

## HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all information needed to use COPIKTRA safely and effectively. See full prescribing information for COPIKTRA.

COPIKTRA® (duvelisib), capsules for oral use  
Initial U.S. Approval: 2018

### WARNING: FATAL AND SERIOUS TOXICITIES: INFECTIONS, DIARRHEA OR COLITIS, CUTANEOUS REACTIONS, and PNEUMONITIS

See full prescribing information for complete boxed warning

- Fatal and/or serious infections occurred in 31% of COPIKTRA-treated patients. Monitor for signs and symptoms of infection. Withhold COPIKTRA if infection is suspected. (5.1)
- Fatal and/or serious diarrhea or colitis occurred in 18% of COPIKTRA-treated patients. Monitor for the development of severe diarrhea or colitis. Withhold COPIKTRA. (5.2)
- Fatal and/or serious cutaneous reactions occurred in 5% of COPIKTRA-treated patients. Withhold COPIKTRA. (5.3)
- Fatal and/or serious pneumonitis occurred in 5% of COPIKTRA-treated patients. Monitor for pulmonary symptoms and interstitial infiltrates. Withhold COPIKTRA. (5.4)

### INDICATIONS AND USAGE

COPIKTRA is a kinase inhibitor indicated for the treatment of adult patients with:

- Relapsed or refractory chronic lymphocytic leukemia (CLL) or small lymphocytic lymphoma (SLL) after at least two prior therapies. (1.1)
- Relapsed or refractory follicular lymphoma (FL) after at least two prior systemic therapies. (1.2).

This indication is approved under accelerated approval based on overall response rate. Continued approval for this indication may be contingent upon verification and description of clinical benefit in confirmatory trials.

----- **DOSAGE AND ADMINISTRATION** -----  
25 mg orally, twice daily. Modify dosage for toxicity. (2.1, 2.2)

----- **DOSAGE FORMS AND STRENGTHS** -----  
Capsules: 25 mg, 15 mg. (3)

----- **CONTRAINDICATIONS** -----  
None.

----- **WARNINGS AND PRECAUTIONS** -----  
• Hepatotoxicity: Monitor hepatic function. (5.5)  
• Neutropenia: Monitor blood counts. (5.6)  
• Embryo-Fetal toxicity: COPIKTRA can cause fetal harm. Advise patients of potential risk to a fetus and to use effective contraception. (5.7)

----- **ADVERSE REACTIONS** -----  
The most common adverse reactions ( $\geq 20\%$ ) are diarrhea or colitis, neutropenia, rash, fatigue, pyrexia, cough, nausea, upper respiratory infection, pneumonia, musculoskeletal pain, and anemia. (6)

To report SUSPECTED ADVERSE REACTIONS, contact Verastem, Inc. (Verastem) at 877-7RXVSTM or 1-877-779-8786, or U.S. Food and Drug Administration (FDA) at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

----- **DRUG INTERACTIONS** -----  
• CYP3A inducers: Avoid co-administration with strong CYP3A inducers. (7.1)  
• CYP3A inhibitors: Monitor for COPIKTRA toxicities when co-administered with strong or moderate CYP3A inhibitors. Reduce COPIKTRA dose to 15 mg twice daily when co-administered with strong CYP3A4 inhibitors. (7.1)  
• CYP3A substrates: Monitor for signs of toxicities when co-administering COPIKTRA with sensitive CYP3A substrates. (7.2)

----- **USE IN SPECIFIC POPULATIONS** -----  
Lactation: Advise women not to breastfeed. (8.2)

See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.

Revised: 07/2019

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## FULL PRESCRIBING INFORMATION

### **WARNING: FATAL AND SERIOUS TOXICITIES: INFECTIONS, DIARRHEA OR COLITIS, CUTANEOUS REACTIONS, and PNEUMONITIS**

- **Fatal and/or serious infections occurred in 31% of COPIKTRA-treated patients. Monitor for signs and symptoms of infection. Withhold COPIKTRA if infection is suspected [see Warnings and Precautions (5.1)].**
- **Fatal and/or serious diarrhea or colitis occurred in 18% of COPIKTRA-treated patients. Monitor for the development of severe diarrhea or colitis. Withhold COPIKTRA [see Warnings and Precautions (5.2)].**
- **Fatal and/or serious cutaneous reactions occurred in 5% of COPIKTRA-treated patients. Withhold COPIKTRA [see Warnings and Precautions (5.3)].**
- **Fatal and/or serious pneumonitis occurred in 5% of COPIKTRA-treated patients. Monitor for pulmonary symptoms and interstitial infiltrates. Withhold COPIKTRA [see Warnings and Precautions (5.4)].**

## **1 INDICATIONS AND USAGE**

### **1.1 Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL)**

COPIKTRA is indicated for the treatment of adult patients with relapsed or refractory CLL or SLL after at least two prior therapies.

### **1.2 Follicular Lymphoma (FL)**

COPIKTRA is indicated for the treatment of adult patients with relapsed or refractory FL after at least two prior systemic therapies.

This indication is approved under accelerated approval based on overall response rate (ORR) [see *Clinical Studies (14.2)*]; continued approval for this indication may be contingent upon verification and description of clinical benefit in confirmatory trials.

## **2 DOSAGE AND ADMINISTRATION**

### **2.1 Dosing**

The recommended dose of COPIKTRA is 25 mg administered as oral capsules twice daily (BID) with or without food. A cycle consists of 28 days. The capsules should be swallowed whole. Advise patients not to open, break, or chew the capsules.

Advise patients that if a dose is missed by fewer than 6 hours, to take the missed dose right away and take the next dose as usual. If a dose is missed by more than 6 hours, advise patients to wait and take the next dose at the usual time.

## 2.2 Recommended Prophylaxis

Provide prophylaxis for *Pneumocystis jirovecii* (PJP) during treatment with COPIKTRA. Following completion of COPIKTRA treatment, continue PJP prophylaxis until the absolute CD4+ T cell count is greater than 200 cells/ $\mu$ L.

Withhold COPIKTRA in patients with suspected PJP of any grade, and discontinue if PJP is confirmed.

Consider prophylactic antivirals during COPIKTRA treatment to prevent cytomegalovirus (CMV) infection including CMV reactivation.

## 2.3 Dose Modifications for Adverse Reactions

Manage toxicities per

[Table 1](#) with dose reduction, treatment hold, or discontinuation of COPIKTRA.

**Table 1. COPIKTRA Dose Modifications and Toxicity Management**

Toxicity	Adverse Reaction Grade	Recommended Management
<b>Nonhematologic Adverse Reactions</b>		
Infections	Grade 3 or higher infection	<ul style="list-style-type: none"> <li>Withhold COPIKTRA until resolved</li> <li>Resume at the same or reduced dose (see <a href="#">Table 2</a>)</li> </ul>
	Clinical CMV infection or viremia (positive PCR or antigen test)	<ul style="list-style-type: none"> <li>Withhold COPIKTRA until resolved</li> <li>Resume at the same or reduced dose (see <a href="#">Table 2</a>)</li> <li>If COPIKTRA is resumed, monitor patients for CMV reactivation (by PCR or antigen test) at least monthly</li> </ul>
	PJP	<ul style="list-style-type: none"> <li>For suspected PJP, withhold COPIKTRA until evaluated</li> <li>For confirmed PJP, discontinue COPIKTRA</li> </ul>
Non-infectious Diarrhea or colitis	Mild/moderate diarrhea (Grade 1-2, up to 6 stools per day over baseline) and responsive to antidiarrheal agents, OR Asymptomatic (Grade 1) colitis	<ul style="list-style-type: none"> <li>No change in dose</li> <li>Initiate supportive therapy with antidiarrheal agents as appropriate</li> <li>Monitor at least weekly until resolved</li> </ul>
	Mild/moderate diarrhea (Grade 1-2, up to 6 stools per day over baseline) and	<ul style="list-style-type: none"> <li>Withhold COPIKTRA until resolved</li> <li>Initiate supportive therapy with enteric acting steroids (e.g., budesonide)</li> <li>Monitor at least weekly until resolved</li> </ul>

<b>Toxicity</b>	<b>Adverse Reaction Grade</b>	<b>Recommended Management</b>
	unresponsive to antidiarrheal agents	<ul style="list-style-type: none"> <li>Resume at a reduced dose (see <a href="#">Table 2</a>)</li> </ul>
	Abdominal pain, stool with mucus or blood, change in bowel habits, peritoneal signs,  OR  Severe diarrhea (Grade 3, >6 stools per day over baseline)	<ul style="list-style-type: none"> <li>Withhold COPIKTRA until resolved</li> <li>Initiate supportive therapy with enteric acting steroids (e.g., budesonide) or systemic steroids</li> <li>Monitor at least weekly until resolved</li> <li>Resume at a reduced dose (see <a href="#">Table 2</a>)</li> <li>For recurrent Grade 3 diarrhea or recurrent colitis of any grade, discontinue COPIKTRA</li> </ul>
	Life-threatening	<ul style="list-style-type: none"> <li>Discontinue COPIKTRA</li> </ul>
Cutaneous reactions	Grade 1-2	<ul style="list-style-type: none"> <li>No change in dose</li> <li>Initiate supportive care with emollients, anti-histamines (for pruritus), or topical steroids</li> <li>Monitor closely</li> </ul>
	Grade 3	<ul style="list-style-type: none"> <li>Withhold COPIKTRA until resolved</li> <li>Initiate supportive care with emollients, anti-histamines (for pruritus), or topical steroids</li> <li>Monitor at least weekly until resolved</li> <li>Resume at reduced dose (see <a href="#">Table 2</a>)</li> <li>If severe cutaneous reaction does not improve, worsens, or recurs, discontinue COPIKTRA</li> </ul>
	Life-threatening	<ul style="list-style-type: none"> <li>Discontinue COPIKTRA</li> </ul>
	SJS, TEN, DRESS (any grade)	<ul style="list-style-type: none"> <li>Discontinue COPIKTRA</li> </ul>
Pneumonitis without suspected infectious cause	Moderate (Grade 2) symptomatic pneumonitis	<ul style="list-style-type: none"> <li>Withhold COPIKTRA</li> <li>Treat with systemic steroid therapy</li> <li>If pneumonitis recovers to Grade 0 or 1, COPIKTRA may be resumed at reduced dose (see <a href="#">Table 2</a>)</li> <li>If non-infectious pneumonitis recurs or patient does not respond to steroid therapy, discontinue COPIKTRA</li> </ul>
	Severe (Grade 3) or life-threatening pneumonitis	<ul style="list-style-type: none"> <li>Discontinue COPIKTRA</li> <li>Treat with systemic steroid therapy</li> </ul>
ALT/AST elevation	3 to 5 × upper limit of normal (ULN) (Grade 2)	<ul style="list-style-type: none"> <li>Maintain COPIKTRA dose</li> <li>Monitor at least weekly until return to &lt; 3 × ULN</li> </ul>
	> 5 to 20 × ULN (Grade 3)	<ul style="list-style-type: none"> <li>Withhold COPIKTRA and monitor at least weekly until return to &lt; 3 × ULN</li> <li>Resume COPIKTRA at same dose (first occurrence) or at a reduced dose for subsequent occurrence (see <a href="#">Table 2</a>)</li> </ul>
	> 20 × ULN (Grade 4)	<ul style="list-style-type: none"> <li>Discontinue COPIKTRA</li> </ul>

Toxicity	Adverse Reaction Grade	Recommended Management
<b>Hematologic Adverse Reactions</b>		
Neutropenia	Absolute neutrophil count (ANC) 0.5 to 1.0 Gi/L	<ul style="list-style-type: none"> <li>• Maintain COPIKTRA dose</li> <li>• Monitor ANC at least weekly</li> </ul>
	ANC less than 0.5 Gi/L	<ul style="list-style-type: none"> <li>• Withhold COPIKTRA.</li> <li>• Monitor ANC until &gt; 0.5 Gi/L</li> <li>• Resume COPIKTRA at same dose (first occurrence) or at a reduced dose for subsequent occurrence (see <a href="#">Table 2</a>)</li> </ul>
Thrombocytopenia	Platelet count 25 to < 50 Gi/L (Grade 3) with Grade 1 bleeding	<ul style="list-style-type: none"> <li>• No change in dose</li> <li>• Monitor platelet counts at least weekly</li> </ul>
	Platelet count 25 to < 50 Gi/L (Grade 3) with Grade 2 bleeding or Platelet count < 25 Gi/L (Grade 4)	<ul style="list-style-type: none"> <li>• Withhold COPIKTRA</li> <li>• Monitor platelet counts until <math>\geq 25</math> Gi/L and resolution of bleeding (if applicable)</li> <li>• Resume COPIKTRA at same dose (first occurrence) or resume at a reduced dose for subsequent occurrence (see <a href="#">Table 2</a>)</li> </ul>

Abbreviations: ALT = alanine aminotransferase; ANC = absolute neutrophil count; AST = aspartate aminotransferase; CMV = cytomegalovirus; DRESS = drug reaction with eosinophilia and systemic systems; PCR = polymerase chain reaction; PJP = *Pneumocystis jirovecii*; pneumonia; SJS = Stevens-Johnson syndrome; TEN = toxic epidermal necrolysis; ULN = upper limit of normal

Recommended dose modification levels for COPIKTRA are presented in [Table 2](#).

**Table 2. Dose Modification Levels**

Dose Level	Dose
Initial Dose	25 mg twice daily
Dose Reduction	15 mg twice daily
Subsequent Dose Modification	Discontinue COPIKTRA if patient is unable to tolerate 15 mg twice daily.

#### 2.4 Dose Modification for Concomitant Use with CYP3A4 Inhibitors

Reduce COPIKTRA dose to 15 mg twice daily when co-administered with strong CYP3A4 inhibitors (e.g. ketoconazole) [see *Drug Interactions (7.1)*].

### 3 DOSAGE FORMS AND STRENGTHS

Strength	Description
25 mg	White to off-white opaque and Swedish orange opaque capsule printed in black ink with “duv 25 mg”
15 mg	Pink opaque capsule printed in black ink with “duv 15 mg”

### 4 CONTRAINDICATIONS

None.

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Infections

Serious, including fatal (18/442; 4%), infections occurred in 31% of patients receiving COPIKTRA 25 mg BID (N = 442). The most common serious infections were pneumonia, sepsis, and lower respiratory infections. Median time to onset of any grade infection was 3 months (range: 1 day to 32 months), with 75% of cases occurring within 6 months.

Treat infections prior to initiation of COPIKTRA. Advise patients to report any new or worsening signs and symptoms of infection. For grade 3 or higher infection, withhold COPIKTRA until infection has resolved. Resume COPIKTRA at the same or reduced dose [see *Dosage and Administration (2.3)*].

Serious, including fatal, *Pneumocystis jirovecii* pneumonia (PJP) occurred in 1% of patients taking COPIKTRA. Provide prophylaxis for PJP during treatment with COPIKTRA. Following completion of COPIKTRA treatment, continue PJP prophylaxis until the absolute CD4+ T cell count is greater than 200 cells/ $\mu$ L. Withhold COPIKTRA in patients with suspected PJP of any grade, and permanently discontinue if PJP is confirmed.

CMV reactivation/infection occurred in 1% of patients taking COPIKTRA. Consider prophylactic antivirals during COPIKTRA treatment to prevent CMV infection including CMV reactivation. For clinical CMV infection or viremia, withhold COPIKTRA until infection or viremia resolves. If COPIKTRA is resumed, administer the same or reduced dose and monitor patients for CMV reactivation by PCR or antigen test at least monthly [see *Dosage and Administration (2.3)*].

#### 5.2 Diarrhea or Colitis

Serious, including fatal (1/442; <1%), diarrhea or colitis occurred in 18% of patients receiving COPIKTRA 25 mg BID (N = 442). The median time to onset of any grade diarrhea or colitis was 4 months (range: 1 day to 33 months), with 75% of cases occurring by 8 months. The median event duration was 0.5 months (range: 1 day to 29 months; 75<sup>th</sup> percentile: 1 month).

Advise patients to report any new or worsening diarrhea. For non-infectious diarrhea or colitis, follow the guidelines below:

For patients presenting with mild or moderate diarrhea (Grade 1-2) (i.e. up to 6 stools per day over baseline) or asymptomatic (Grade 1) colitis, initiate supportive care with antidiarrheal agents as appropriate, continue COPIKTRA at the current dose, and monitor the patient at least weekly until the event resolves. If the diarrhea is unresponsive to antidiarrheal therapy, withhold COPIKTRA and initiate supportive therapy with enteric acting steroids (e.g. budesonide). Monitor the patient at least weekly. Upon resolution of the diarrhea, consider restarting COPIKTRA at a reduced dose.

For patients presenting with abdominal pain, stool with mucus or blood, change in bowel habits, peritoneal signs, or with severe diarrhea (Grade 3) (i.e. > 6 stools per day over baseline) withhold COPIKTRA and initiate supportive therapy with enteric acting steroids (e.g. budesonide) or systemic steroids. A diagnostic work-up to determine etiology, including colonoscopy, should be performed. Monitor at least weekly. Upon resolution of the diarrhea or colitis, restart COPIKTRA at a reduced dose. For recurrent Grade 3 diarrhea or recurrent colitis of any grade, discontinue COPIKTRA. Discontinue COPIKTRA for life-threatening diarrhea or colitis [*see Dosage and Administration (2.3)*].

### **5.3 Cutaneous Reactions**

Serious, including fatal (2/442; < 1%), cutaneous reactions occurred in 5% of patients receiving COPIKTRA 25 mg BID (N = 442). Fatal cases included drug reaction with eosinophilia and systemic symptoms (DRESS) and toxic epidermal necrolysis (TEN). Median time to onset of any grade cutaneous reaction was 3 months (range: 1 day to 29 months, 75th percentile: 6 months), with a median event duration of 1 month (range: 1 day to 37 months, 75th percentile: 2 months).

Presenting features for the serious events were primarily described as pruritic, erythematous, or maculo-papular. Less common presenting features include exanthem, desquamation, erythroderma, skin exfoliation, keratinocyte necrosis, and papular rash. Advise patients to report any new or worsening cutaneous reactions. Review all concomitant medications and discontinue any medications potentially contributing to the event. For patients presenting with mild or moderate (Grade 1-2) cutaneous reactions, continue COPIKTRA at the current dose, initiate supportive care with emollients, anti-histamines (for pruritus), or topical steroids, and monitor the patient closely. Withhold COPIKTRA for severe (Grade 3) cutaneous reaction until resolution. Initiate supportive care with steroids (topical or systemic) or anti-histamines (for pruritus). Monitor at least weekly until resolved. Upon resolution of the event, restart COPIKTRA at a reduced dose. Discontinue COPIKTRA if severe cutaneous reaction does not improve, worsens, or recurs. For life-threatening cutaneous reactions, discontinue COPIKTRA. In patients with SJS, TEN, or DRESS of any grade, discontinue COPIKTRA [*see Dosage and Administration (2.3)*].

### **5.4 Pneumonitis**

Serious, including fatal (1/442; < 1%), pneumonitis without an apparent infectious cause occurred in 5% of patients receiving COPIKTRA 25 mg BID (N = 442). Median time to onset of any grade pneumonitis was 4 months (range: 9 days to 27 months), with 75% of cases occurring within 9 months). The median event duration was 1 month, with 75% of cases resolving by 2 months.

Withhold COPIKTRA in patients who present with new or progressive pulmonary signs and symptoms such as cough, dyspnea, hypoxia, interstitial infiltrates on a radiologic exam, or a decline by more than 5% in oxygen saturation and evaluate for etiology. If the pneumonitis is infectious, patients may be restarted on COPIKTRA at the previous dose once the infection, pulmonary signs and symptoms resolve. For moderate non-infectious pneumonitis (Grade 2), treat with systemic corticosteroids, and resume COPIKTRA at a reduced dose upon resolution. If non-infectious pneumonitis recurs or does not respond to steroid therapy, discontinue COPIKTRA. For severe or life-threatening non-infectious pneumonitis, discontinue COPIKTRA and treat with systemic steroids [see *Dosage and Administration (2.3)*].

### **5.5 Hepatotoxicity**

Grade 3 and 4 ALT and/or AST elevation developed in 8% and 2%, respectively, in patients receiving COPIKTRA 25 mg BID (N = 442). Two percent of patients had both an ALT or AST greater than 3 x ULN and total bilirubin greater than 2 x ULN. Median time to onset of any grade transaminase elevation was 2 months (range: 3 days to 26 months), with a median event duration of 1 month (range: 1 day to 16 months).

Monitor hepatic function during treatment with COPIKTRA. For Grade 2 ALT/AST elevation (greater than 3 to 5 x ULN), maintain COPIKTRA dose and monitor at least weekly until return to less than 3 x ULN. For Grade 3 ALT/AST elevation (greater than 5 to 20 x ULN), withhold COPIKTRA and monitor at least weekly until return to less than 3 x ULN. Resume COPIKTRA at the same dose (first occurrence) or at a reduced dose for subsequent occurrence. For grade 4 ALT/AST elevation (greater than 20 x ULN) discontinue COPIKTRA [see *Dosage and Administration (2.3)*].

### **5.6 Neutropenia**

Grade 3 or 4 neutropenia occurred in 42% of patients receiving COPIKTRA 25 mg BID (N = 442), with Grade 4 neutropenia occurring in 24% of all patients. The median time to onset of Grade  $\geq$  3 neutropenia was 2 months (range: 3 days to 31 months), with 75% of cases occurring within 4 months.

Monitor neutrophil counts at least every 2 weeks for the first 2 months of COPIKTRA therapy, and at least weekly in patients with neutrophil counts < 1.0 Gi/L (Grade 3-4). Withhold COPIKTRA in patients presenting with neutrophil counts < 0.5 Gi/L (Grade 4). Monitor until ANC is > 0.5 Gi/L, resume COPIKTRA at same dose for the first occurrence or a reduced dose for subsequent occurrence [see *Dosage and Administration (2.3)*].

### **5.7 Embryo-Fetal Toxicity**

Based on findings in animals and its mechanism of action, COPIKTRA can cause fetal harm when administered to a pregnant woman. In animal reproduction studies, administration of duvelisib to pregnant rats and rabbits during organogenesis caused adverse developmental outcomes including embryo-fetal mortality (resorptions, post-implantation loss, and decreased viable fetuses), alterations to growth (lower fetal weights) and structural abnormalities (malformations) at maternal doses approximately 10 times and 39 times the maximum recommended human dose (MRHD) of 25 mg BID in rats and rabbits, respectively. Advise pregnant women of the potential risk to a fetus. Advise females of reproductive potential and males with female partners of reproductive potential to use effective contraception during



treatment and for at least 1 month after the last dose [see *Use in Specific Populations (8.1, 8.3)* and *Clinical Pharmacology (12.1, 12.3)*].

## 6 ADVERSE REACTIONS

The following adverse reactions have been associated with COPIKTRA in clinical trials and are discussed in greater detail in other sections of the prescribing information:

- Infections [see *Warnings and Precautions (5.1)*]
- Diarrhea or Colitis [see *Warnings and Precautions (5.2)*]
- Cutaneous Reactions [see *Warnings and Precautions (5.3)*]
- Pneumonitis [see *Warnings and Precautions (5.4)*]
- Hepatotoxicity [see *Warnings and Precautions (5.5)*]
- Neutropenia [see *Warnings and Precautions (5.6)*]

### 6.1 Clinical Trial Experience

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

#### ***Summary of Clinical Trial Experience in B-cell Malignancies***

The data described below reflect exposure to COPIKTRA in two single-arm, open-label clinical trials, one open-label extension clinical trial, and one randomized, open-label, actively controlled clinical trial totaling 442 patients with previously treated hematologic malignancies primarily including CLL/SLL (69%) and FL (22%). Patients were treated with COPIKTRA 25 mg BID until unacceptable toxicity or progressive disease. The median duration of exposure was 9 months (range: 0.1 to 53 months), with 36% (160/442) of patients having at least 12 months of exposure.

For the 442 patients, the median age was 67 years (range: 30 to 90 years), 65% were male, 92% were White, and 93% had an Eastern Cooperative Oncology Group (ECOG) performance status of 0 to 1. Patients had a median of 2 prior therapies. The trials required hepatic transaminases at least  $\leq 3$  times upper limit of normal (ULN), total bilirubin  $\leq 1.5$  times ULN, and serum creatinine  $\leq 1.5$  times ULN. Patients were excluded for prior exposure to a PI3K inhibitor within 4 weeks.

Fatal adverse reactions within 30 days of the last dose occurred in 36 patients (8%) treated with COPIKTRA 25 mg BID.

Serious adverse reactions were reported in 289 patients (65%). The most frequent serious adverse reactions that occurred were infection (31%), diarrhea or colitis (18%), pneumonia (17%), rash (5%), and pneumonitis (5%).

Adverse reactions resulted in treatment discontinuation in 156 patients (35%), most often due to diarrhea or colitis, infection, and rash. COPIKTRA was dose reduced in 104 patients (24%) due to adverse reactions, most often due to diarrhea or colitis and transaminase elevation. The median time to first dose modification or discontinuation was 4 months (range: 0.1 to 27

months), with 75% of patients having their first dose modification or discontinuation within 7 months.

**Common Adverse Reactions**

Table 3. summarizes common adverse reactions in patients receiving COPIKTRA 25 mg BID, and

Table 4 summarizes the treatment-emergent laboratory abnormalities. The most common adverse reactions (reported in  $\geq 20\%$  of patients) were diarrhea or colitis, neutropenia, rash, fatigue, pyrexia, cough, nausea, upper respiratory infection, pneumonia, musculoskeletal pain, and anemia.

**Table 3.**

**Common Adverse Reactions ( $\geq 10\%$  Incidence) in Patients with B-cell Malignancies Receiving COPIKTRA**

Adverse Reactions	COPIKTRA 25 mg BID (N = 442)	
	Any Grade n (%)	Grade $\geq 3$ n (%)
<b>Blood and lymphatic system disorders</b>		
Neutropenia †	151 (34)	132 (30)
Anemia †	90 (20)	48 (11)
Thrombocytopenia †	74 (17)	46 (10)
<b>Gastrointestinal disorders</b>		
Diarrhea or colitis † <sup>a</sup>	222 (50)	101 (23)
Nausea †	104 (24)	4 (< 1)
Abdominal pain	78 (18)	9 (2)
Vomiting	69 (16)	6 (1)
Mucositis	61 (14)	6 (1)
Constipation	57 (13)	1 (< 1)
<b>General disorders and administration site conditions</b>		
Fatigue †	126 (29)	22 (5)
Pyrexia	115 (26)	7 (2)
<b>Hepatobiliary disorders</b>		
Transaminase elevation † <sup>b</sup>	67 (15)	34 (8)

Adverse Reactions	COPIKTRA 25 mg BID (N = 442)	
	Any Grade n (%)	Grade ≥ 3 n (%)
<b>Infections and infestations</b>		
Upper respiratory tract infection †	94 (21)	2 (< 1)
Pneumonia † <sup>c</sup>	91 (21)	67 (15)
Lower respiratory tract infection †	46 (10)	11 (3)
<b>Metabolism and nutrition disorders</b>		
Decreased appetite	63 (14)	2 (< 1)
Edema †	60 (14)	6 (1)
Hypokalemia †	45 (10)	17 (4)
<b>Musculoskeletal and connective tissue disorders</b>		
Musculoskeletal pain †	90 (20)	6 (1)
Arthralgia	46 (10)	1 (< 1)
<b>Nervous system disorders</b>		
Headache †	55 (12)	1 (< 1)
<b>Respiratory, thoracic and mediastinal disorders</b>		
Cough †	111 (25)	2 (< 1)
Dyspnea †	52 (12)	8 (2)
<b>Skin and subcutaneous tissue disorders</b>		
Rash † <sup>d</sup>	136 (31)	41 (9)

† Grouped term for reactions with multiple preferred terms

<sup>a</sup> Diarrhea or colitis includes the preferred terms: colitis, enterocolitis, colitis microscopic, colitis ulcerative, diarrhea, diarrhea hemorrhagic

<sup>b</sup> Transaminase elevation includes the preferred terms: alanine aminotransferase increased, aspartate aminotransferase increased, transaminases increased, hypertransaminasemia, hepatocellular injury, hepatotoxicity

<sup>c</sup> Pneumonia includes the preferred terms: All preferred terms containing "pneumonia" except for "pneumonia aspiration"; bronchopneumonia, bronchopulmonary aspergillosis

<sup>d</sup> Rash includes the preferred terms: dermatitis (including allergic, exfoliative, perivascular), erythema (including multiforme), rash (including exfoliative, erythematous, follicular, generalized, macular & papular, pruritic, pustular), toxic epidermal necrolysis and toxic skin eruption, drug reaction with eosinophilia and systemic symptoms, drug eruption, Stevens-Johnson syndrome

Grade 4 adverse reactions occurring in  $\geq 2\%$  of recipients of COPIKTRA included neutropenia (18%), thrombocytopenia (6%), sepsis (3%), hypokalemia and increased lipase (2% each), and pneumonia and pneumonitis (2% each).

**Table 4.**

**Most Common New or Worsening Laboratory Abnormalities ( $\geq 20\%$  Any Grade) in Patients with B-cell Malignancies Receiving COPIKTRA**

Laboratory Parameter <sup>a</sup>	COPIKTRA 25 mg BID (N = 442)	
	Any Grade n (%) <sup>b</sup>	Grade $\geq 3$ n (%) <sup>b</sup>
<b>Hematology abnormalities</b>		
Neutropenia	276 (63)	184 (42)
Anemia	198 (45)	66 (15)
Thrombocytopenia	170 (39)	65 (15)
Lymphocytosis	132 (30)	92 (21)
Leukopenia	129 (29)	34 (8)
Lymphopenia	90 (21)	39 (9)
<b>Chemistry abnormalities</b>		
ALT increased	177 (40)	34 (8)
AST increased	163 (37)	24 (6)
Lipase increased	133 (36)	58 (16)
Hypophosphatemia	136 (31)	23 (5)
ALP increased	128 (29)	7 (2)
Serum amylase increased	101 (28)	16 (4)
Hyponatremia	116 (27)	30 (7)
Hyperkalemia	114 (26)	14 (3)
Hypoalbuminemia	111 (25)	7 (2)
Creatinine increased	106 (24)	7 (2)
Hypocalcemia	100 (23)	12 (3)

<sup>a</sup> Includes laboratory abnormalities that are new or worsening in grade or with worsening from baseline unknown.

<sup>b</sup> Percentages are based on number of patients with at least one post-baseline assessment; not all patients were evaluable.

Grade 4 laboratory abnormalities developing in  $\geq 2\%$  of patients included neutropenia (24%), thrombocytopenia (7%), lipase increase (4%), lymphocytopenia (3%), and leukopenia (2%).

## ***Summary of Clinical Trial Experience in CLL/SLL***

### ***Study 1***

The safety data below reflects exposure in a randomized, open-label, actively controlled clinical trial for adult patients with CLL or SLL who received at least one prior therapy. Of 313 patients treated, 158 received COPIKTRA monotherapy and 155 received ofatumumab. The 442-patient safety analysis above includes patients from Study 1.

COPIKTRA was administered at 25 mg BID in 28-day treatment cycles until unacceptable toxicity or progressive disease. The comparator group received 12 doses of ofatumumab with an initial dose of 300 mg intravenous (IV) on Day 1 followed a week later by 7 weekly doses of 2000 mg IV, followed 4 weeks later by 2000 mg IV every 4 weeks for 4 doses.

In the total study population, the median age was 69 years (range: 39 to 90 years), 60% were male, 92% were White, and 91% had an ECOG performance status of 0 to 1. Patients had a median of 2 prior therapies, with 61% of patients having received 2 or more prior therapies. The trial required a hemoglobin  $\geq$  8 g/dL and platelets  $\geq$  10,000  $\mu$ L with or without transfusion support, hepatic transaminases  $\leq$  3 times upper limit of normal (ULN), total bilirubin  $\leq$  1.5 times ULN, and serum creatinine  $\leq$  2 times ULN. The trial excluded patients with prior autologous transplant within 6 months or allogeneic transplant, prior exposure to a PI3K inhibitor or a Bruton's tyrosine kinase (BTK) inhibitor, and uncontrolled autoimmune hemolytic anemia or idiopathic thrombocytopenic purpura.

During randomized treatment, the median duration of exposure to COPIKTRA was 11.6 months with 72% (114/158) exposed for  $\geq$  6 months and 49% (77/158) exposed for  $\geq$  1 year. The median duration of exposure to ofatumumab was 5.3 months, with 77% (120/155) receiving at least 10 of 12 doses.

Fatal adverse reactions within 30 days of the last dose occurred in 12% (19/158) of patients treated with COPIKTRA and in 4% (7/155) of patients treated with ofatumumab.

Serious adverse reactions were reported in 73% (115/158) of patients treated with COPIKTRA and most often involved infection (38% of patients; 60/158) and diarrhea or colitis (23% of patients; 36/158).

COPIKTRA was discontinued in 57 patients (36%), most often due to diarrhea or colitis, infection, and rash. COPIKTRA was dose reduced in 46 patients (29%) due to adverse reactions, most often due to diarrhea or colitis and rash.

### ***Common Adverse Reactions***

Table 5 summarizes selected adverse reactions in Study 1, and Table 6 summarizes treatment-emergent laboratory abnormalities. The most common adverse reactions with COPIKTRA (reported in  $\geq$  20% of patients) were diarrhea or colitis, neutropenia, pyrexia, upper respiratory tract infection, pneumonia, rash, fatigue, nausea, anemia and cough.

**Table 5.**

**Common Nonhematologic Adverse Reactions (≥ 10% Incidence) in Patients with CLL/SLL Receiving COPIKTRA (Study 1)**

Adverse Reactions	COPIKTRA N = 158		Ofatumumab N = 155	
	Any Grade (%)	Grade ≥ 3 (%)	Any Grade (%)	Grade ≥ 3 (%)
<b>Gastrointestinal disorders</b>				
Diarrhea or colitis <sup>†a</sup>	57	25	14	2
Nausea <sup>†</sup>	23	0	11	0
Constipation	17	<1	8	0
Abdominal pain	16	3	7	0
Vomiting	15	0	7	0
<b>General disorders and administration site conditions</b>				
Pyrexia	29	3	10	<1
Fatigue <sup>†</sup>	25	4	23	4
<b>Hepatobiliary disorders</b>				
Transaminase elevation <sup>†d</sup>	11	6	4	<1
<b>Infections and infestations</b>				
Upper respiratory tract infection <sup>†</sup>	28	0	16	<1
Pneumonia <sup>†b</sup>	27	22	8	3
Lower respiratory tract infection <sup>†</sup>	18	4	10	1
<b>Investigations</b>				
Weight decreased	11	0	2	0
<b>Metabolism and nutrition disorders</b>				
Decreased appetite	13	0	3	<1
Edema <sup>†</sup>	11	1	5	0
<b>Musculoskeletal and connective tissue disorders</b>				
Musculoskeletal pain <sup>†</sup>	17	1	12	<1
<b>Respiratory, thoracic and mediastinal disorders</b>				
Cough <sup>†</sup>	23	1	16	0

Adverse Reactions	COPIKTRA N = 158		Ofatumumab N = 155	
	Any Grade (%)	Grade ≥ 3 (%)	Any Grade (%)	Grade ≥ 3 (%)
Dyspnea	12	3	7	0
<b>Skin and subcutaneous tissue disorders</b>				
Rash † <sup>c</sup>	27	11	15	<1

Grades were obtained per CTCAE version 4.03.

† Grouped term for reactions with multiple preferred terms

<sup>a</sup> Diarrhea or colitis includes the preferred terms: colitis, enterocolitis, colitis microscopic, colitis ulcerative, diarrhea

<sup>b</sup> Pneumonia includes the preferred terms: All preferred term containing "pneumonia" except for "pneumonia aspiration"; bronchopneumonia, bronchopulmonary aspergillosis

<sup>c</sup> Rash includes the preferred terms: dermatitis (including allergic, exfoliative, perivascular), erythema (including multiforme), rash (including exfoliative, erythematous, follicular, generalized, macular & papular, pruritic, pustular), toxic skin eruption, drug eruption

<sup>d</sup> Transaminase elevation includes the preferred terms: alanine aminotransferase increased, aspartate aminotransferase increased, transaminases increased, hepatotoxicity

**Table 6.****Most Common New or Worsening Laboratory Abnormalities ( $\geq 20\%$  Any Grade) in Patients with CLL/SLL Receiving COPIKTRA (Study 1)**

Laboratory Parameter	COPIKTRA N = 158		Ofatumumab N = 155	
	Any Grade (%)	Grade $\geq 3$ (%)	Any Grade (%)	Grade $\geq 3$ (%)
<b>Hematology abnormalities</b>				
Neutropenia	67	49	52	37
Anemia	55	20	36	7
Thrombocytopenia	43	16	34	8
Lymphocytosis	30	22	11	6
<b>Chemistry abnormalities</b>				
ALT increased	42	7	12	0
Lipase increased	37	12	15	3
AST increased	36	3	14	1
Phosphate decreased	34	3	20	3
Hyperkalemia	31	4	24	1
Hyponatremia	31	7	18	3
Amylase increased	31	5	10	1
Hypoalbuminemia	31	2	15	1
Creatinine increased	29	1	31	0
Alkaline phosphatase increased	27	0	14	0
Hypocalcemia	25	1	17	1
Hypokalemia	20	8	8	0

Grades were obtained per CTCAE version 4.03.

Grade 4 laboratory abnormalities that developed in  $\geq 2\%$  of COPIKTRA treated patients included neutropenia (32%), thrombocytopenia (6%), lymphopenia (3%), and hypokalemia (2%).

The data above are not an adequate basis for comparison of rates between the study drug and the active control.

***Summary of Clinical Trial Experience in FL***

The data described below reflect the exposure to COPIKTRA 25 mg BID in 96 patients with relapsed or refractory FL. These patients were included in the 442-patient safety analysis presented above. The median duration of treatment was 24 weeks, with 46% of patients exposed for  $\geq 6$  months and 19% exposed for  $\geq 1$  year.



The median age was 64 years (range: 30 to 82 years), and 93% had an ECOG performance status of 0 to 1. Patients had a median of 3 prior systemic therapies.

Serious adverse reactions were reported in 58% and most often involved diarrhea or colitis, pneumonia, renal insufficiency, rash, and sepsis. The most common adverse reactions ( $\geq 20\%$  of patients) were diarrhea or colitis, nausea, fatigue, musculoskeletal pain, rash, neutropenia, cough, anemia, pyrexia, headache, mucositis, abdominal pain, vomiting, transaminase elevation, and thrombocytopenia.

Adverse reactions resulted in COPIKTRA discontinuation in 29% of patients, most often due to diarrhea or colitis and rash. COPIKTRA was dose reduced in 23% due to adverse reactions, most often due to transaminase elevation, diarrhea or colitis, lipase increased, and infection.

## **7 DRUG INTERACTIONS**

### **7.1 Effects of Other Drugs on COPIKTRA**

#### *CYP3A Inducers*

Co-administration with a strong CYP3A inducer decreases duvelisib area under the curve (AUC) [see *Clinical Pharmacology (12.3)*], which may reduce COPIKTRA efficacy. Avoid co-administration of COPIKTRA with strong CYP3A4 inducers.

#### *CYP3A Inhibitors*

Co-administration with a strong CYP3A inhibitor increases duvelisib AUC [see *Clinical Pharmacology (12.3)*], which may increase the risk of COPIKTRA toxicities. Reduce COPIKTRA dose to 15 mg BID when co-administered with a strong CYP3A4 inhibitor [see *Dosage and Administration (2.4)*].

### **7.2 Effects of COPIKTRA on Other Drugs**

#### *CYP3A Substrates*

Co-administration with COPIKTRA increases AUC of a sensitive CYP3A4 substrate [see *Clinical Pharmacology (12.3)*] which may increase the risk of toxicities of these drugs. Consider reducing the dose of the sensitive CYP3A4 substrate and monitor for signs of toxicities of the co-administered sensitive CYP3A substrate.

## **8 USE IN SPECIFIC POPULATIONS**

### **8.1 Pregnancy**

#### *Risk Summary*

Based on findings from animal studies and the mechanism of action, COPIKTRA can cause fetal harm when administered to a pregnant woman [see *Clinical Pharmacology (12.1)*].

There are no available data in pregnant women to inform the drug-associated risk. In animal reproduction studies, administration of duvelisib to pregnant rats and rabbits during organogenesis caused adverse developmental outcomes including embryo-fetal mortality (resorptions, post-implantation loss, and decreased viable fetuses), alterations to growth (lower

fetal weights) and structural abnormalities (malformations) at maternal doses 10 times and 39 times the MRHD of 25 mg BID in rats and rabbits, respectively (*see Data*).

The estimated background risk of major birth defects and miscarriage for the indicated population is unknown. All pregnancies have a background risk of birth defect, loss, or other adverse outcomes. 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 an embryo-fetal development study in rats, pregnant animals received daily oral doses of duvelisib of 0, 10, 50, 150 and 275 mg/kg/day during the period of organogenesis. Administration of duvelisib at doses  $\geq$  50 mg/kg/day resulted in adverse developmental outcomes including reduced fetal weights and external abnormalities (bent tail and fetal anasarca), and doses  $\geq$  150 mg/kg/day resulted in maternal toxicity including mortality and no live fetuses (100% resorption) in surviving dams. In another study in pregnant rats receiving oral doses of duvelisib up to 35 mg/kg/day during the period of organogenesis, no maternal or embryo-fetal effects were observed. The dose of 50 mg/kg/day in rats is approximately 10 - times the MRHD of 25 mg BID.

In an embryo-fetal development study in rabbits, pregnant animals received daily oral doses of duvelisib of 0, 25, 100, and 200 mg/kg/day during the period of organogenesis. Administration of duvelisib at doses  $\geq$  100 mg/kg/day resulted in maternal toxicity (body weight losses or lower mean body weights and increased mortality) and adverse developmental outcomes (increased resorptions and post-implantation loss, abortion, and decreased numbers of viable fetuses). In another study in pregnant rabbits receiving oral doses of duvelisib up to 75 mg/kg/day, no maternal or embryo-fetal effects were observed. The dose of 100 mg/kg/day in rabbits is approximately 39 times the MRHD of 25 mg BID.

## **8.2 Lactation**

#### *Risk Summary*

There are no data on the presence of duvelisib and/or its metabolites in human milk, the effects on the breastfed child, or on milk production. Because of the potential for serious adverse reactions from duvelisib in a breastfed child, advise lactating women not to breastfeed while taking COPIKTRA and for at least 1 month after the last dose.

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

#### *Pregnancy Testing*

COPIKTRA can cause fetal harm when administered to a pregnant woman [*see Use in Specific Populations (8.1)*]. Conduct pregnancy testing before initiation of COPIKTRA treatment.

#### *Contraception*

##### Females

Based on animal studies, COPIKTRA can cause fetal harm when administered to a pregnant woman. Advise females of reproductive potential to use effective contraception during treatment with COPIKTRA and for at least 1 month after the last dose.

### Males

Advise male patients with female partners of reproductive potential to use effective contraception during treatment with COPIKTRA and for at least 1 month after the last dose.

### *Infertility*

Based on testicular findings in animals, male fertility may be impaired by treatment with COPIKTRA [see *Nonclinical Toxicology (13.1)*]. There are no data on the effect of COPIKTRA on human fertility.

## **8.4 Pediatric Use**

Safety and effectiveness of COPIKTRA have not been established in pediatric patients. Pediatric studies have not been conducted.

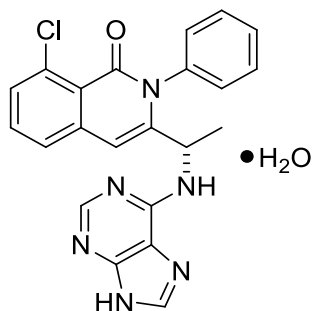
## **8.5 Geriatric Use**

Clinical trials of COPIKTRA included 270 patients (61%) that were 65 years of age and older and 104 (24%) that were 75 years of age and older. No major differences in efficacy or safety were observed between patients less than 65 years of age and patients 65 years of age and older.

## **11 DESCRIPTION**

COPIKTRA (duvelisib) is a dual inhibitor of phosphatidylinositol 3-kinases PI3K- $\delta$  and PI3K- $\gamma$ .

Duvelisib is a white-to-off-white crystalline solid with the empirical formula  $C_{22}H_{17}ClN_6O \cdot H_2O$  and a molecular weight of 434.88 g/mol. Hydration can vary with relative humidity. Duvelisib contains a single chiral center as (*S*) enantiomer. Duvelisib is soluble in ethanol and practically insoluble in water. Duvelisib is described chemically as a hydrate of (*S*)-3-(1-(9H-purin-6-ylamino)ethyl)-8-chloro-2-phenylisoquinolin-1(2H)-one and has the following chemical structure:



COPIKTRA capsules are for oral administration and are supplied as white to off-white opaque and Swedish orange opaque capsules (25 mg, on anhydrous basis) or pink opaque capsules (15

mg, on anhydrous basis), and contain the following inactive ingredients: colloidal silicon dioxide, crospovidone, magnesium stearate, and microcrystalline cellulose. Capsule shells contain gelatin, titanium dioxide, black ink, and red iron oxide.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Duvelisib is an inhibitor of PI3K with inhibitory activity predominantly against PI3K- $\delta$  and PI3K- $\gamma$  isoforms expressed in normal and malignant B-cells. Duvelisib induced growth inhibition and reduced viability in cell lines derived from malignant B-cells and in primary CLL tumor cells. Duvelisib inhibits several key cell-signaling pathways, including B-cell receptor signaling and CXCR12-mediated chemotaxis of malignant B-cells. Additionally, duvelisib inhibits CXCL12-induced T cell migration and M-CSF and IL-4 driven M2 polarization of macrophages.

### 12.2 Pharmacodynamics

At the recommended dose of 25 mg BID, reductions in levels of phosphorylated AKT (a downstream marker for PI3K inhibition) were observed in patients treated with COPIKTRA.

#### *Cardiac Electrophysiology*

The effect of multiple doses of COPIKTRA 25 and 75 mg BID on the QTc interval was evaluated in patients with previously treated hematologic malignancies. Increases of > 20 ms in the QTc interval were not observed.

### 12.3 Pharmacokinetics

Duvelisib exposure increased in a dose-proportional manner over a dose range of 8 mg to 75 mg twice daily (0.3 to 3 times the recommended dosage).

At steady state following 25 mg BID administration of duvelisib in patients, the geometric mean (CV%) maximum concentration ( $C_{max}$ ) was 1.5 (64%)  $\mu\text{g/mL}$  and AUC was 7.9 (77%)  $\mu\text{g}\cdot\text{h/mL}$ .

#### Absorption

The absolute bioavailability of 25 mg duvelisib after a single oral dose in healthy volunteers was 42%. The median time to peak concentration ( $T_{max}$ ) was observed at 1 to 2 hours in patients.

#### *Effect of Food*

COPIKTRA may be administered without regard to food. The administration of a single dose of COPIKTRA with a high-fat meal (fat accounted for approximately 50% of the total caloric content of the meal) decreased  $C_{max}$  by approximately 37% and decreased the AUC by approximately 6%, relative to fasting conditions.

#### Distribution

Protein binding of duvelisib is greater than 98% with no concentration dependence. The mean blood-to-plasma ratio was 0.5. The geometric mean (CV%) apparent volume of distribution at steady state ( $V_{ss}/F$ ) is 28.5 L (62%). Duvelisib is a substrate of P-glycoprotein (P-gp) and BCRP in vitro.

## Elimination

The geometric mean (CV%) apparent systemic clearance at steady-state is 4.2 L/hr (56%) in patients with lymphoma or leukemia. The geometric mean (CV%) terminal elimination half-life of duvelisib is 4.7 hours (57%).

## *Metabolism*

Duvelisib is primarily metabolized by cytochrome P450 CYP3A4.

## *Excretion*

Following a single 25 mg oral dose of radiolabeled duvelisib, 79% of the radioactivity was excreted in feces (11% unchanged) and 14% was excreted in the urine (< 1% unchanged).

## Specific Populations

Age (18 to 90 years), sex, race, renal impairment (creatinine clearance 23 to 80 mL/ min), hepatic impairment (Child Pugh Class A, B, and C) and body weight (40 to 154 kg) had no clinically significant effect on the exposure of duvelisib.

## Drug Interaction Studies

### *Strong and Moderate CYP3A Inhibitors*

Co-administration of strong CYP3A inhibitor ketoconazole (at 200 mg BID for 5 days), a strong inhibitor of CYP3A4, with a single oral 10 mg dose of COPIKTRA in healthy adults (n= 16) increased duvelisib  $C_{max}$  by 1.7-fold and AUC by 4-fold. Based on physiologically-based pharmacokinetic (PBPK) modeling and simulation, the increase in exposure to duvelisib is estimated to be ~2-fold at steady state when concomitantly used with strong CYP3A4 inhibitors such as ketoconazole [see *Dosage and Administration (2.3)* and *Drug Interactions (7.1)*]. PBPK modeling and simulation estimated no effect on duvelisib exposures from concomitantly used mild or moderate CYP3A4 inhibitors.

### *Strong and Moderate CYP3A4 Inducers*

Co-administration of 600 mg once daily rifampin, a strong CYP3A inducer, for 7 days with a single oral 25 mg COPIKTRA dose in healthy adults (N = 13) decreased duvelisib  $C_{max}$  by 66% and AUC by 82%.

The effect of moderate CYP3A4 induction has not been studied [see *Drug Interactions (7.1)*].

### *CYP3A4 Substrates*

Co-administration of multiple doses of COPIKTRA 25 mg BID for 5 days with single oral 2 mg midazolam, a sensitive CYP3A4 substrate, in healthy adults (N = 14), increased in the midazolam AUC by 4.3-fold and  $C_{max}$  by 2.2-fold [see *Drug Interactions (7.2)*].

### *In Vitro Studies*

Duvelisib is a substrate of P-glycoprotein (P-gp) and breast cancer-resistant protein (BCRP).

Duvelisib does not inhibit OAT1, OAT3, OCT1, OCT2, OATP1B1, OATP1B3, BCRP, or P-gp.

## 13 NONCLINICAL TOXICOLOGY

### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Carcinogenicity studies have not been conducted with duvelisib.

Duvelisib did not cause genetic damage in in vitro or in vivo assays.

Fertility studies with duvelisib were not conducted. Histological findings in male and female rats were observed in the repeat dose toxicity studies and included testis (seminiferous epithelial atrophy, decreased weight, soft testes), and epididymis (small size, oligo/aspermia) in males and ovary (decreased weight) and uterus (atrophy) in females.

## 14 CLINICAL EFFICACY

### 14.1 Efficacy in Relapsed or Refractory CLL/SLL

#### Study 1

A randomized, multicenter, open-label trial (Study 1; NCT02004522) compared COPIKTRA versus ofatumumab in 319 adult patients with CLL (N = 312) or SLL (N = 7) after at least one prior therapy. The trial excluded patients with prior autologous transplant within 6 months or allogeneic transplant, prior exposure to a PI3K inhibitor or a Bruton's tyrosine kinase (BTK) inhibitor. The trial required hepatic transaminases  $\leq 3$  times upper limit of normal (ULN), total bilirubin  $\leq 1.5$  times ULN, and serum creatinine  $\leq 2$  times ULN.

The study randomized patients with a 1:1 ratio to receive either COPIKTRA 25 mg BID until disease progression or unacceptable toxicity or ofatumumab for 7 cycles. Ofatumumab was administered intravenously at an initial dose of 300 mg, followed one week later by 2000 mg once weekly for 7 doses, and then 2000 mg once every 4 weeks for 4 additional doses.

The approval of COPIKTRA was based on efficacy and safety analysis of patients with at least 2 prior lines of therapy, where the benefit:risk appeared greater in this more heavily pretreated population compared to the overall trial population.

In this subset (95 randomized to COPIKTRA, 101 to ofatumumab), the median patient age was 69 years (range: 40 to 90 years), 59% were male, and 88% had an ECOG performance status of 0 or 1. Forty-six percent received 2 prior lines of therapy, and 54% received 3 or more prior lines. At baseline, 52% of patients had at least one tumor  $\geq 5$  cm, and 22% of patients had a documented 17p deletion.

During randomized treatment, the median duration of exposure to COPIKTRA was 13 months (range: 0.2 to 37), with 80% of patients receiving at least 6 months and 52% receiving at least 12 months of COPIKTRA. The median duration of exposure to ofatumumab was 5 months (range:  $< 0.1$  to 6).

Efficacy was based on progression-free survival (PFS) as assessed by an Independent Review Committee (IRC). Other efficacy measures included overall response rate. Efficacy of COPIKTRA compared to ofatumumab specifically in patients treated with at least two prior therapies is presented in [Table 8](#) and [Figure 1](#).

**Table 8.****Efficacy in CLL or SLL After at Least Two Prior Therapies (Study 1)**

<b>Outcome per IRC</b>	<b>COPIKTRA N = 95</b>	<b>Ofatumumab N = 101</b>
<b>PFS</b>		
Number of events, n (%)	55 (58)	70 (69)
Progressive disease	44	62
Death	11	8
Median PFS (SE), months <sup>a</sup>	16.4 (2.1)	9.1 (0.5)
Hazard Ratio (SE), <sup>b</sup> COPIKTRA/ofatumumab	0.40 (0.2)	
<b>Response rate</b>		
ORR, n (%) <sup>c</sup>	74 (78)	39 (39)
CR	0 (0)	0 (0)
PR	74 (78)	39 (39)
Difference in ORR, % (SE)	39 (6.4)	

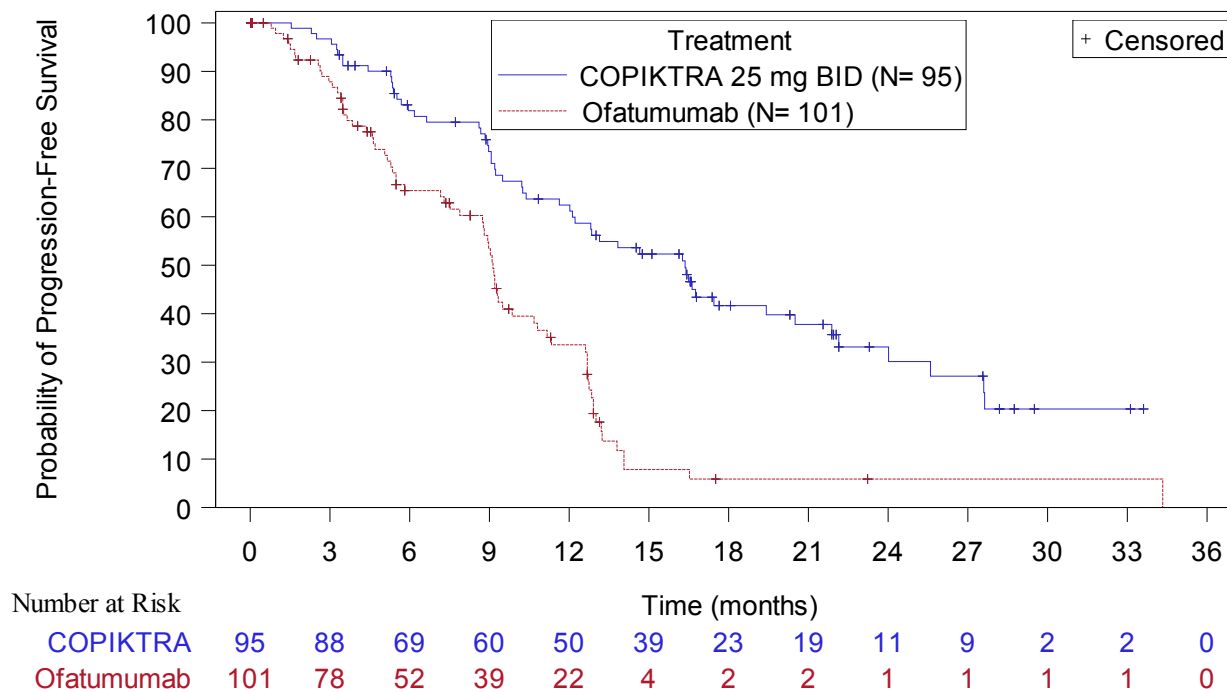
Abbreviations: CI = confidence interval; CR = complete response; IRC = Independent Review Committee; PFS = progression-free survival; PR = partial response; SE = standard error

<sup>a</sup> Kaplan-Meier estimate

<sup>b</sup> Standard Error of ln(hazard ratio) = 0.2

<sup>c</sup> IWCLL or revised IWG response criteria, with modification for treatment-related lymphocytosis

**Figure 1. Kaplan-Meier Curve of PFS per IRC In Patients with at Least 2 Prior Therapies (Study 1)**



## 14.2 Efficacy in Relapsed or Refractory FL

### Study 2

Efficacy of COPIKTRA in patients with previously treated FL is based on a single-arm, multicenter trial (Study 2; NCT01882803). In this study, COPIKTRA 25 mg BID was administered in patients with FL (N = 83) who were refractory to rituximab and to either chemotherapy or radioimmunotherapy. Refractory disease was defined as less than a partial remission or relapse within 6 months after the last dose. The trial excluded patients with Grade 3b FL, large cell transformation, prior allogeneic transplant, and prior exposure to a PI3K inhibitor or to a Bruton’s tyrosine kinase inhibitor.

The median age was 64 years (range: 30 to 82 years), 68% were male, and 37% had bulky disease assessed at baseline (target lesion  $\geq 5$  cm). Patients had a median of 3 prior lines of therapy (range: 1 to 10), with 94% being refractory to their last therapy and 81% being refractory to 2 or more prior lines of therapy. Most patients (93%) had an ECOG performance status of 0 or 1.

The median duration of exposure to COPIKTRA was 5 months (range: 0.4 to 24), with 41% of patients receiving at least 6 months and 10% receiving at least 12 months of COPIKTRA.

Efficacy was based on overall response rate and duration of response as assessed by an IRC (Table 9).



**Table 9. Efficacy in Patients with Relapsed or Refractory FL (Study 2)**

Endpoint	FL N = 83
ORR, n (%) <sup>a</sup>	35 (42)
95% CI	(31, 54)
CR, n (%)	1 (1)
PR, n (%)	34 (41)
Duration of response	
Range, months	0.0 <sup>+</sup> to 41.9 <sup>+</sup>
Patients maintaining response at 6 months, n/N (%)	15/35 (43)
Patients maintaining response at 12 months, n/N (%)	6/35 (17)

Abbreviations: CI = confidence interval; CR = complete response; IRC = Independent Review Committee; ORR = overall response rate; PR = partial response

<sup>a</sup> Per IRC according to Revised International Working Group criteria

<sup>+</sup> Denotes censored observation

## 16 HOW SUPPLIED/STORAGE AND HANDLING

COPIKTRA (duvelisib) capsules are supplied as follows:

Capsule Strength	Description	Package Configuration	NDC No.
25 mg	White to off-white and Swedish orange opaque capsules marked with “duv 25 mg” in black ink	<ul style="list-style-type: none"> <li>14-day (28ct) single blister pack</li> <li>14-day (28ct) carton (1 x 28ct blister pack per carton)</li> <li>28-day (56ct) carton (2 x 28ct blister packs per carton)</li> <li>28-day (56ct) HDPE bottles</li> </ul>	<ul style="list-style-type: none"> <li>71779-125-04</li> <li>71779-125-03</li> <li>71779-125-02</li> <li>71779-125-01</li> </ul>
15 mg	Pink opaque capsules marked with “duv 15 mg” in black ink	<ul style="list-style-type: none"> <li>14-day (28ct) single blister pack</li> <li>28-day (56ct) carton (2 x 28ct blister packs per carton)</li> <li>56-count HDPE bottles</li> </ul>	<ul style="list-style-type: none"> <li>71779-115-03</li> <li>71779-115-02</li> <li>71779-115-01</li> </ul>

Abbreviations: HDPE = high-density polyethylene; NDC = National Drug Code; no. = number

Store at 20° to 25°C (68° to 77°F), with excursions permitted at 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature]. Retain in original package until dispensing. Dispense blister packs in original container.

## 17 PATIENT COUNSELING INFORMATION

Advise the patient to read the FDA-approved patient labeling (Medication Guide).

Physicians and healthcare professionals are advised to discuss the following with patients prior to treatment with COPIKTRA:

- *Infections*

Advise patients that COPIKTRA can cause serious infections that may be fatal. Advise patients to immediately report symptoms of infection (e.g. fever, chills) [see *Warnings and Precautions (5.1)*].

- *Diarrhea or Colitis*

Advise patients that COPIKTRA can cause serious diarrhea or colitis (inflammation of the gut) that may be fatal, and to notify their healthcare provider immediately about any new or worsening diarrhea, stool with mucus or blood, or abdominal pain [see *Warnings and Precautions (5.2)*].

- *Cutaneous Reactions*

Advise patients that COPIKTRA can cause a serious skin rash that may be fatal, and to notify their healthcare provider immediately if they develop a new or worsening skin rash [see *Warnings and Precautions (5.3)*].

- *Pneumonitis*

Advise patients that COPIKTRA may cause pneumonitis (inflammation of the lungs) that may be fatal, and to report any new or worsening respiratory symptoms including cough or difficulty breathing [see *Warnings and Precautions (5.4)*].

- *Hepatotoxicity*

Advise patients that COPIKTRA may cause significant elevations in liver enzymes, and that monitoring of liver tests is needed. Advise patients to report symptoms of liver dysfunction including jaundice (yellow eyes or yellow skin), abdominal pain, bruising, or bleeding [see *Warnings and Precautions (5.5)*].

- *Neutropenia*

Advise patients of the need for periodic monitoring of blood counts. Advise patients to notify their healthcare provider immediately if they develop a fever or any sign of infection [see *Warnings and Precautions (5.6)*].

- *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 [see *Use in Specific Populations (8.1)*].

Advise females of reproductive potential to use effective contraception during treatment and for at least 1 month after receiving the last dose of COPIKTRA [see *Warnings and Precautions (5.7) and Use in Specific Populations (8.1, 8.3)*].

Advise males with female partners of reproductive potential to use effective contraception during treatment with COPIKTRA and for at least 1 month after the last dose [see *Warnings and Precautions (5.7)* and *Use in Specific Populations (8.1, 8.3)*].

- *Lactation*

Advise lactating women not to breastfeed during treatment with COPIKTRA and for at least 1 month after the last dose [see *Use in Specific Populations (8.2)*].

Advise patients to inform their healthcare providers of all concomitant medications, including prescription medicines, over-the-counter drugs, vitamins, and herbal products, before and during treatment with COPIKTRA [see *Drug Interactions (7)*].

- *Instructions for Taking COPIKTRA*

Advise patients to take COPIKTRA exactly as prescribed. COPIKTRA may be taken with or without food; the capsules should be swallowed whole [see *Dosage and Administration (2.1)*].

Advise patients that if a dose is missed by fewer than 6 hours, to take the missed dose right away and take the next dose as usual. If a dose is missed by more than 6 hours, advise patients to wait and take the next dose at the usual time [see *Dosage and Administration (2.3)*].

Manufactured for: Verastem, Inc., Needham, MA 02494

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