

## HIGHLIGHTS OF PRESCRIBING INFORMATION

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

**FOLOTYN (pralatrexate injection)**  
**Solution for intravenous injection**  
**Initial U.S. Approval: 2009**

### -----RECENT MAJOR CHANGES-----

Warnings and Precautions, Mucositis (5.2) 4/2010  
Warnings and Precautions, Dermatologic Reactions (5.3) 4/2010  
Warnings and Precautions, Tumor Lysis Syndrome (5.4) 10/2010

### -----INDICATIONS AND USAGE-----

FOLOTYN is a folate analog metabolic inhibitor indicated for the treatment of patients with relapsed or refractory peripheral T-cell lymphoma (PTCL). This indication is based on overall response rate. Clinical benefit such as improvement in progression-free survival or overall survival has not been demonstrated. (1)

### -----DOSAGE AND ADMINISTRATION-----

- The recommended dose of FOLOTYN is 30 mg/m<sup>2</sup> administered as an intravenous push over 3 to 5 minutes once weekly for 6 weeks in 7-week cycles. (2.1)
- Supplement patients with vitamin B<sub>12</sub> 1 mg intramuscularly every 8-10 weeks and folic acid 1.0-1.25 mg orally on a daily basis. (2.2)
- Treatment interruption or dose reduction to 20 mg/m<sup>2</sup> may be needed to manage adverse drug reactions. (2.5)

### -----DOSAGE FORMS AND STRENGTHS-----

- Sterile, single-use vials containing pralatrexate at a concentration of 20 mg/mL in the following presentations:
  - 20 mg of pralatrexate in 1 mL solution in a vial (20 mg / 1 mL)
  - 40 mg of pralatrexate in 2 mL solution in a vial (40 mg / 2 mL) (3)

### -----CONTRAINDICATIONS-----

- None. (4)

### -----WARNINGS AND PRECAUTIONS-----

- Thrombocytopenia, neutropenia, and anemia may occur. Monitor blood counts and omit or modify dose for hematologic toxicities. (2.5, 5.1)
- Mucositis may occur. If ≥ Grade 2 mucositis is observed, omit or modify dose. (2.5, 5.2)
- Fatal dermatologic reactions may occur. Dermatologic reactions may be progressive and increase in severity with further treatment. Patients with dermatologic reactions should be monitored closely, and if severe, FOLOTYN should be withheld or discontinued. (5.3)
- Tumor lysis syndrome may occur. Monitor patients and treat if needed. (5.4)
- FOLOTYN can cause fetal harm. Women should avoid becoming pregnant while being treated with FOLOTYN, and pregnant women should be informed of the potential harm to the fetus. (5.6, 8.1)
- Use caution in patients with moderate to severe renal function impairment. (5.7)
- Elevated liver function test abnormalities may occur. If liver function test abnormalities are ≥ Grade 3, omit or modify dose. (2.5, 5.8)

### -----ADVERSE REACTIONS-----

Most common adverse reactions are mucositis, thrombocytopenia, nausea, and fatigue. Most common serious adverse reactions are pyrexia, mucositis, sepsis, febrile neutropenia, dehydration, dyspnea, and thrombocytopenia. (6)

To report SUSPECTED ADVERSE REACTIONS, contact Allos Therapeutics, Inc at 1-888-ALLOS88 (1-888-255-6788) or [www.FOLOTYN.com](http://www.FOLOTYN.com) or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch)

### -----DRUG INTERACTIONS-----

- Co-administration with probenecid, NSAIDs, and trimethoprim/sulfamethaxazole may result in delayed renal clearance. (7)

### -----USE IN SPECIFIC POPULATIONS-----

- Women should be advised against breastfeeding while being treated with FOLOTYN. (8.3)

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

Revised: 10/2010

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## FULL PRESCRIBING INFORMATION

### 1 INDICATIONS AND USAGE

FOLOTYN is indicated for the treatment of patients with relapsed or refractory peripheral T-cell lymphoma (PTCL). This indication is based on overall response rate. Clinical benefit such as improvement in progression-free survival or overall survival has not been demonstrated.

### 2 DOSAGE AND ADMINISTRATION

FOLOTYN should be administered under the supervision of a qualified physician experienced in the use of antineoplastic agents. Appropriate management of complications is possible only when adequate diagnostic and treatment facilities are readily available.

#### 2.1 Peripheral T-cell Lymphoma

The recommended dose of FOLOTYN is 30 mg/m<sup>2</sup> administered as an intravenous (IV) push over 3-5 minutes via the side port of a free-flowing 0.9% Sodium Chloride Injection, USP IV line once weekly for 6 weeks in 7-week cycles until progressive disease or unacceptable toxicity.

#### 2.2 Vitamin Supplementation

Patients should take low-dose (1.0-1.25 mg) oral folic acid on a daily basis. Folic acid should be initiated during the 10-day period preceding the first dose of FOLOTYN, and dosing should continue during the full course of therapy and for 30 days after the last dose of FOLOTYN. Patients should also receive a vitamin B<sub>12</sub> (1 mg) intramuscular injection no more than 10 weeks prior to the first dose of FOLOTYN and every 8-10 weeks thereafter. Subsequent vitamin B<sub>12</sub> injections may be given the same day as treatment with FOLOTYN [see *Warnings and Precautions* (5.5)].

#### 2.3 Preparation and Administration Precautions

FOLOTYN is a cytotoxic anticancer agent. Caution should be exercised in handling, preparing, and administering of the solution. The use of gloves and other protective clothing is recommended. If FOLOTYN comes in contact with the skin, immediately and thoroughly wash with soap and water. If FOLOTYN comes in contact with mucous membranes, flush thoroughly with water.

Several published guidelines for handling and disposal of anticancer agents are available [see *References* (15)].

#### 2.4 Preparation for Intravenous Push Administration

1. FOLOTYN vials should be refrigerated at 2-8°C (36-46°F) until use.
2. FOLOTYN vials should be stored in original carton to protect from light until use.
3. FOLOTYN is a clear, yellow solution. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit. Do not use any vials exhibiting particulate matter or discoloration.
4. The calculated dose of FOLOTYN should be aseptically withdrawn into a syringe for immediate use.
5. Do not dilute FOLOTYN.
6. FOLOTYN vials contain no preservatives and are intended for single use only. After withdrawal of dose, discard vial including any unused portion.
7. Unopened vial(s) of FOLOTYN are stable if stored in the original carton at room temperature for 72 hours. Any vials left at room temperature for greater than 72 hours should be discarded.

## 2.5 Monitoring and Dose Modifications

Management of severe or intolerable adverse reactions may require dose omission, reduction, or interruption of FOLOTYN therapy.

### Monitoring

Complete blood cell counts and severity of mucositis should be monitored weekly. Serum chemistry tests, including renal and hepatic function, should be performed prior to the start of the first and fourth dose of a given cycle.

### Dose Modification Recommendations

Prior to administering any dose of FOLOTYN:

- Mucositis should be  $\leq$  Grade 1.
- Platelet count should be  $\geq 100,000/\mu\text{L}$  for first dose and  $\geq 50,000/\mu\text{L}$  for all subsequent doses.
- Absolute neutrophil count (ANC) should be  $\geq 1,000/\mu\text{L}$ .

Doses may be omitted or reduced based on patient tolerance. Omitted doses will not be made up at the end of the cycle; once a dose reduction occurs for toxicity, do not re-escalate. For dose modifications and omissions, use the guidelines in Tables 1, 2, and 3.

**Table 1 FOLOTYN Dose Modifications for Mucositis**

Mucositis Grade <sup>a</sup> on Day of Treatment	Action	Dose upon Recovery to $\leq$ Grade 1
Grade 2	Omit dose	Continue prior dose
Grade 2 recurrence	Omit dose	20 mg/m <sup>2</sup>
Grade 3	Omit dose	20 mg/m <sup>2</sup>
Grade 4	Stop therapy	

<sup>a</sup> Per National Cancer Institute-Common Terminology Criteria for Adverse Events (NCI CTCAE, Version 3.0)

**Table 2 FOLOTYN Dose Modifications for Hematologic Toxicities**

Blood Count on Day of Treatment	Duration of Toxicity	Action	Dose upon Restart
Platelet $< 50,000/\mu\text{L}$	1 week	Omit dose	Continue prior dose
	2 weeks	Omit dose	20 mg/m <sup>2</sup>
	3 weeks	Stop therapy	
ANC 500-1,000/ $\mu\text{L}$ and no fever	1 week	Omit dose	Continue prior dose
ANC 500-1,000/ $\mu\text{L}$ with fever or ANC $< 500/\mu\text{L}$	1 week	Omit dose, give G-CSF or GM-CSF support	Continue prior dose with G-CSF or GM-CSF support
	2 weeks or recurrence	Omit dose, give G-CSF or GM-CSF support	20 mg/m <sup>2</sup> with G-CSF or GM-CSF support
	3 weeks or 2 <sup>nd</sup> recurrence	Stop therapy	

**Table 3 FOLOTYN Dose Modifications for All Other Treatment-related Toxicities**

Toxicity Grade <sup>a</sup> on Day of Treatment	Action	Dose upon Recovery to $\leq$ Grade 2
Grade 3	Omit dose	20 mg/m <sup>2</sup>
Grade 4	Stop therapy	

<sup>a</sup> Per National Cancer Institute-Common Terminology Criteria for Adverse Events (NCI CTCAE, Version 3.0)

### 3 DOSAGE FORMS AND STRENGTHS

FOLOTYN is available in sterile, single-use vials containing pralatrexate at a concentration of 20 mg/mL in the following presentations:

- 20 mg of pralatrexate in 1 mL solution in a vial (20 mg / 1 mL)
- 40 mg of pralatrexate in 2 mL solution in a vial (40 mg / 2 mL)

### 4 CONTRAINDICATIONS

None.

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Bone Marrow Suppression

FOLOTYN can suppress bone marrow function, manifested by thrombocytopenia, neutropenia, and anemia. Dose modifications are based on ANC and platelet count prior to each dose [*see Dosage and Administration (2.5) and Adverse Reactions (6)*].

#### 5.2 Mucositis

Treatment with FOLOTYN may cause mucositis. If  $\geq$  Grade 2 mucositis is observed, omit dose and follow guidelines in Section 2.5, Table 1 [*see Dosage and Administration (2.5)*].

#### 5.3 Dermatologic Reactions

FOLOTYN has been associated with severe dermatologic reactions, which may result in death. These dermatologic reactions have been reported in clinical studies (14/663 patients [2.1%]) and post marketing experience, and have included skin exfoliation, ulceration, and toxic epidermal necrolysis (TEN). These reactions may be progressive and increase in severity with further treatment, and may involve skin and subcutaneous sites of known lymphoma. Patients with dermatologic reactions should be monitored closely, and if severe, FOLOTYN should be withheld or discontinued.

#### 5.4 Tumor Lysis Syndrome

Tumor lysis syndrome has been reported in patients with lymphoma receiving FOLOTYN. Patients receiving FOLOTYN should be monitored closely and treated for complications.

#### 5.5 Folic Acid and Vitamin B<sub>12</sub> Supplementation

Patients should be instructed to take folic acid and receive vitamin B<sub>12</sub> to potentially reduce treatment-related hematological toxicity and mucositis [*see Dosage and Administration (2.2)*].

#### 5.6 Pregnancy Category D

FOLOTYN can cause fetal harm when administered to a pregnant woman. FOLOTYN was embryotoxic and fetotoxic in rats and rabbits. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential hazard to the fetus [*see Use in Specific Populations (8.1)*].

#### 5.7 Decreased Renal Function

Although FOLOTYN has not been formally tested in patients with renal impairment, caution is advised when administering FOLOTYN to patients with moderate to severe impairment. Monitor patients for renal function and systemic toxicity due to increased drug exposure [*see Clinical Pharmacology (12.3)*].

#### 5.8 Elevated Liver Enzymes

Reference ID: 2888243

Liver function test abnormalities have been observed after FOLOTYN administration. Persistent liver function test abnormalities may be indicators of liver toxicity and require dose modification. Monitor patients for liver function [*see Dosage and Administration (2.5)*].

## **6 ADVERSE REACTIONS**

The most common adverse reactions observed in patients with peripheral T-cell lymphoma (PTCL) treated with FOLOTYN were mucositis, thrombocytopenia, nausea, and fatigue.

### **6.1 Clinical Trials Experience**

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

The safety of FOLOTYN was evaluated in 111 PTCL patients in a single-arm clinical study in which patients received a starting dose of 30 mg/m<sup>2</sup> once weekly for 6 weeks in 7-week cycles. The median duration of treatment was 70 days (range 1-540 days).

#### ***Most Frequent Adverse Reactions***

Table 4 summarizes the most frequent adverse reactions, regardless of causality, using the National Cancer Institute-Common Terminology Criteria for Adverse Events (NCI CTCAE, version 3.0).

**Table 4 Adverse Reactions Occurring in PTCL Patients (Incidence  $\geq$  10% of patients)**

Preferred Term	N=111					
	Total		Grade 3		Grade 4	
	N	%	N	%	N	%
Any Adverse Event	111	100	48	43	34	31
Mucositis <sup>a</sup>	78	70	19	17	4	4
Thrombocytopenia <sup>b</sup>	45	41	15	14	21	19 <sup>b</sup>
Nausea	44	40	4	4	0	0
Fatigue	40	36	5	5	2	2
Anemia	38	34	17	15	2	2
Constipation	37	33	0	0	0	0
Pyrexia	36	32	1	1	1	1
Edema	33	30	1	1	0	0
Cough	31	28	1	1	0	0
Epistaxis	29	26	0	0	0	0
Vomiting	28	25	2	2	0	0
Neutropenia	27	24	14	13	8	7
Diarrhea	23	21	2	2	0	0
Dyspnea	21	19	8	7	0	0
Anorexia	17	15	3	3	0	0
Hypokalemia	17	15	4	4	1	1
Rash	17	15	0	0	0	0
Pruritus	16	14	2	2	0	0
Pharyngolaryngeal pain	15	14	1	1	0	0
Liver function test abnormal <sup>c</sup>	14	13	6	5	0	0
Abdominal pain	13	12	4	4	0	0
Pain in extremity	13	12	0	0	0	0
Back pain	12	11	3	3	0	0
Leukopenia	12	11	3	3	4	4
Night sweats	12	11	0	0	0	0
Asthenia	11	10	1	1	0	0
Tachycardia	11	10	0	0	0	0
Upper respiratory tract infection	11	10	1	1	0	0

<sup>a</sup>Stomatitis or mucosal inflammation of the gastrointestinal and genitourinary tracts.

<sup>b</sup>Five patients with platelets < 10,000/ $\mu$ L

<sup>c</sup>Alanine aminotransferase, aspartate aminotransferase, and transaminases increased

### ***Serious Adverse Events***

Forty-four percent of patients (n = 49) experienced a serious adverse event while on study or within 30 days after their last dose of FOLOTYN. The most common serious adverse events (> 3%), regardless of causality, were pyrexia, mucositis, sepsis, febrile neutropenia, dehydration, dyspnea, and thrombocytopenia. One death from cardiopulmonary arrest in a patient with mucositis and febrile neutropenia was reported in this trial. Deaths from mucositis, febrile neutropenia, sepsis, and pancytopenia occurred in 1.2% of patients treated on all FOLOTYN trials at doses ranging from 30 to 325 mg/m<sup>2</sup>.

### ***Discontinuations***

Twenty-three percent of patients (n = 25) discontinued treatment with FOLOTYN due to adverse reactions. The adverse reactions reported most frequently as the reason for discontinuation of treatment were mucositis (6%, n = 7) and thrombocytopenia (5%, n = 5).

### ***Dose Modifications***

The target dose of FOLOTYN was 30 mg/m<sup>2</sup> once weekly for 6 weeks in 7-week cycles. The majority of patients (69%, n = 77) remained at the target dose for the duration of treatment. Overall, 85% of scheduled doses were administered.

## **6.2 Post Marketing Experience**

Toxic epidermal necrolysis has been identified during post approval use of FOLOTYN. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure [see *Warnings and Precautions* (5.3)].

## **7 DRUG INTERACTIONS**

*In vitro* studies indicate that pralatrexate is not a substrate, inhibitor, or inducer of CYP450 isoenzymes and has low potential for drug-drug interactions at CYP450 isoenzymes [see *Clinical Pharmacology* (12.3)]. No formal clinical assessments of pharmacokinetic drug-drug interactions between FOLOTYN and other drugs have been conducted. The effect of co-administration of the uricosuric drug probenecid on pralatrexate pharmacokinetics was investigated in a Phase 1 clinical study. Co-administration of increasing doses of probenecid resulted in delayed clearance of pralatrexate and a commensurate increase in exposure.

Due to the contribution of renal excretion (approximately 34%) to the overall clearance of pralatrexate, concomitant administration of drugs that are subject to substantial renal clearance (eg, NSAIDs, trimethoprim/sulfamethoxazole) may result in delayed clearance of pralatrexate.

## **8 USE IN SPECIFIC POPULATIONS**

### **8.1 Pregnancy**

Pregnancy Category D [see *Warnings and Precautions* (5.6)].

FOLOTYN can cause fetal harm when administered to a pregnant woman. Pralatrexate was embryotoxic and fetotoxic in rats at IV doses of 0.06 mg/kg/day (0.36 mg/m<sup>2</sup>/day or about 1.2% of the clinical dose on a mg/m<sup>2</sup> basis) given on gestation days 7 through 20. Treatment with pralatrexate caused a dose-dependent decrease in fetal viability manifested as an increase in late, early, and total resorptions. There was also a dose-dependent increase in post-implantation loss. In rabbits, IV doses of 0.03 mg/kg/day (0.36 mg/m<sup>2</sup>/day) or greater given on gestation days 8 through 21 also caused abortion and fetal lethality. This toxicity manifested as early and total resorptions, post-implantation loss, and a decrease in the total number of live fetuses. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential hazard to the fetus.

Reference ID: 2888243

### 8.3 Nursing Mothers

It is not known whether pralatrexate is excreted in human milk. Because many drugs are excreted in human milk, and because of the potential for serious adverse reactions in nursing infants from this drug, a decision should be made whether to discontinue nursing or to discontinue FOLOTYN, taking into account the importance of FOLOTYN to the mother.

### 8.4 Pediatric Use

Pediatric patients were not included in clinical studies with FOLOTYN. The safety and effectiveness of FOLOTYN in pediatric patients have not been established.

### 8.5 Geriatric Use

In the PTCL efficacy study, 36% of patients (n = 40) were 65 years of age and over. No overall differences in efficacy and safety were observed in patients based on age (< 65 years compared with ≥ 65 years).

No dosage adjustment is required in elderly patients with normal renal function [see *Clinical Pharmacology* (12.3)]

### 8.6 Hepatic Impairment

Formal studies have not been performed with FOLOTYN in patients with hepatic impairment. Patients with the following laboratory values were excluded from the pralatrexate lymphoma clinical trials: total bilirubin > 1.5 mg/dL; aspartate aminotransferase (AST) or alanine aminotransferase (ALT) > 2.5 × upper limit of normal (ULN); and AST or ALT > 5 × ULN if documented hepatic involvement with lymphoma.

### 8.7 Renal Impairment

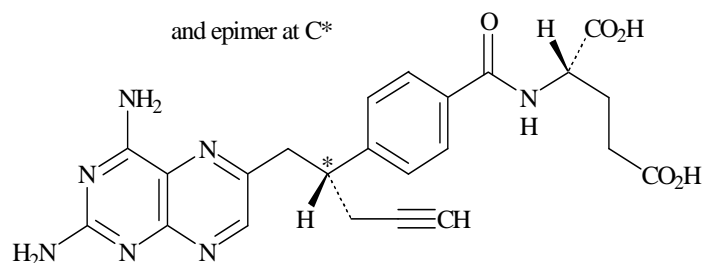
[see *Warnings and Precautions* (5.7) and *Clinical Pharmacology* (12.3)].

## 10 OVERDOSAGE

No specific information is available on the treatment of overdose of FOLOTYN. If an overdose occurs, general supportive measures should be instituted as deemed necessary by the treating physician. Based on FOLOTYN'S mechanism of action the prompt administration of leucovorin should be considered.

## 11 DESCRIPTION

FOLOTYN (pralatrexate injection) contains pralatrexate, which is an antineoplastic folate analog. Pralatrexate has the chemical name (2S)-2-[[4-[(1R)-1-[(2, 4-diaminopteridin-6-yl)methyl]but-3-ynyl]benzoyl]amino]pentanedioic acid. The structural formula is as follows:



Pralatrexate is a 1:1 racemic mixture of *S*- and *R*- diastereomers at the C10 position (indicated with \*).

The molecular formula is C<sub>23</sub>H<sub>23</sub>N<sub>7</sub>O<sub>5</sub> and the molecular weight is 477.48 g/mol.

Pralatrexate is an off-white to yellow solid. It is soluble in aqueous solutions at pH 6.5 or higher. Pralatrexate is practically insoluble in chloroform and ethanol. The pK<sub>a</sub> values are 3.25, 4.76, and 6.17.

Reference ID: 2888243

FOLOTYN is supplied as a preservative-free, sterile, isotonic, non-pyrogenic clear yellow aqueous parenteral solution contained in a single-use clear glass vial (Type I) for intravenous administration. Each 1 mL of solution contains 20 mg of pralatrexate, sufficient sodium chloride to achieve an isotonic (280-300 mOsm) solution, and sufficient sodium hydroxide, and hydrochloric acid if needed, to adjust and maintain the pH at 7.5-8.5. FOLOTYN is supplied as either 20 mg (1 mL) or 40 mg (2 mL) single-use vials at a concentration of 20 mg/mL.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Pralatrexate is a folate analog metabolic inhibitor that competitively inhibits dihydrofolate reductase. It is also a competitive inhibitor for polyglutamylation by the enzyme folylpolyglutamyl synthetase. This inhibition results in the depletion of thymidine and other biological molecules the synthesis of which depends on single carbon transfer.

### 12.3 Pharmacokinetics

#### *Absorption*

The pharmacokinetics of pralatrexate administered as a single agent at a dose of 30 mg/m<sup>2</sup> administered as an intravenous push over 3-5 minutes once weekly for 6 weeks in 7-week cycles have been evaluated in 10 patients with PTCL. The total systemic clearance of pralatrexate diastereomers was 417 mL/min (*S*-diastereomer) and 191 mL/min (*R*-diastereomer). The terminal elimination half-life of pralatrexate was 12-18 hours (coefficient of variance [CV] = 62-120%). Pralatrexate total systemic exposure (AUC) and maximum plasma concentration (C<sub>max</sub>) increased proportionally with dose (dose range 30-325 mg/m<sup>2</sup>, including pharmacokinetics data from high-dose solid tumor clinical studies). The pharmacokinetics of pralatrexate did not change significantly over multiple treatment cycles, and no accumulation of pralatrexate was observed.

#### *Distribution*

Pralatrexate diastereomers showed a steady-state volume of distribution of 105 L (*S*-diastereomer) and 37 L (*R*-diastereomer). *In vitro* studies indicate that pralatrexate is approximately 67% bound to plasma proteins. In *in vitro* studies using MDR1-MDCK and Caco-2 cell systems, pralatrexate was not a substrate for P-glycoprotein (Pgp)-mediated transport nor did it inhibit Pgp-mediated transport.

#### *Metabolism*

*In vitro* studies using human hepatocytes, liver microsomes and S9 fractions, and recombinant human CYP450 isozymes showed that pralatrexate is not significantly metabolized by the phase I hepatic CYP450 isozymes or phase II hepatic glucuronidases. *In vitro* studies indicated that pralatrexate has low potential to induce or inhibit the activity of CYP450 isozymes.

#### *Excretion*

A mass balance study has not been performed. The mean fraction of unchanged pralatrexate diastereomers excreted in urine following a pralatrexate dose of 30 mg/m<sup>2</sup> administered as an intravenous push over 3-5 minutes was 31% (*S*-diastereomer) (CV = 47%) and 38% (*R*-diastereomer) (CV = 45%), respectively.

#### *Patients with Renal Impairment*

Approximately 34% of pralatrexate was excreted unchanged into urine following a single dose of 30 mg/m<sup>2</sup> administered as an intravenous push over 3-5 minutes. In a population pharmacokinetic analysis drug clearance decreased with decreasing creatinine clearance [see *Warnings and Precautions* (5.7)].

#### *Patients with Hepatic Impairment*

Pralatrexate has not been studied in patients with hepatic impairment.

### ***Effects of Age and Gender***

Due to the contribution of renal excretion to overall clearance of pralatrexate, age-related decline in renal function may lead to a reduction in clearance and a commensurate increase in plasma exposure. There was no significant effect of gender on pharmacokinetics.

## **13 NONCLINICAL TOXICOLOGY**

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

#### ***Carcinogenesis***

Carcinogenicity studies have not been performed with pralatrexate.

#### ***Mutagenesis***

Pralatrexate did not cause mutations in the Ames test or the Chinese hamster ovary cell chromosome aberration assay. Nevertheless, these tests do not reliably predict genotoxicity for this class of compounds. Pralatrexate did not cause mutations in the mouse micronucleus assay.

#### ***Impairment of Fertility***

No fertility studies have been performed.

## **14 CLINICAL STUDIES**

### ***Peripheral T-cell Lymphoma (PTCL)***

The safety and efficacy of FOLOTYN was evaluated in an open-label, single-arm, multi-center, international trial that enrolled 115 patients with relapsed or refractory PTCL. One hundred and eleven patients were treated with FOLOTYN at 30 mg/m<sup>2</sup> once weekly by IV push over 3-5 minutes for 6 weeks in 7-week cycles until disease progression or unacceptable toxicity. Of the 111 patients treated, 109 patients were evaluable for efficacy. Evaluable patients had histologically confirmed PTCL by independent central review using the Revised European American Lymphoma (REAL) World Health Organization (WHO) disease classification, and relapsed or refractory disease after at least one prior treatment.

The primary efficacy endpoint was overall response rate (complete response, complete response unconfirmed, and partial response) as assessed by International Workshop Criteria (IWC). The key secondary efficacy endpoint was duration of response. Response assessments were scheduled at the end of cycle 1 and then every other cycle (every 14 weeks). Duration of response was measured from the first day of documented response to disease progression or death. Response and disease progression were evaluated by independent central review using the IWC.

The median age of treated patients was 59.0 years (range 21-85); 68% were male and 32% were female. Most patients were White (72%) and other racial origins included: Black (13%), Hispanic (8%), Asian (5%), other and unknown (<1% each). Patients had an Eastern Cooperative Oncology Group (ECOG) performance status at study entry of 0 (39%), 1 (44%), or 2 (17%). The median time from initial diagnosis to study entry was 15.6 months (range 0.8 – 322.3).

The median number of prior systemic therapies was 3 (range 1-12). Approximately one-fourth of patients (24%, n = 27) did not have evidence of response to any previous therapy. Approximately two-thirds of patients (63%, n = 70) did not have evidence of response to their most recent prior therapy before entering the study.

In all evaluable patients (n = 109) treated with FOLOTYN, the response rate, as determined by independent central review by IWC, was 27% (n = 29) (Table 5).

**Table 5 Response Analysis per Independent Central Review (IWC)**

	Evaluable Patients (N=109)		Median Duration of Response	Range of Duration of Response
	N (%)	95% CI		
<b>Overall Response</b>				
CR+CRu+PR	29 (27)	19, 36	287 days (9.4 months)	1-503 days
CR/CRu	9 (8)			
PR	20 (18)			
<b>Responses ≥ 14 weeks</b>				
CR+CRu+PR	13 (12)	7, 20	Not Reached	98-503 days
CR/CRu	7 (6)			
PR	6 (6)			

Fourteen patients went off treatment in cycle 1; 2 patients were unevaluable for response by IWC due to insufficient materials provided to central review.

CR = Complete Response, CRu = Complete Response unconfirmed, PR = Partial Response

The initial response assessment was scheduled at the end of cycle 1. Of the responders, 66% responded within cycle 1. The median time to first response was 45 days (range 37-349 days).

## 15 REFERENCES

- 1 Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings. NIOSH Alert 2004-165.
- 2 OSHA Technical Manual, TED 1-0.15A, Section VI: Chapter 2. Controlling Occupational Exposure to Hazardous Drugs. OSHA, 1999. [http://www.osha.gov/dts/osta/otm/otm\\_vi/otm\\_vi\\_2.html](http://www.osha.gov/dts/osta/otm/otm_vi/otm_vi_2.html)
- 3 American Society of Health-System Pharmacists. ASHP guidelines on handling hazardous drugs. Am J Health-Syst Pharm. 2006;63:1172-1193.
- 4 Polovich, M., White, J. M., & Kelleher, L. O. (eds.) 2005. Chemotherapy and biotherapy guidelines and recommendations for practice (2nd. ed.) Pittsburgh, PA: Oncology Nursing Society.

## 16 HOW SUPPLIED/STORAGE AND HANDLING

FOLOTYN is available in single-use clear glass vials containing pralatrexate at a concentration of 20 mg/mL as a preservative-free, sterile, clear yellow solution individually packaged for intravenous use in the following presentations:

**NDC 48818-001-01:** 20 mg of pralatrexate in 1 mL solution in a vial (20 mg / 1 mL)

**NDC 48818-001-02:** 40 mg of pralatrexate in 2 mL solution in a vial (40 mg / 2 mL)

Vials must be stored refrigerated at 2-8°C (36-46°F) (*see* USP Controlled Cold Temperature) in original carton to protect from light.

Handle and dispose of FOLOTYN according to guidelines issued for cytotoxic drugs, including the use of gloves and other protective clothing to prevent skin contact [*see References (15)*].

Reference ID: 2888243

Each vial of FOLOTYN is intended for single use only. Any unused drug remaining after injection must be discarded.

**Rx only**

**17 PATIENT COUNSELING INFORMATION**

See FDA-approved Patient Package Insert.

Patients should be instructed to read the Patient Package Insert carefully.

**17.1 Need for Folic Acid and Vitamin B<sub>12</sub>**

Patients treated with FOLOTYN must be instructed to take folic acid and vitamin B<sub>12</sub> as a prophylactic measure to potentially reduce possible side effects [*see Dosage and Administration (2.2)*].

**17.2 Low Blood Cell Counts**

Patients should be informed of the risk of low blood cell counts and instructed to immediately contact their physician should any signs of infection develop, including fever. Patients should also be instructed to contact their physician if bleeding or symptoms of anemia occur.

**17.3 Mucositis**

Physicians should discuss with patients the signs and symptoms of mucositis. Patients should be instructed on ways to reduce the risk of its development, and/or ways to maintain nutrition and control discomfort from mucositis if it occurs.

**17.4 Fatal Dermatologic Reactions**

Physicians should discuss with patients the signs and symptoms of dermatologic reactions. Patients should be made aware to immediately notify their physician if any skin reactions occur [*see Warnings and Precautions (5.3)*].

**17.5 Tumor Lysis Syndrome**

Physicians should discuss with patients the signs and symptoms of tumor lysis syndrome. Patients should be instructed to notify their physician if they experience these symptoms [*see Warnings and Precautions (5.4)*].

**17.6 Concomitant Medications**

Patients should be instructed to inform their physician if they are taking any concomitant medications including prescription drugs (such as trimethoprim/sulfamethoxazole) and nonprescription drugs (such as nonsteroidal anti-inflammatory drugs) [*see Drug Interactions (7)*].

**17.7 Pregnancy/Nursing**

Patients should be instructed to tell their physician if they are pregnant or plan to become pregnant due to the risk of fetal harm. Patients should be instructed to tell their physician if they are nursing.



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THERAPEUTICS

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## Patient Information

### **FOLOTYN® (FOH-loh-tin) (pralatrexate injection)**

Read the Patient Information that comes with FOLOTYN before you start treatment and each time you get treated with FOLOTYN. There may be new information. This leaflet does not take the place of talking to your doctor about your medical condition or treatment. Talk to your doctor if you have any questions about FOLOTYN.

### **What is FOLOTYN?**

FOLOTYN is a prescription anti-cancer (chemotherapy) medicine. FOLOTYN is used to treat people with a type of cancer called Peripheral T-cell Lymphoma (PTCL) that does not go away, gets worse, or comes back after use of another cancer treatment.

### **What should I tell my doctor before receiving FOLOTYN?**

#### **Before you receive FOLOTYN, tell your doctor if you:**

- have liver problems.
- have kidney problems.
- have any other medical conditions.
- are pregnant or plan to become pregnant. FOLOTYN can harm your unborn baby. Talk to your doctor about the best way to prevent pregnancy while taking FOLOTYN. Tell your doctor right away if you become pregnant while taking FOLOTYN.
- are breast-feeding or plan to breast-feed. It is not known if FOLOTYN passes into breast milk. You and your doctor should decide if you will take FOLOTYN or breast-feed. You should not do both. Talk to your doctor about the best way to feed your baby while you are being treated with FOLOTYN.

**Tell your doctor about all the medicines you take**, including prescription and non-prescription medicines, vitamins, and herbal supplements. Some medicines may affect how FOLOTYN works, and FOLOTYN may affect how other medicines works. Especially tell your doctor if you take:

- sulfamethoxazole trimethoprim (Bactrim®, Septra®, Septra DS, Sulfatrim Pediatric, Sulfamethoprim, Sulfamethoprim-DS)
- non-steroidal anti-inflammatory drugs (NSAIDs)
- probenecid (Probalan, Col-Probenecid)

Ask your doctor or pharmacist if you are not sure if your medicine is listed above.

Know the medicines you take. Keep a list of them and show it to your doctor or pharmacist each time you start a new medicine.

### How will I receive FOLOTYN?

- FOLOTYN will be given to you as directed by your doctor, as an intravenous (IV) injection into your vein over 3 to 5 minutes.
- FOLOTYN is usually given in cycles, one time each week for 6 weeks, with no treatment on the 7<sup>th</sup> week. Treatment with FOLOTYN may be continued as long as it is helpful to you.

To lower your chances of harmful side effects, it is important that you take folic acid and vitamin B<sub>12</sub> during your treatment with FOLOTYN. Your doctor will give you specific instructions for vitamin supplementation.

- You will take folic acid by mouth for 10 days before your first dose of FOLOTYN. Do not take more or less folic acid than your doctor tells you to take. Continue taking folic acid every day until your doctor tells you to stop.
- Your doctor will give you a vitamin B<sub>12</sub> injection into your muscle (intramuscular) before your first dose of FOLOTYN and about every 8 to 10 weeks during treatment with FOLOTYN.

You should have regular blood tests before and during your treatment with FOLOTYN. Your doctor may change your dose of FOLOTYN or delay treatment based on the results of your blood tests and on your general condition.

### What are the possible side effects of FOLOTYN?

#### FOLOTYN may cause serious side effects, including:

- **Low Blood Cell Counts:** FOLOTYN can affect your bone marrow and cause you to have low blood cell counts. Your doctor will do blood tests as needed to check your blood cell counts.
- **Low Platelet Count (thrombocytopenia):** Tell your doctor right away if you have any unusual bleeding, such as nosebleeds, or bruising under your skin.
- **Low White Blood Cell Count (neutropenia):** A low white blood cell count can cause you to get infections, which may be serious. Serious illness or death can happen if an infection is not treated right away when white blood cell counts are very low. Tell your doctor right away if you have any of the following signs or symptoms of an infection:
  - fever
  - chills
  - cough
  - shortness of breath
  - pain or burning on urination

- **Low Red Blood Cell Count (anemia):** Tell your doctor if you have any of these symptoms of anemia during treatment with FOLOTYN:
  - feeling weak, tired, or you get tired easily
  - you look pale
  - you feel short of breath
- **Redness and sores of the mucous membrane lining of the mouth, lips, throat, digestive tract, and genitals (mucositis).** Discomfort or pain due to mucositis may happen as early as a few days after treatment with FOLOTYN. Your doctor should tell you about ways to reduce your risk of getting mucositis, and how to maintain nutrition and control the discomfort from mucositis.
- **Severe skin reactions.** Severe skin reactions may happen after treatment with FOLOTYN, especially if you have lymphoma in or under your skin. If your skin reactions are severe, they may lead to serious illness or death. Tell your doctor right away if you have any of the following skin reactions:
  - rash
  - peeling and loss of skin
  - sores
  - blisters
- **Tumor Lysis Syndrome (TLS).** FOLOTYN can cause the fast breakdown of certain types of cancer cells. This can lead to TLS. Your doctor may do blood tests to check you for TLS and treat you for TLS if needed.
- **Harm to an unborn baby.** Females should avoid becoming pregnant while being treated with FOLOTYN. Talk to your doctor about how to avoid pregnancy while taking FOLOTYN.
- **Fever.** Fever is often one of the most common and earliest signs of infection. Follow your doctor's instructions about how often to take your temperature, especially during the days after treatment with FOLOTYN. If you have a fever, tell your doctor or nurse right away.
- **Loss of too much fluid from the body (dehydration).** If you feel tired and weak this could be a sign of dehydration. Follow your doctor's instructions for what to do to help prevent or treat dehydration.
- **Shortness of breath.** Tell your doctor if this is a problem for you.

**Common side effects of FOLOTYN include:**

- nausea
- vomiting
- tiredness
- constipation
- swelling
- cough
- nosebleed
- diarrhea

Tell your doctor about any side effect that bothers you or that does not go away.

These are not all the possible side effects of FOLOTYN. For more information, ask your doctor or pharmacist.

Call your doctor for medical advice about side effects. You can report side effects to FDA at 1-800-FDA-1088.

### **General information about FOLOTYN**

Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. This patient information leaflet summarizes the most important information about FOLOTYN. If you would like more information, talk with your doctor. You can ask your pharmacist or doctor for information about FOLOTYN that is written for health professionals. For more information, go to [www.FOLOTYN.com](http://www.FOLOTYN.com) or call 1-888-255-6788.

### **What are the ingredients in FOLOTYN?**

**Active ingredient:** pralatrexate

**Inactive ingredients:** sodium chloride, sodium hydroxide, and hydrochloric acid

### **What is PTCL?**

PTCL is a rare type of non-Hodgkin's lymphoma, a cancer of the lymphatic system. It happens when a type of T-cell (a kind of white blood cell) grows too much. PTCL may be found in different parts of the body, such as the lymph nodes, skin, bone marrow, liver, or spleen.



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