including limb/paw defects (ectrodactyly, absent or misshapen long bones), malformed thoracic and lumbar vertebrae, great blood vessel abnormalities (high arched/retroesophageal aorta, retroesophageal subclavian artery), and retarded ossifications. At 4 mg/kg/day and 8 mg/kg/day in rats, the maternal systemic exposures were less than human exposures at the recommended clinical dose based on unbound AUC.

## PATIENT MEDICATION INFORMATION

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

#### Pr **BALVERSA**<sup>®</sup> erdafitinib tablets

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

#### What is **BALVERSA**<sup>®</sup> used for?

For the following indication **BALVERSA**<sup>®</sup> has been approved *with conditions* (NOC/c). This means it has passed Health Canada's review and can be bought and sold in Canada, but the manufacturer has agreed to complete more studies to make sure the drug works the way it should. For more information, talk to your healthcare professional.

**BALVERSA**<sup>®</sup> is used to treat a type of bladder cancer called urothelial carcinoma (cancer in the bladder and urinary tract organs). It is used in adults:

- whose cancer has spread to other parts of the body or cannot be removed by surgery; and
- whose cancer was previously treated with chemotherapy, which did not work or is no longer working; and
- whose cancer has changes in certain genes called FGFR (known as fibroblast growth factor receptors).

#### What is a Notice of Compliance with Conditions (NOC/c)?

A Notice of Compliance with Conditions (NOC/c) is a type of approval to sell a drug in Canada.

Health Canada only gives an NOC/c to a drug that treats, prevents, or helps identify a serious or life-threatening illness. The drug must show promising proof that it works well, is of high quality, and is reasonably safe. Also, the drug must either respond to a serious medical need in Canada or be much safer than existing treatments.

Drug makers must agree in writing to clearly state on the label that the drug was given an NOC/c, to complete more testing to make sure the drug works the way it should, to actively monitor the drug's performance after it has been sold, and to report their findings to Health Canada.

#### How does **BALVERSA**<sup>®</sup> work?

Fibroblast growth factor receptors (FGFRs) are proteins found on cells that help them grow and divide. Some people with bladder cancer have FGFRs that are abnormally active. **BALVERSA**<sup>®</sup> works by blocking the activity of FGFRs to slow down the growth and spread of bladder cancer cells.

#### What are the ingredients in **BALVERSA**<sup>®</sup>?

Medicinal ingredients: erdafitinib

Non-medicinal ingredients: croscarmellose sodium, ferrousferic oxide/iron oxide black (for the brown tablets only), glycerol monocaprylocaprate Type I, iron oxide red (for the orange and brown tablets only), iron oxide yellow, magnesium stearate (from vegetable source), mannitol, meglumine, microcrystalline cellulose, polyvinyl alcohol partially hydrolyzed, sodium lauryl sulfate, talc, titanium dioxide

**BALVERSA® comes in the following dosage forms:**

Tablets (film-coated): 3 mg (yellow), 4 mg (orange) and 5 mg (brown)

**Do not use BALVERSA® if:**

- you are allergic to erdafitinib or to any other ingredient in the medicine.

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

- have vision or eye problems.
- have or have had kidney or liver problems.

**Other warnings you should know about:**

**General:**

Only a doctor who has experience treating cancer should treat you with this drug. Before prescribing you BALVERSA®, your doctor will perform a test. This test will confirm that your disease is suitable for treatment with this drug.

**Eye problems:**

Eye problems are common with BALVERSA® and can be serious. Eye problems include dry eyes, disorders of the cornea (front part of eye) and disorders of the retina (an internal part of the eye). Tell your healthcare professional right away if you develop any eye problem or if your vision changes while taking BALVERSA®. Use a lubricating eye ointment or a tear replacement therapy at least every 2 hours while awake to prevent and treat dry eyes.

**High phosphate levels in the blood (hyperphosphatemia):**

Hyperphosphatemia is common with BALVERSA® but also can be serious. Adhere to a low phosphate diet. Ask your doctor for dietary advice. Avoid the use of drugs that can increase the levels of phosphate in your blood. This includes potassium phosphate supplements, vitamin D supplements, antacids, and phosphate-containing enemas and laxatives.

**Stomatitis (mouth sores, inflammation of the mouth):**

Stomatitis is common with BALVERSA®.

**Pregnancy, birth control and breastfeeding – information for women and men:**

**Pregnancy – information for women**

- A pregnancy test should be done before you start to take BALVERSA®.

- Avoid becoming pregnant while taking BALVERSA®. It may harm your unborn child or make you lose the pregnancy.
- If you become pregnant while taking BALVERSA®, tell your doctor right away.
- If you plan to get pregnant after taking your last dose of BALVERSA®, ask your doctor for advice. This is because BALVERSA® may remain in your body after the last dose.

#### **Pregnancy – information for men**

- Avoid fathering a child while taking BALVERSA®. It may harm your unborn child.
- If your partner becomes pregnant while you are taking BALVERSA®, tell your partner's doctor right away.

#### **Birth Control – information for women and men**

- Use an effective method of birth control while taking BALVERSA®.
- Talk to your doctor about birth control methods that may be right for you.
- Men taking BALVERSA® must use a condom. Do **NOT** donate or store semen while taking it. This is because the drug may pass into the sperm.
- **After you finish treatment with BALVERSA®:**
  - **Women who are able to become pregnant:** Keep using birth control for 3 months after stopping BALVERSA®.
  - **Males with female partners who are pregnant or able to become pregnant:** Keep using birth control and do **NOT** donate or store semen for 3 months after stopping BALVERSA®.

#### **Breastfeeding – information for women**

- BALVERSA® may pass into breast milk. Do **NOT** breast-feed while you are taking it and for 3 months after taking your last dose of BALVERSA®. Talk to your doctor about the best way to feed your baby.

#### **Fertility – information for women and men:**

BALVERSA® may affect your fertility. Talk to your doctor if this is a concern for you.

#### **Children and adolescents:**

BALVERSA® is **NOT** recommended for use in patients under the age of 18 years.

#### **Driving and using machines:**

Eye problems are common in patients taking BALVERSA®. Give yourself time after taking BALVERSA® to see how you feel before driving a vehicle or using machinery. If you develop symptoms affecting your vision, do **NOT** drive or use machines as long as these last.

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

#### **The following may interact with BALVERSA®:**

- clarithromycin, ciprofloxacin, rifampin - used to treat bacterial infections
- itraconazole, fluconazole, miconazole - used to treat fungal infections
- atazanavir, darunavir/ritonavir, cobicistat - used to treat viral infections, primarily HIV
- enzalutamide, apalutamide – used to treat prostate cancer
- mitotane – used to treat adrenal cancer



- carbamazepine and phenytoin - used to prevent seizures or to treat epilepsy or to treat a painful condition of the face called trigeminal neuralgia
- St. John's Wort (*Hypericum perforatum*) - an herbal medicine used for depression
- digoxin - used for heart problems
- metformin – used to treat diabetes
- alprazolam – used to treat anxiety
- cyclosporine – used to prevent organ transplant rejection
- dihydroergotamine – used to treat migraine and headaches

#### How to take BALVERSA®:

- Take BALVERSA® exactly as your healthcare professional has told you. Check with your doctor, pharmacist or nurse if you are not sure.
- Your doctor will tell you how much BALVERSA® to take. It is important that you take the recommended daily dose.
- Do **NOT** change your dose or stop taking BALVERSA® without first talking with your doctor.
- Take BALVERSA® with or without food at about the same time each day.
- If you take digoxin, your doctor may adjust the time that you take your medications.
- Swallow BALVERSA® tablets whole.
- If you vomit after taking your dose, do **NOT** take another one. Take your next dose the next day at the normal time.

#### Usual dose:

##### Usual adult starting dose:

**8 mg:** Take two 4 mg tablets by mouth once a day.

Your doctor may adjust your dose, temporarily stop or completely stop your treatment. This may happen:

- based on your blood test results.
- if you are taking medicines that may interact with BALVERSA®.
- if you have certain side effects while taking BALVERSA®.

##### Increased adult dose:

**9 mg:** Take three 3 mg tablets by mouth once a day.

##### Reduced adult dose:

**6 mg:** Take two 3 mg tablets by mouth once a day.

**5 mg:** Take one 5 mg tablet by mouth once a day.

**4 mg:** Take one 4 mg tablet by mouth once a day.

#### Overdose:

If you take too much BALVERSA®, call your healthcare professional or go to the nearest hospital emergency room right away.

#### Missed dose:

- If you are late in taking BALVERSA®, take it as soon as you remember if it is on the same day. Continue with taking the next scheduled dose the next day at the normal

time.

- If you miss a day's dose, do NOT take a double dose to make up for the missed dose. Instead, wait until it is time and take your regular dose at the normal time.

### **What are possible side effects from using BALVERSA®?**

These are not all the possible side effects you may feel when taking BALVERSA®. If you experience any side effects not listed here, contact your healthcare professional.

Side effects may include:

- decreased appetite
- mouth sores
- diarrhea
- constipation
- nausea
- vomiting
- stomach (abdominal) pain
- dry mouth
- dry skin
- hair loss
- nasal dryness
- vagina dryness
- feeling tired
- feeling weak
- fever
- muscle pain
- change in sense of taste
- weight loss
- sore throat

BALVERSA® can cause abnormal blood test results including liver and kidney blood tests. It may also affect the phosphate levels in your blood. Your healthcare professional will test your blood:

- before you start on BALVERSA®,
- about 2 weeks after starting treatment, and
- once a month thereafter during treatment with BALVERSA®.

Your doctor will interpret the results and tell you if your test results are abnormal. Your doctor may tell you to temporarily or completely stop taking BALVERSA®. Your doctor may also adjust your dose. If you develop increased levels of phosphate in your blood, your doctor may give you medicine to manage this side effect.

BALVERSA® can cause eye problems. Your healthcare professional will send you to see an eye specialist to examine and monitor your eyes:

- before you start on BALVERSA®, and
- if you develop eye or vision problems while taking BALVERSA®.

Your healthcare professional will check your eyes monthly for vision problems using an Amsler grid test. They may also provide you with instructions on using the grid. This is so you can monitor your vision at home between visits. Your doctor may tell you to temporarily or

completely stop taking BALVERSA®. Your doctor may also adjust your dose to manage this side effect.

<b>Serious side effects and what to do about them</b>			
<b>Symptom / effect</b>	<b>Talk to your healthcare professional</b>		<b>Stop taking drug and get immediate medical help</b>
	<b>Only if severe</b>	<b>In all cases</b>	
<b>VERY COMMON</b>			
<b>Nail or skin problems:</b> nails separating from the bed, infected skin around the nail, poor nail formation, discolored nails		✓	
<b>Palmar-Plantar erythrodysesthesia syndrome (hand-foot syndrome):</b> swelling, peeling or tenderness, mainly on the hands or feet		✓	
<b>Eye (vision) problems:</b> dry eyes, inflamed eyes, watering eyes, disorders of the retina (an internal part of the eye)		✓	
<b>Urinary tract infection:</b> burning feeling when you urinate		✓	
<b>Hematuria:</b> blood in urine		✓	
<b>Anemia</b> (low red blood cells): feeling tired, looking pale and you may feel your heart pumping		✓	
<b>COMMON</b>			
<b>Nail or skin problems:</b> nail pain, itching, crack in the skin, ridging of nails, breaking of the nails, thickened skin, flaky skin, abnormal growth or appearance on the skin, very dry skin, bleeding under the nail, thinning of the skin, skin reaction, nail discomfort		✓	
<b>Eczema:</b> itchy skin rash		✓	
<b>Eczema Nummular:</b> itchy skin rash with round spots		✓	
<b>Eye (vision) problems:</b> blurred vision, inflamed cornea (front part of the eye), vision loss (detached retina), swelling of the retina, disease of the retina, ulcers on		✓	

Serious side effects and what to do about them			
Symptom / effect	Talk to your healthcare professional		Stop taking drug and get immediate medical help
	Only if severe	In all cases	
the cornea (front part of the eye), a gel-like substance separates from the retina			

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

<p><b>Reporting Side Effects</b></p> <p>You can report any suspected side effects associated with the use of health products to Health Canada by:</p> <ul style="list-style-type: none"> <li>• Visiting the Web page on Adverse Reaction Reporting (<a href="http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php">http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php</a>) for information on how to report online, by mail or by fax; or</li> <li>• Calling toll-free at 1-866-234-2345.</li> </ul> <p><i>NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.</i></p>
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**Storage:**

- Store BALVERSA® at room temperature between 15°C - 30°C.
- Do **NOT** throw away any medicines via wastewater or household waste. Ask your healthcare provider or pharmacist about the right way to throw away outdated or unused BALVERSA®. These measures will help protect the environment.
- **Keep out of reach and sight of children.**

**If you want more information about BALVERSA®:**

- Talk to your healthcare professional
- Find the full product monograph that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the Health Canada website (<http://hc-sc.gc.ca/index-eng.php>); the manufacturer’s website ([www.janssen.com/canada](http://www.janssen.com/canada)), or by calling Janssen Inc. at: 1-800-567-3331 or 1-800-387-8781.

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