



**Patient G.M.**

# PROFILE OF A PATIENT WITH **Advanced Liposarcoma**

## **Indication**

### **Liposarcoma**

HALAVEN (eribulin mesylate) Injection is indicated for the treatment of patients with unresectable or metastatic liposarcoma who have received a prior anthracycline-containing regimen.

Please see Important Safety Information throughout and accompanying HALAVEN full Prescribing Information.

 **Halaven**<sup>®</sup>  
(eribulin mesylate) Injection | 0.5 mg per mL



### Patient history and treatment

- Patient G.M. is a 52-year-old man who presented with a mass in his posterior right thigh
- An MRI revealed a 36-cm mass in the right posteromedial thigh, and a biopsy revealed it to be an intermediate-grade sarcoma
- Preoperative radiation therapy (50 Gy) was given, followed by surgical resection of the mass
- Resection margins were negative. Final pathology was reported as atypical lipomatous tumor with some areas of cellularity suggestive of dedifferentiated liposarcoma

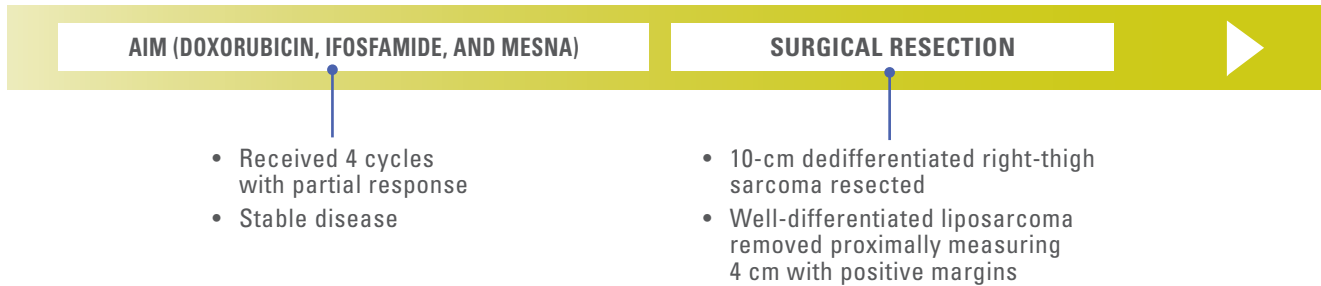
### Disease progression

- On routine follow-up 3 years post-surgery, MRI revealed a new 5.3- x 4.8-cm soft tissue mass posterior and medial to the midfemoral shaft
- CT of chest/abdomen/pelvis revealed a 2.2-cm hemangioma in the right lobe of the liver. There was also a stable, noncalcified 4.5-mm lung nodule in the right-lower lobe
- PET revealed hypermetabolic, partially calcified soft-tissue mass in the deep posteromedial mid-thigh measuring 12 cm in craniocaudal dimension
- Core needle biopsy of recurrent right-thigh mass revealed pleomorphic spindle and fibrous mesenchymal tumor consistent with recurrent dedifferentiated liposarcoma

MRI=magnetic resonance imaging; Gy=gray; CT=computerized tomography; PET=positron emission tomography.

\*This case study presents a hypothetical patient. HALAVEN® (eribulin mesylate) Injection (0.5 mg per mL) is not appropriate for all patients. This information should not substitute for the independent medical judgment of the treating physician.

### Previous treatment for recurrence



### Follow-up ~2 years later

- MRI showed right lower extremity disease progression of the residual lipomatous tumor of the right thigh
- Imaging 3 months later revealed slowly progressing disease in the right thigh
- Surgery was not recommended

*“I want more time to spend with my partner—our 20th anniversary is approaching”*

**What factors do you take into account when choosing a treatment regimen for metastatic dedifferentiated liposarcoma?**

---

## HALAVEN® Important Safety Information

### Warnings and Precautions

**Neutropenia:** Severe neutropenia (ANC <500/mm<sup>3</sup>) lasting >1 week occurred in 12% of patients with liposarcoma or leiomyosarcoma. Febrile neutropenia occurred in 0.9% of patients and fatal neutropenic sepsis occurred in 0.9% of patients. Monitor complete blood cell counts prior to each dose, and increase the frequency of monitoring in patients who develop Grade 3 or 4 cytopenias. Delay administration and reduce subsequent doses in patients who experience febrile neutropenia or Grade 4 neutropenia lasting >7 days.

**Peripheral Neuropathy:** Grade 3 peripheral neuropathy occurred in 3.1% of patients with liposarcoma and leiomyosarcoma receiving HALAVEN and neuropathy lasting more than 60 days occurred in 58% (38/65) of patients who had neuropathy at the last treatment visit. Patients should be monitored for signs of peripheral motor and sensory neuropathy. Withhold HALAVEN in patients who experience Grade 3 or 4 peripheral neuropathy until resolution to Grade 2 or less.

**Embryo-Fetal Toxicity:** HALAVEN can cause fetal harm when administered to a pregnant woman. Advise females of reproductive potential to use effective contraception during treatment with HALAVEN and for at least 2 weeks following the final dose. Advise males with female partners of reproductive potential to use effective contraception during treatment with HALAVEN and for 3.5 months following the final dose.

**QT Prolongation:** Monitor for prolonged QT intervals in patients with congestive heart failure, bradyarrhythmias, drugs known to prolong the QT interval, and electrolyte abnormalities. Correct hypokalemia or hypomagnesemia prior to initiating HALAVEN and monitor these electrolytes periodically during therapy. Avoid in patients with congenital long QT syndrome.

### Adverse Reactions

In patients with liposarcoma and leiomyosarcoma receiving HALAVEN, the most common adverse reactions (≥25%) reported in patients receiving HALAVEN were fatigue (62%), nausea (41%), alopecia (35%), constipation (32%), peripheral neuropathy (29%), abdominal pain (29%), and pyrexia (28%). The most common (≥5%) Grade 3-4 laboratory abnormalities reported in patients receiving HALAVEN were neutropenia (32%), hypokalemia (5.4%), and hypocalcemia (5%). Neutropenia (4.9%) and pyrexia (4.5%) were the most common serious adverse reactions. The most common adverse reactions resulting in discontinuation were fatigue and thrombocytopenia (0.9% each).

### Use in Specific Populations

**Lactation:** Because of the potential for serious adverse reactions in breastfed infants from eribulin mesylate, advise women not to breastfeed during treatment with HALAVEN and for 2 weeks after the final dose.

**Hepatic and Renal Impairment:** A reduction in starting dose is recommended for patients with mild or moderate hepatic impairment and/or moderate or severe renal impairment.

Please see additional Important Safety Information throughout and accompanying HALAVEN full Prescribing Information.



## Patient G.M. is appropriate for treatment with HALAVEN

### A treatment option for patients with advanced liposarcoma<sup>1,2</sup>

- ✓ Who have received a prior anthracycline-containing regimen
- ✓ With intermediate-to-high tumor grades regardless of liposarcoma subtype

### Current clinical findings

➤ ECOG PS: 0

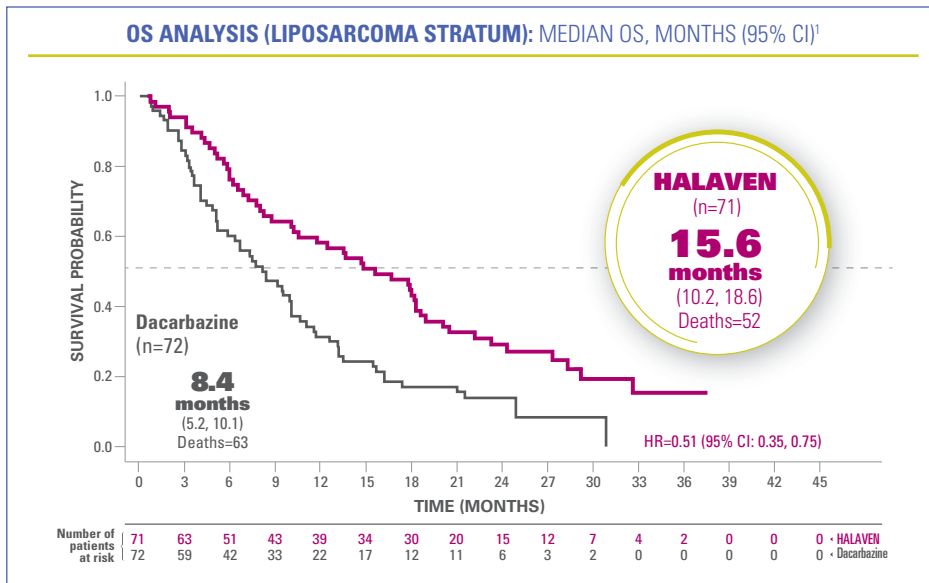
#### LABORATORY FINDINGS AT 2-YEAR FOLLOW-UP

PARAMETER	PATIENT G.M.'S RESULTS	
Liver	GGT	75 U/L
	ALP	96 U/L
	ALT	52 U/L
Serum creatinine	0.9 mg/dL	
WBC	$3.8 \times 10^3/\mu\text{L}$	
RBC	$5.4 \times 10^6/\mu\text{L}$	
Platelets	$175 \times 10^3/\mu\text{L}$	

ECOG PS=Eastern Cooperative Oncology Group performance status; GGT=gamma-glutamyl transpeptidase; ALP=alkaline phosphatase; ALT=alanine aminotransferase; WBC=white blood cell; RBC=red blood cell.

# Overall survival (OS) benefit and safety profile demonstrated in the Phase III trial

The first and only single agent to show a significant survival advantage in a Phase III study of patients with advanced liposarcoma<sup>2</sup>



The efficacy and safety of HALAVEN were evaluated in an open-label, randomized (1:1), multicenter, active-controlled trial. Eligible patients were required to have unresectable, locally advanced, or metastatic liposarcoma or leiomyosarcoma, at least 2 prior systemic chemotherapies (one of which must have included an anthracycline), and disease progression within 6 months of the most recent chemotherapy regimen. Patients were randomized to HALAVEN 1.4 mg/m<sup>2</sup> administered intravenously on Days 1 and 8 of a 21-day cycle or to dacarbazine at a dose of 850 mg/m<sup>2</sup>, 1,000 mg/m<sup>2</sup>, or 1,200 mg/m<sup>2</sup> administered intravenously every 21 days (dacarbazine dose was selected by the investigator prior to randomization). Treatment continued until disease progression or unacceptable toxicity. Randomization was stratified by histology (liposarcoma or leiomyosarcoma), number of prior therapies (2 vs >2), and geographic region. The most common (>40%) prior systemic chemotherapies were doxorubicin (90%), ifosfamide (62%), gemcitabine (59%), trabectedin (50%), and docetaxel (48%).<sup>1</sup> CI=confidence interval.

- In the overall study population, HALAVEN demonstrated a statistically significant improvement in OS compared with dacarbazine. Median OS in all treated patients was 13.5 months with HALAVEN vs 11.3 months with dacarbazine, HR=0.75 (95% CI: 0.61, 0.94),  $P=0.011$ . The treatment effects of HALAVEN were limited to patients with liposarcoma, based on preplanned, exploratory subgroup analyses of OS and PFS<sup>1</sup>
- There was no evidence of efficacy of HALAVEN in patients with advanced or metastatic leiomyosarcoma in this trial<sup>1</sup>

**Patients in the HALAVEN arm with liposarcoma had a 49% reduction in relative risk of death vs control group<sup>1,3</sup>**

## The secondary endpoint in the Phase III trial was PFS<sup>1</sup>

- Median PFS in the liposarcoma stratum was 2.9 months (95% CI: 2.6, 4.8) for patients receiving HALAVEN vs 1.7 months (95% CI: 1.4, 2.6) for patients receiving dacarbazine, HR=0.52 (95% CI: 0.35, 0.78)
- Median PFS in all patients was 2.6 months (95% CI: 2.0, 2.8) for patients receiving HALAVEN vs 2.6 months (95% CI: 1.7, 2.7) for patients receiving dacarbazine, HR=0.86 (95% CI: 0.69, 1.06)

## Adverse reactions

In patients with liposarcoma and leiomyosarcoma receiving HALAVEN, the most common adverse reactions ( $\geq 25\%$ ) reported in patients receiving HALAVEN were fatigue (62%), nausea (41%), alopecia (35%), constipation (32%), peripheral neuropathy (29%), abdominal pain (29%), and pyrexia (28%). The most common ( $\geq 5\%$ ) Grade 3-4 laboratory abnormalities reported in patients receiving HALAVEN were neutropenia (32%), hypokalemia (5.4%), and hypocalcemia (5%). Neutropenia (4.9%) and pyrexia (4.5%) were the most common serious adverse reactions. The most common adverse reactions resulting in discontinuation were fatigue and thrombocytopenia (0.9% each).

HR=hazard ratio; PFS=progression-free survival.

Please see additional Important Safety Information throughout and accompanying HALAVEN full Prescribing Information.

## HALAVEN<sup>®</sup> is administered as a quick 2- to 5-minute IV infusion<sup>1</sup>

### RECOMMENDED HALAVEN ADMINISTRATION<sup>1</sup>

	DOSE	INFUSION TIME	SCHEDULE
<b>Recommended dose</b>	<b>1.4 mg/m<sup>2</sup></b>	<b>2 to 5 minutes</b>	<b>Days 1 and 8 (21-day cycle)</b>
<b>In patients with</b>	1.1 mg/m <sup>2</sup>		
• Mild hepatic impairment <sup>a</sup>	0.7 mg/m <sup>2</sup>		
• Moderate hepatic impairment <sup>b</sup>	1.1 mg/m <sup>2</sup>		
• Moderate or severe renal impairment <sup>c</sup>	1.1 mg/m <sup>2</sup>		

<sup>a</sup>Mild hepatic impairment=Child-Pugh A. <sup>b</sup>Moderate hepatic impairment=Child-Pugh B. <sup>c</sup>Creatinine clearance (CLcr) of 15-49 mL/min.

➤ Patients with severe hepatic impairment (Child-Pugh C) were not studied<sup>1</sup>

### Recommended dose modifications<sup>1\*</sup>

- Assess for peripheral neuropathy and obtain complete blood cell counts prior to each dose
- Do not administer HALAVEN on Day 1 or Day 8 in patients with ≥Grade 3 neutropenia,<sup>†</sup> ≥Grade 2 thrombocytopenia,<sup>‡</sup> or Grade 3/4 nonhematologic toxicities
- **The Day 8 dose may be delayed for up to 1 week** in patients with toxicities
  - If toxicities resolve or improve to Grade 2 or less by Day 15, administer at a reduced dose and initiate the next cycle no sooner than 2 weeks later
  - If toxicities do not resolve or improve to Grade 2 or less by Day 15, omit the dose
- If a dose has been delayed for toxicities that have recovered to a severity of Grade 2 or less, resume at the recommended reduced dose
- If a dose has been reduced due to toxicities, do not re-escalate

### RECOMMENDED DOSE REDUCTIONS<sup>1\*</sup>

EVENTS REQUIRING PERMANENT DOSE REDUCTION	CURRENT DOSE	RECOMMENDED DOSE REDUCTION
<b>Hematologic toxicities</b> <ul style="list-style-type: none"> <li>• ANC &lt;500/mm<sup>3</sup> for &gt;7 days or ANC &lt;1,000/mm<sup>3</sup> with fever or infection</li> <li>• Platelets &lt;25,000/mm<sup>3</sup> or platelets &lt;50,000/mm<sup>3</sup> requiring transfusion</li> </ul> <b>Grade 3/4 nonhematologic toxicities</b>	<b>1.4 mg/m<sup>2</sup></b>	<b>1.1 mg/m<sup>2</sup></b>
<b>Omission or delay of Day 8 dose in previous cycle for toxicity</b>		
<b>Any event requiring permanent dose reduction while receiving 1.1 mg/m<sup>2</sup></b>	<b>1.1 mg/m<sup>2</sup></b>	<b>0.7 mg/m<sup>2</sup></b>
<b>Any event requiring permanent dose reduction while receiving 0.7 mg/m<sup>2</sup></b>	<b>0.7 mg/m<sup>2</sup></b>	<b>Discontinue HALAVEN</b>

IV=intravenous; ANC=absolute neutrophil count.

\*Toxicities graded in accordance with National Cancer Institute Common Terminology Criteria for Adverse Events version 3.0.<sup>1</sup>

<sup>†</sup>Greater than or equal to Grade 3 neutropenia=ANC <1,000/mm<sup>3</sup>.<sup>4</sup>

<sup>‡</sup>Greater than or equal to Grade 2 thrombocytopenia=platelets <75,000/mm<sup>3</sup>.<sup>4</sup>

## Learn about the HALAVEN® \$0 Co-Pay Program and the Eisai Assistance Program

[www.eisaireimbursement.com/hcp/halaven](http://www.eisaireimbursement.com/hcp/halaven)

or call **1.866.61.EISAI** (1.866.613.4724)

Monday-Friday, 8 AM to 8 PM, ET

For more information,  
visit [www.halaven.com/hcp/advanced-liposarcoma](http://www.halaven.com/hcp/advanced-liposarcoma)

**References:** **1.** HALAVEN [package insert]. Woodcliff Lake, NJ: Eisai Inc; 2016. **2.** Schöffski P, Chawla S, Maki RG, et al. Eribulin versus dacarbazine in previously treated patients with advanced liposarcoma or leiomyosarcoma: a randomised, open-label, multicentre, phase 3 trial. *Lancet*. 2016;387(10028):1629-1637. **3.** NCI dictionary of cancer terms. National Cancer Institute Web site. <http://www.cancer.gov/publications/dictionaries/cancer-terms?Cdrid=618612>. Accessed September 30, 2016. **4.** National Cancer Institute. Cancer Therapy Evaluation Program, Common Terminology Criteria for Adverse Events v3.0. NIH Publication # 03-5410. [http://ctep.cancer.gov/protocolDevelopment/electronic\\_applications/docs/ctcae3.pdf](http://ctep.cancer.gov/protocolDevelopment/electronic_applications/docs/ctcae3.pdf). Published March 31, 2003. Updated August 9, 2006. Accessed September 30, 2016.

Please see Important Safety Information throughout  
and accompanying HALAVEN full Prescribing Information.



HALAVEN® is a registered trademark used by Eisai Inc. under license from Eisai R&D Management Co., Ltd.  
© 2016 Eisai Inc. All rights reserved. Printed in USA/October 2016 HALA-US0627a

 **Halaven**®  
(eribulin mesylate) Injection | 0.5 mg per mL



## HIGHLIGHTS OF PRESCRIBING INFORMATION

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

### HALAVEN® (eribulin mesylate) injection, for intravenous use

Initial U.S. Approval: 2010

#### RECENT MAJOR CHANGES

Indications and Usage (1.2)	01/2016
Warnings and Precautions (5.1, 5.2, 5.3)	01/2016

#### INDICATIONS AND USAGE

HALAVEN is a microtubule inhibitor indicated for the treatment of patients with:

- Metastatic breast cancer who have previously received at least two chemotherapeutic regimens for the treatment of metastatic disease. Prior therapy should have included an anthracycline and a taxane in either the adjuvant or metastatic setting. (1.1)
- Unresectable or metastatic liposarcoma who have received a prior anthracycline-containing regimen. (1.2)

#### DOSAGE AND ADMINISTRATION

- Administer 1.4 mg/m<sup>2</sup> intravenously over 2 to 5 minutes on Days 1 and 8 of a 21-day cycle. (2.1)
- Reduce dose in patients with hepatic impairment or with moderate or severe renal impairment. (2.1)
- Do not mix with other drugs or administer with dextrose-containing solutions. (2.3)

#### DOSAGE FORMS AND STRENGTHS

Injection: 1 mg per 2 mL (0.5 mg per mL) (3)

#### CONTRAINDICATIONS

None (4)

## WARNINGS AND PRECAUTIONS

- Neutropenia:** Monitor peripheral blood cell counts and adjust dose as appropriate. (5.1)
- Peripheral Neuropathy:** Monitor for signs of neuropathy. Manage with dose delay and adjustment. (5.2)
- Embryo-Fetal Toxicity:** Can cause fetal harm. Advise females of reproductive potential of the potential risk to the fetus and to use effective contraception. (5.3, 8.1, 8.3)
- QT Prolongation:** Monitor for prolonged QT intervals in patients with congestive heart failure, bradyarrhythmias, drugs known to prolong the QT interval, and electrolyte abnormalities. Avoid in patients with congenital long QT syndrome. (5.4)

#### ADVERSE REACTIONS

The most common adverse reactions (≥25%) in metastatic breast cancer were neutropenia, anemia, asthenia/fatigue, alopecia, peripheral neuropathy, nausea, and constipation. (6.1)

The most common adverse reactions (≥25%) in liposarcoma and leiomyosarcoma were fatigue, nausea, alopecia, constipation, peripheral neuropathy, abdominal pain, and pyrexia. The most common (≥5%) Grade 3-4 laboratory abnormalities in liposarcoma and leiomyosarcoma were neutropenia, hypokalemia, and hypocalcemia. (6.1)

**To report SUSPECTED ADVERSE REACTIONS, contact Eisai Inc. at (1-877-873-4724) or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch**

#### USE IN SPECIFIC POPULATIONS

- Lactation:** Do not breastfeed. (8.2)
- Hepatic Impairment:** A lower starting dose is recommended for patients with mild (Child-Pugh A) and moderate (Child-Pugh B) hepatic impairment. Patients with severe hepatic impairment (Child-Pugh C) were not studied. (8.6)
- Renal Impairment:** A lower starting dose is recommended for patients with moderate (CLcr 30-49 mL/min) or severe (CLcr 15-29 mL/min) renal impairment. (8.7)

**See 17 for PATIENT COUNSELING INFORMATION and FDA-approved Patient Labeling (Patient Information).**

Revised: October 2016

## FULL PRESCRIBING INFORMATION: CONTENTS\*

### 1 INDICATIONS AND USAGE

- Metastatic Breast Cancer
- Liposarcoma

### 2 DOSAGE AND ADMINISTRATION

- Recommended Dose
- Dose Modification
- Instructions for Preparation and Administration

### 3 DOSAGE FORMS AND STRENGTHS

### 4 CONTRAINDICATIONS

### 5 WARNINGS AND PRECAUTIONS

- Neutropenia
- Peripheral Neuropathy
- Embryo-Fetal Toxicity
- QT Prolongation

### 6 ADVERSE REACTIONS

- Clinical Trials Experience
- Postmarketing Experience

### 7 DRUG INTERACTIONS

- Effects of Other Drugs on HALAVEN
- Effects of HALAVEN on Other Drugs

### 8 USE IN SPECIFIC POPULATIONS

- Pregnancy
- Lactation
- Females and Males of Reproductive Potential
- Pediatric Use
- Geriatric Use
- Hepatic Impairment
- Renal Impairment

### 10 OVERDOSAGE

### 11 DESCRIPTION

### 12 CLINICAL PHARMACOLOGY

- Mechanism of Action
- Pharmacodynamics
- Pharmacokinetics

### 13 NONCLINICAL TOXICOLOGY

- Carcinogenesis, Mutagenesis, Impairment of Fertility

### 14 CLINICAL STUDIES

- Metastatic Breast Cancer
- Liposarcoma

### 16 HOW SUPPLIED/STORAGE AND HANDLING

### 17 PATIENT COUNSELING INFORMATION

\*Sections or subsections omitted from the full prescribing information are not listed.

## FULL PRESCRIBING INFORMATION

### 1 INDICATIONS AND USAGE

#### 1.1 Metastatic Breast Cancer

HALAVEN is indicated for the treatment of patients with metastatic breast cancer who have previously received at least two chemotherapeutic regimens for the treatment of metastatic disease. Prior therapy should have included an anthracycline and a taxane in either the adjuvant or metastatic setting [see *Clinical Studies* (14.1)].

#### 1.2 Liposarcoma

HALAVEN is indicated for the treatment of patients with unresectable or metastatic liposarcoma who have received a prior anthracycline-containing regimen [see *Clinical Studies* (14.2)].

### 2 DOSAGE AND ADMINISTRATION

#### 2.1 Recommended Dose

The recommended dose of HALAVEN is 1.4 mg/m<sup>2</sup> administered intravenously over 2 to 5 minutes on Days 1 and 8 of a 21-day cycle.

The recommended dose of HALAVEN in patients with mild hepatic impairment (Child-Pugh A) is 1.1 mg/m<sup>2</sup> administered intravenously over 2 to 5 minutes on Days 1 and 8 of a 21-day cycle [see *Use in Specific Populations* (8.6)].

The recommended dose of HALAVEN in patients with moderate hepatic impairment (Child-Pugh B) is 0.7 mg/m<sup>2</sup> administered intravenously over 2 to 5 minutes on Days 1 and 8 of a 21-day cycle [see *Use in Specific Populations* (8.6)].

The recommended dose of HALAVEN in patients with moderate or severe renal impairment (creatinine clearance (CLcr) 15-49 mL/min) is 1.1 mg/m<sup>2</sup> administered intravenously over 2 to 5 minutes on Days 1 and 8 of a 21-day cycle [see *Use in Specific Populations* (8.7)].

#### 2.2 Dose Modification

Assess for peripheral neuropathy and obtain complete blood cell counts prior to each dose.

##### Recommended dose delays

- Do not administer HALAVEN on Day 1 or Day 8 for any of the following:
  - ANC < 1,000/mm<sup>3</sup>
  - Platelets < 75,000/mm<sup>3</sup>
  - Grade 3 or 4 non-hematological toxicities.
- The Day 8 dose may be delayed for a maximum of 1 week.
  - If toxicities do not resolve or improve to ≤ Grade 2 severity by Day 15, omit the dose.

- If toxicities resolve or improve to ≤ Grade 2 severity by Day 15, administer HALAVEN at a reduced dose and initiate the next cycle no sooner than 2 weeks later.

##### Recommended dose reductions

- If a dose has been delayed for toxicity and toxicities have recovered to Grade 2 severity or less, resume HALAVEN at a reduced dose as set out in Table 1.
- Do not re-escalate HALAVEN dose after it has been reduced.

**Table 1: Recommended Dose Reductions**

Event Description	Recommended HALAVEN Dose
<b>Permanently reduce the 1.4 mg/m<sup>2</sup> HALAVEN dose for any of the following:</b>	1.1 mg/m <sup>2</sup>
ANC <500/mm <sup>3</sup> for >7 days	
ANC <1,000 /mm <sup>3</sup> with fever or infection	
Platelets <25,000/mm <sup>3</sup>	
Platelets <50,000/mm <sup>3</sup> requiring transfusion	
Non-hematologic Grade 3 or 4 toxicities	0.7 mg/m <sup>2</sup>
Omission or delay of Day 8 HALAVEN dose in previous cycle for toxicity	
<b>Occurrence</b> of any event requiring permanent dose reduction while receiving 1.1 mg/m <sup>2</sup>	Discontinue HALAVEN
<b>Occurrence</b> of any event requiring permanent dose reduction while receiving 0.7 mg/m <sup>2</sup>	

ANC = absolute neutrophil count.

Toxicities graded in accordance with National Cancer Institute (NCI) Common Terminology Criteria for Adverse Events (CTCAE) version 3.0.

#### 2.3 Instructions for Preparation and Administration

Aseptically withdraw the required amount of HALAVEN from the single-use vial and administer undiluted or diluted in 100 mL of 0.9% Sodium Chloride Injection, USP.

**Do not dilute in or administer through an intravenous line containing solutions with dextrose.** Do not administer in the same intravenous line concurrent with the other medicinal products.

Store undiluted HALAVEN in the syringe for up to 4 hours at room temperature or for up to 24 hours under refrigeration (40°F or 4°C). Store diluted solutions of HALAVEN for up to 4 hours at room temperature or up to 24 hours under refrigeration.

Discard unused portions of the vial.

### 3 DOSAGE FORMS AND STRENGTHS

Injection: 1 mg/2 mL (0.5 mg/mL).

### 4 CONTRAINDICATIONS

None.

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Neutropenia

In Study 1, severe neutropenia (ANC < 500/mm<sup>3</sup>) lasting more than one week occurred in 12% (62/503) of patients with metastatic breast cancer, leading to discontinuation in <1% of patients. Febrile neutropenia (fever ≥38.5°C with Grade 3 or 4 neutropenia) occurred in 5% (23/503) of patients; two patients (0.4%) died from complications of febrile neutropenia [see *Adverse Reactions* (6.1)].

In Study 1, patients with alanine aminotransferase (ALT) or aspartate aminotransferase (AST) > 3 × ULN (upper limit of normal) experienced a higher incidence of Grade 4 neutropenia and febrile neutropenia than patients with normal aminotransferase levels. Patients with bilirubin > 1.5 × ULN also had a higher incidence of Grade 4 neutropenia and febrile neutropenia.

In Study 2, severe neutropenia (ANC < 500/mm<sup>3</sup>) lasting more than one week occurred in 12% (26/222) of patients with liposarcoma or leiomyosarcoma. Febrile neutropenia occurred in 0.9% of patients treated with HALAVEN and fatal neutropenic sepsis in 0.9% [see *Adverse Reactions* (6.1)].

Monitor complete blood counts prior to each dose; increase the frequency of monitoring in patients who develop Grade 3 or 4 cytopenias. Delay administration of HALAVEN and reduce subsequent doses in patients who experience febrile neutropenia or Grade 4 neutropenia lasting longer than 7 days [see *Dosage and Administration* (2.2)]. Clinical studies of HALAVEN did not include patients with baseline neutrophil counts below 1,500/mm<sup>3</sup>.

#### 5.2 Peripheral Neuropathy

In Study 1, Grade 3 peripheral neuropathy occurred in 8% (40/503) of patients, and Grade 4 in 0.4% (2/503) of patients with metastatic breast cancer (MBC). Peripheral neuropathy was the most common toxicity leading to discontinuation of HALAVEN (5% of patients; 24/503) in Study 1. Neuropathy lasting more than one year occurred in 5% (26/503) of patients. Twenty-two percent (109/503) of patients developed a new or worsening neuropathy that had not recovered within a median follow-up duration of 269 days (range 25-662 days).

In Study 2, Grade 3 peripheral neuropathy occurred in 3.1% (7/223) of HALAVEN-treated patients. Peripheral neuropathy led to discontinuation of HALAVEN in 0.9% of patients. The median time to first occurrence of peripheral neuropathy of any severity was 5 months (range: 3.5 months to 9 months). Neuropathy lasting more than 60 days occurred in 58% (38/65) of patients. Sixty three percent (41/65) had not recovered within a median follow-up duration of 6.4 months (range: 27 days to 29 months).

Monitor patients closely for signs of peripheral motor and sensory neuropathy. Withhold HALAVEN in patients who experience Grade 3 or 4 peripheral neuropathy, until resolution to Grade 2 or less [see *Dosage and Administration* (2.2)].

#### 5.3 Embryo-Fetal Toxicity

Based on findings from an animal reproduction study and its mechanism of action, HALAVEN can cause fetal harm when administered to a pregnant woman. There are no adequate and well-controlled studies of HALAVEN in pregnant women. In animal reproduction studies, eribulin mesylate caused embryo-fetal toxicity when administered to pregnant rats during organogenesis at doses below the recommended human dose. Advise pregnant women of the potential risk to a fetus. Advise females of reproductive potential to use effective contraception during treatment with HALAVEN and for at least 2 weeks following the final dose. Advise males with female partners of reproductive potential to use effective contraception during treatment with HALAVEN and for 3.5 months following the final dose [see *Use in Specific Populations* (8.1)].

#### 5.4 QT Prolongation

In an uncontrolled open-label ECG study in 26 patients, QT prolongation was observed on Day 8, independent of eribulin concentration, with no QT prolongation observed on Day 1. ECG monitoring is recommended if therapy is initiated in patients with congestive heart failure, bradyarrhythmias, drugs known to prolong the QT interval, including Class Ia and III antiarrhythmics, and electrolyte abnormalities. Correct hypokalemia or hypomagnesemia prior to initiating HALAVEN and monitor these electrolytes periodically during therapy. Avoid HALAVEN in patients with congenital long QT syndrome.

### 6 ADVERSE REACTIONS

#### 6.1 Clinical Trials Experience

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

The following adverse reactions are discussed in detail in other sections of the labeling:

- Neutropenia [see *Warnings and Precautions* (5.1)]
- Peripheral neuropathy [see *Warnings and Precautions* (5.2)]
- QT prolongation [see *Warnings and Precautions* (5.4)]

In clinical trials, HALAVEN has been administered to 1963 patients including 467 patients exposed to HALAVEN for 6 months or longer. The majority of the 1963 patients were women (92%) with a median age of 55 years (range: 17 to 85 years). The racial and ethnic distribution was White (72%), Black (4%), Asian (9%), and other (3%).

#### Metastatic Breast Cancer

The most common adverse reactions (≥25%) reported in patients receiving HALAVEN were neutropenia, anemia, asthenia/fatigue, alopecia, peripheral neuropathy, nausea, and constipation. The most common serious adverse reactions reported in patients receiving HALAVEN were febrile neutropenia (4%) and neutropenia (2%). The most common adverse reaction resulting in discontinuation of HALAVEN was peripheral neuropathy (5%).

The adverse reactions described in Table 2 were identified in 750 patients treated in Study 1 [see *Clinical Studies* (14.1)]. In Study 1, patients were randomized (2:1) to receive either HALAVEN (1.4 mg/m<sup>2</sup> on Days 1 and 8 of a 21-day cycle) or single agent treatment chosen by their physician (control group). A total of 503 patients received HALAVEN and 247 patients in the control group received therapy consisting of chemotherapy [total 97% (anthracyclines 10%, capecitabine 18%, gemcitabine 19%, taxanes 15%, vinorelbine 25%, other chemotherapies 10%)] or hormonal therapy (3%). The median duration of exposure was 118 days for patients

receiving HALAVEN and 63 days for patients receiving control therapy. Table 2 reports the most common adverse reactions occurring in at least 10% of patients in either group.

**Table 2: Adverse Reactions<sup>a</sup> with a Per-Patient Incidence of at Least 10% in Study 1**

Adverse Reactions	HALAVEN n=503		Control Group n=247	
	All Grades	≥ Grade 3	All Grades	≥ Grade 3
<b>Blood and lymphatic system disorders<sup>b</sup></b>				
Neutropenia	82%	57%	53%	23%
Anemia	58%	2%	55%	4%
<b>Nervous system disorders</b>				
Peripheral neuropathy <sup>c</sup>	35%	8%	16%	2%
Headache	19%	<1%	12%	<1%
<b>General disorders</b>				
Asthenia/Fatigue	54%	10%	40%	11%
Pyrexia	21%	<1%	13%	<1%
Mucosal inflammation	9%	1%	10%	2%
<b>Gastrointestinal disorders</b>				
Nausea	35%	1%	28%	3%
Constipation	25%	1%	21%	1%
Vomiting	18%	1%	18%	1%
Diarrhea	18%	0	18%	0
<b>Musculoskeletal and connective tissue disorders</b>				
Arthralgia/Myalgia	22%	<1%	12%	1%
Back pain	16%	1%	7%	2%
Bone pain	12%	2%	9%	2%
Pain in extremity	11%	1%	10%	1%
<b>Metabolism and nutrition disorders</b>				
Decreased weight	21%	1%	14%	<1%
Anorexia	20%	1%	13%	1%
<b>Respiratory, thoracic, and mediastinal disorders</b>				
Dyspnea	16%	4%	13%	4%
Cough	14%	0	9%	0
<b>Skin and subcutaneous tissue disorders</b>				
Alopecia	45%	NA <sup>d</sup>	10%	NA <sup>d</sup>
<b>Infections</b>				
Urinary Tract Infection	10%	1%	5%	0

<sup>a</sup> adverse reactions were graded per National Cancer Institute Criteria for Adverse Events version 4.0.

<sup>b</sup> based upon laboratory data.

<sup>c</sup> includes peripheral neuropathy, peripheral sensorimotor neuropathy, peripheral motor neuropathy, polyneuropathy, peripheral sensory neuropathy, and paraesthesia.

<sup>d</sup> not applicable; (grading system does not specify > Grade 2 for alopecia).

**Cytopenias:** Grade 3 neutropenia occurred in 28% (143/503) of patients who received HALAVEN in Study 1, and 29% (144/503) of patients experienced Grade 4 neutropenia. Febrile neutropenia occurred in 5% (23/503) of patients; two patients (0.4%) died from complications of febrile neutropenia. Dose reduction due to neutropenia was required in 12% (62/503) of patients and discontinuation was required in <1% of patients. The mean time to nadir was 13 days and the mean time to recovery from severe neutropenia (<500/mm<sup>3</sup>) was 8 days. Grade 3 or greater thrombocytopenia occurred in 1% (7/503) of patients. G-CSF (granulocyte colony-stimulating factor) or GM-CSF (granulocyte-macrophage colony-stimulating factor) was used in 19% of patients who received HALAVEN.

**Peripheral Neuropathy:** In Study 1, 17% of enrolled patients had Grade 1 peripheral neuropathy and 3% of patients had Grade 2 peripheral neuropathy at baseline. Dose reduction due to peripheral neuropathy was required by 3% (14/503) of patients who received HALAVEN. Four percent (20/503) of patients experienced peripheral motor neuropathy of any grade and 2% (8/503) of patients developed Grade 3 peripheral motor neuropathy.

**Liver Function Test Abnormalities:** Among patients with Grade 0 or 1 ALT levels at baseline, 18% of HALAVEN-treated patients experienced Grade 2 or greater ALT elevation. One HALAVEN-treated patient without documented liver metastases had concomitant Grade 2 elevations in bilirubin and ALT; these abnormalities resolved and did not recur with re-exposure to HALAVEN.

**Less Common Adverse Reactions:** The following additional adverse reactions were reported in ≥5% to <10% of the HALAVEN-treated group:

- **Eye Disorders:** increased lacrimation
- **Gastrointestinal Disorders:** dyspepsia, abdominal pain, stomatitis, dry mouth
- **General Disorders and Administration Site Conditions:** peripheral edema
- **Infections and Infestations:** upper respiratory tract infection
- **Metabolism and Nutrition Disorders:** hypokalemia
- **Musculoskeletal and Connective Tissue Disorders:** muscle spasms, muscular weakness
- **Nervous System Disorders:** dysgeusia, dizziness
- **Psychiatric Disorders:** insomnia, depression
- **Skin and Subcutaneous Tissue Disorders:** rash

#### Liposarcoma

The safety of HALAVEN was evaluated in Study 2, an open-label, randomized, multicenter, active-controlled trial, in which patients were randomized (1:1) to receive either HALAVEN 1.4 mg/m<sup>2</sup> on Days 1 and 8 of a 21-day cycle or dacarbazine at doses of 850 mg/m<sup>2</sup> (20%), 1000 mg/m<sup>2</sup> (64%), or 1200 mg/m<sup>2</sup> (16%) every 3 weeks. A total of 223 patients received HALAVEN and 221 patients received dacarbazine. Patients were required to have received at least two prior systemic chemotherapy regimens. The trial excluded patients with pre-existing ≥ Grade 3 peripheral neuropathy, known central nervous system metastasis, elevated serum bilirubin or significant chronic liver disease, history of myocardial infarction within 6 months, history of New York Heart Association Class II or IV heart failure, or cardiac arrhythmia requiring treatment. The median age of the safety population in Study 2 was 56 years (range: 24 to 83 years); 67% female; 73% White, 3% Black or African American, 8% Asian/Pacific Islander, and 15% unknown; 99% received prior anthracycline-containing regimen; and 99% received ≥ 2 prior regimens. The median duration of exposure was 2.3 months (range: 21 days to 26 months) for patients receiving HALAVEN [see *Clinical Studies* (14.2)].

The most common adverse reactions (≥25%) reported in patients receiving HALAVEN were fatigue, nausea, alopecia, constipation, peripheral neuropathy, abdominal pain, and pyrexia. The most common (≥5%) Grade 3-4 laboratory abnormalities reported in patients receiving HALAVEN were neutropenia, hypokalemia, and hypocalcemia. The most common serious adverse reactions reported in patients receiving HALAVEN were neutropenia (4.9%) and pyrexia (4.5%). Permanent discontinuation of HALAVEN for adverse reactions occurred in 8% of patients. The most common adverse reactions resulting in discontinuation of HALAVEN were fatigue and thrombocytopenia (0.9% each). Twenty-six percent of patients required at least one dose reduction. The most frequent adverse reactions that led to dose reduction were neutropenia (18%) and peripheral neuropathy (4.0%).

Table 3 summarizes the incidence of adverse reactions occurring in at least 10% of patients in the HALAVEN-treated arm in Study 2.

**Table 3: Adverse Reactions<sup>a</sup> Occurring in ≥10% (all Grades) of Patients Treated on the HALAVEN arm and at a Higher Incidence than in the Dacarbazine Arm (Between Arm Difference of ≥5% for All Grades or ≥2% for Grades 3 and 4) (Study 2)<sup>b</sup>**

Adverse Reaction	HALAVEN n=223		Dacarbazine n=221	
	All Grades	Grades 3-4	All Grades	Grades 3-4
<b>Nervous system disorders</b>				
Peripheral Neuropathy <sup>c</sup>	29%	3.1%	8%	0.5%
Headache	18%	0%	10%	0%
<b>General disorders</b>				
Pyrexia	28%	0.9%	14%	0.5%
<b>Gastrointestinal disorders</b>				
Constipation	32%	0.9%	26%	0.5%
Abdominal pain <sup>d</sup>	29%	1.8%	23%	4.1%
Stomatitis	14%	0.9%	5%	0.5%
<b>Skin and subcutaneous tissue disorders</b>				
Alopecia	35%	NA <sup>e</sup>	2.7%	NA <sup>e</sup>
<b>Infections</b>				
Urinary tract infection	11%	2.2%	5%	0.5%

<sup>a</sup> Adverse reactions were graded per National Cancer Institute Criteria for Adverse Events version 4.03 (NCI CTCAE v4.03).

<sup>b</sup> Safety data from one study site enrolling six patients were excluded.

<sup>c</sup> Includes peripheral neuropathy, peripheral sensorimotor neuropathy, peripheral motor neuropathy, polyneuropathy, peripheral sensory neuropathy, and paraesthesia.

<sup>d</sup> Includes abdominal pain, upper abdominal pain, lower abdominal pain, abdominal discomfort.

<sup>e</sup> Not applicable; (grading system does not specify > Grade 2 for alopecia).

Other clinically important adverse reactions occurring in ≥10% of the HALAVEN-treated patients were:

- **Gastrointestinal Disorders:** nausea (41%); vomiting (19%), diarrhea (17%)
- **General Disorders:** asthenia/fatigue (62%); peripheral edema (12%)
- **Metabolism and Nutrition Disorders:** decreased appetite (19%)
- **Musculoskeletal and Connective Tissue Disorders:** arthralgia/myalgia (16%); back pain (16%)
- **Respiratory Disorders:** cough (18%)

**Less Common Adverse Reactions:** The following additional clinically important adverse reactions were reported in ≥5% to <10% of the HALAVEN-treated group:

- **Blood and Lymphatic System Disorders:** thrombocytopenia
- **Eye Disorders:** increased lacrimation
- **Gastrointestinal Disorders:** dyspepsia
- **Metabolism and Nutrition Disorders:** hyperglycemia
- **Musculoskeletal and Connective Tissue Disorders:** muscle spasms, musculoskeletal pain
- **Nervous System Disorders:** dizziness, dysgeusia
- **Psychiatric Disorders:** insomnia, anxiety
- **Respiratory, Thoracic, and Mediastinal Disorders:** oropharyngeal pain
- **Vascular Disorders:** hypotension

**Table 4: Laboratory Abnormalities Occurring in ≥10% (all Grades) of Patients Treated on the HALAVEN arm and at a Higher Incidence than in the Dacarbazine Arm (Between Arm Difference of ≥5% for All Grades or ≥2% for Grades 3 and 4)<sup>a</sup> (Study 2)<sup>b</sup>**

Laboratory Abnormality	Halaven		Dacarbazine	
	All Grades	Grades 3-4	All Grades	Grades 3-4
<b>Hematology</b>				
Anemia	70%	4.1%	52%	6%
Neutropenia	63%	32%	30%	8.9%
<b>Chemistry</b>				
Increased alanine aminotransferase (ALT)	43%	2.3%	28%	2.3%
Increased aspartate aminotransferase (AST)	36%	0.9%	16%	0.5%
Hypokalemia	30%	5.4%	14%	2.8%
Hypocalcemia	28%	5%	18%	1.4%
Hypophosphatemia	20%	3.2%	11%	1.4%

<sup>a</sup> Each test incidence is based on the number of patients who had both baseline and at least one on-study measurement and at least 1 grade increase from baseline. Halaven group (range 221-222) and dacarbazine group (range 214-215)

<sup>b</sup> Laboratory results were graded per NCI CTCAE v4.03.

## 6.2 Postmarketing Experience

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

- **Blood and Lymphatic System Disorders:** lymphopenia
- **Gastrointestinal Disorders:** pancreatitis
- **Hepatobiliary Disorders:** hepatotoxicity
- **Immune System Disorders:** drug hypersensitivity
- **Infections and Infestations:** pneumonia, sepsis/neutropenic sepsis
- **Metabolism and Nutrition Disorders:** hypomagnesemia, dehydration
- **Respiratory, thoracic and mediastinal disorders:** interstitial lung disease
- **Skin and Subcutaneous Tissue Disorders:** pruritus, Stevens-Johnson syndrome, toxic epidermal necrolysis

## 7 DRUG INTERACTIONS

### 7.1 Effects of Other Drugs on HALAVEN

No drug-drug interactions are expected with CYP3A4 inhibitors, CYP3A4 inducers or P-glycoprotein (P-gp) inhibitors. Clinically meaningful differences in exposure (AUC) were not observed in patients with advanced solid tumors when HALAVEN was administered with or without ketoconazole (a strong inhibitor of CYP3A4 and a P-gp inhibitor) and when HALAVEN was administered with or without rifampin (a CYP3A4 inducer) [see *Clinical Pharmacology* (12.3)].

### 7.2 Effect of HALAVEN on Other Drugs

Eribulin does not inhibit CYP1A2, CYP2C9, CYP2C19, CYP2D6, CYP2E1 or CYP3A4 enzymes or induce CYP1A2, CYP2C9, CYP2C19 or CYP3A4 enzymes at relevant clinical concentrations. Eribulin is not expected to alter the plasma concentrations of drugs that are substrates of these enzymes [see *Clinical Pharmacology* (12.3)].

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 Pregnancy

#### Risk Summary

Based on findings from an animal reproduction study and its mechanism of action, HALAVEN can cause fetal harm when administered to a pregnant woman [see *Clinical Pharmacology* (12.1)]. There are no available data on the use of HALAVEN during pregnancy. In an animal reproduction study, eribulin mesylate caused embryo-fetal toxicity when administered to pregnant rats during organogenesis at doses below the recommended human dose [see *Data*]. Advise pregnant women of the potential risk to a fetus.

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

#### Data

#### Animal Data

In an embryo-fetal developmental toxicity study, pregnant rats received intravenous infusion of eribulin mesylate during organogenesis (Gestation Days 8, 10, and 12) at doses approximately 0.04, 0.13, 0.43 and 0.64 times the recommended human dose, based on body surface area. Increased abortion and severe fetal external or soft tissue malformations, including the absence of a lower jaw and tongue, or stomach and spleen, were observed at doses 0.64 times the recommended human dose of 1.4 mg/m<sup>2</sup> based on body surface area. Increased embryo-fetal death/resorption, reduced fetal weights, and minor skeletal anomalies consistent with developmental delay were also reported at doses at or above a maternally toxic dose of approximately 0.43 times the recommended human dose.

### 8.2 Lactation

#### Risk Summary

There is no information regarding the presence of eribulin mesylate or its metabolites in human milk, the effects on the breastfed infant, or the effects on milk production. No lactation studies in animals were conducted. Because of the potential for serious adverse reactions in breastfed infants from eribulin mesylate, advise women not to breastfeed during treatment with HALAVEN and for 2 weeks after the final dose.

### 8.3 Females and Males of Reproductive Potential

#### Contraception

##### Females

Based on findings from an animal reproduction study and its mechanism of action, HALAVEN can cause fetal harm when administered to a pregnant woman [see *Use in Specific Populations* (8.1)]. Advise females of reproductive potential to use effective contraception during treatment with HALAVEN and for at least 2 weeks following the final dose.

##### Males

Based on its mechanism of action, advise males with female partners of reproductive potential to use effective contraception during treatment with HALAVEN and for 3.5 months following the final dose.

#### Infertility

##### Males

Based on animal data, HALAVEN may result in damage to male reproductive tissues leading to impaired fertility of unknown duration [see *Nonclinical Toxicology* (13.1)].

### 8.4 Pediatric Use

The safety and effectiveness of HALAVEN in pediatric patients below the age of 18 years have not been established.

### 8.5 Geriatric Use

Study 1 did not include sufficient numbers of subjects with metastatic breast cancer aged 65 years and older to determine whether they respond differently from younger subjects. Of the 827 subjects who received the recommended dose and schedule of HALAVEN in clinical studies with advanced breast cancer, 15% (121/827) were 65 and older, and 2% (17/827) patients were 75 and older. No overall differences in safety were observed between these subjects and younger subjects.

Clinical studies of HALAVEN did not include a sufficient number of subjects in Study 2 aged 65 years and older to determine whether they respond differently from younger subjects.

### 8.6 Hepatic Impairment

Administration of HALAVEN at a dose of 1.1 mg/m<sup>2</sup> to patients with mild hepatic impairment and 0.7 mg/m<sup>2</sup> to patients with moderate hepatic impairment resulted in similar exposure to eribulin as a dose of 1.4 mg/m<sup>2</sup> to patients with normal hepatic function. Therefore, a lower starting dose of 1.1 mg/m<sup>2</sup> is recommended for patients with mild hepatic impairment (Child-Pugh A) and of 0.7 mg/m<sup>2</sup> is recommended for patients with moderate hepatic

impairment (Child-Pugh B). HALAVEN was not studied in patients with severe hepatic impairment (Child-Pugh C) [see Dosage and Administration (2.1), Clinical Pharmacology (12.3)].

## 8.7 Renal Impairment

For patients with moderate or severe renal impairment (CL<sub>cr</sub> 15-49 mL/min), reduce the starting dose to 1.1 mg/m<sup>2</sup> [see Dosage and Administration (2.1), Clinical Pharmacology (12.3)].

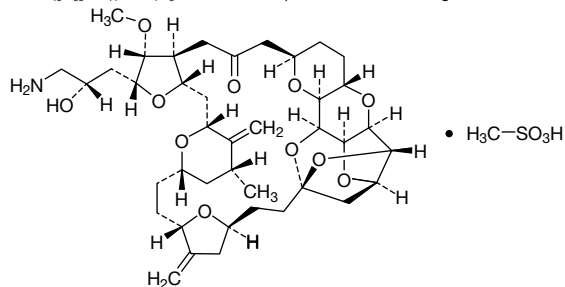
## 10 OVERDOSAGE

Overdosage of HALAVEN has been reported at approximately 4 times the recommended dose, which resulted in Grade 3 neutropenia lasting seven days and a Grade 3 hypersensitivity reaction lasting one day.

There is no known antidote for HALAVEN overdose.

## 11 DESCRIPTION

HALAVEN contains eribulin mesylate, a microtubule dynamics inhibitor. Eribulin mesylate is a synthetic analogue of halichondrin B, a product isolated from the marine sponge *Halichondria okadae*. The chemical name for eribulin mesylate is 11,15:18,21:24,28-Triepoxy-7,9-ethano-12,15-methano-9H,15H-furo[3,2-*h*]furo[2',3':5,6]pyrano[4,3-*b*][1,4]dioxacyclopentacosin-5(4*H*)-one, 2-[(2*S*)-3-amino-2-hydroxypropyl]hexacosahydro-3-methoxy-26-methyl-20,27-bis(methylene)-, (2*R*,3*R*,3*aS*,7*R*,8*aS*,9*S*,10*aR*,11*S*,12*R*,13*aR*,13*bS*,15*S*,18*S*,21*S*,24*S*,26*R*,28*R*,29*aS*)-, methanesulfonate (salt). It has a molecular weight of 826.0 (729.9 for free base). The empirical formula is C<sub>40</sub>H<sub>59</sub>NO<sub>11</sub>•CH<sub>4</sub>O<sub>3</sub>S. Eribulin mesylate has the following structural formula:



HALAVEN is a clear, colorless, sterile solution for intravenous administration. Each vial contains 1 mg of eribulin mesylate as a 0.5 mg/mL solution in ethanol: water (5:95).

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Eribulin inhibits the growth phase of microtubules without affecting the shortening phase and sequesters tubulin into nonproductive aggregates. Eribulin exerts its effects via a tubulin-based antimetabolic mechanism leading to G<sub>2</sub>/M cell-cycle block, disruption of mitotic spindles, and, ultimately, apoptotic cell death after prolonged mitotic blockage.

In addition, eribulin treatment of human breast cancer cells caused changes in morphology and gene expression as well as decreased migration and invasiveness *in vitro*. In mouse xenograft models of human breast cancer, eribulin treatment was associated with increased vascular perfusion and permeability in the tumor cores, resulting in reduced tumor hypoxia, and changes in the expression of genes in tumor specimens associated with a change in phenotype.

### 12.2 Pharmacodynamics

#### Cardiac Electrophysiology

The effect of HALAVEN on the QTc interval was assessed in an open-label, uncontrolled, multicenter, single-arm dedicated QT trial. A total of 26 patients with solid tumors received 1.4 mg/m<sup>2</sup> of HALAVEN on Days 1 and 8 of a 21-day cycle. A delayed QTc prolongation was observed on Day 8, with no prolongation observed on Day 1. The maximum mean QTcF change from baseline (95% upper confidence interval) was 11.4 (19.5) ms.

### 12.3 Pharmacokinetics

The pharmacokinetics (PK) of eribulin is linear with a mean elimination half-life of approximately 40 hours, a mean volume of distribution of 43 L/m<sup>2</sup> to 114 L/m<sup>2</sup> and mean clearance of 1.16 L/hr/m<sup>2</sup> to 2.42 L/hr/m<sup>2</sup> over the dose range of 0.25 mg/m<sup>2</sup> to 4.0 mg/m<sup>2</sup>. The human plasma protein binding of eribulin at concentrations of 100 ng/mL to 1,000 ng/mL ranges from 49% to 65%. Eribulin exposure after multiple dosing is comparable to that following a single dose. No accumulation of eribulin is observed with weekly administration.

#### Elimination

##### Metabolism

Unchanged eribulin was the major circulating species in plasma following administration of <sup>14</sup>C-eribulin to patients. Metabolite concentrations represented <0.6% of parent compound, confirming that there are no major human metabolites of eribulin. Cytochrome P450 3A4 (CYP3A4) negligibly metabolizes eribulin *in vitro*.

##### Excretion

Eribulin is eliminated primarily in feces unchanged. After administration of <sup>14</sup>C-eribulin to patients, approximately 82% of the dose was eliminated in feces and 9% in urine. Unchanged eribulin accounted for approximately 88% and 91% of total eribulin in feces and urine, respectively.

#### Specific Populations

**Age, Sex, and Race/Ethnicity:** Based on a population pharmacokinetic analysis with data collected from 340 patients, sex, race, and age do not have a clinically meaningful effect on the exposure of eribulin.

#### Hepatic Impairment

In a study evaluating the effect of hepatic impairment on the PK of eribulin, eribulin exposures increased by 1.8-fold in patients with mild hepatic impairment (Child-Pugh A; n=7) and by 2.5-fold in patients with moderate (Child-Pugh B; n=5) hepatic impairment as compared to patients with normal hepatic function (n=6). Administration of HALAVEN at a dose of 1.1 mg/m<sup>2</sup> to patients with mild hepatic impairment and 0.7 mg/m<sup>2</sup> to patients with moderate hepatic impairment resulted in similar exposure to eribulin at a dose of 1.4 mg/m<sup>2</sup> to patients with normal hepatic function [see Dosage and Administration (2.1), Use in Specific Populations (8.6)].

#### Renal Impairment

In a study evaluating the effect of renal impairment on the PK of eribulin, patients with moderate (CL<sub>cr</sub> 30-49 mL/min; n=7) and severe renal impairment (CL<sub>cr</sub> 15-29 mL/min; n=6) had 1.5-fold higher eribulin dose-normalized exposures compared to that in patients with normal renal function (CL<sub>cr</sub> ≥ 80 mL/min; n=6). There were no clinically meaningful changes in patients with mild renal impairment (CL<sub>cr</sub> 50-79 mL/min; n=27) [see Dosage and Administration (2.1), Use in Specific Populations (8.7)].

## Drug Interaction Studies

**Effect of Strong Inhibitors or Inducers of CYP3A4 on Eribulin:** The effect of a strong CYP3A4 inhibitor and a P-gp inhibitor, ketoconazole, on the PK of eribulin was studied in a crossover trial of 12 patients with advanced solid tumors. No clinically relevant PK interaction was observed when HALAVEN was administered with or without ketoconazole (the geometric mean ratio of the AUC: 0.97; 90% CI: 0.83, 1.12).

The effect of a CYP3A4 inducer, rifampin, on the PK of eribulin was studied in a crossover trial of 14 patients with advanced solid tumors. No clinically relevant PK interaction was observed when HALAVEN was administered with or without rifampin (the geometric mean ratio of the AUC: 1.10; 90% CI: 0.91, 1.34).

**Effect of Eribulin on CYP Substrates:** Eribulin shows no induction potential for CYP1A, CYP2B6, CYP2C9, CYP2C19, and CYP3A in primary human hepatocytes. Eribulin inhibits CYP3A4 activity in human liver microsomes, but it is unlikely that eribulin will substantially increase the plasma levels of CYP3A4 substrates. No significant inhibition of CYP1A2, CYP2C9, CYP2C19, CYP2D6, or CYP2E1 was detected with eribulin concentrations up to 5 μM in pooled human liver microsomes. *In vitro* drug interaction studies indicate that eribulin does not inhibit drugs that are substrates of these enzymes and it is unlikely that eribulin will affect plasma levels of drugs that are substrates of CYP enzymes.

**Effect of Transporters on Eribulin:** *In vitro* data suggest that eribulin at clinically relevant concentrations is a substrate of P-gp, but is not a substrate of breast cancer resistance protein (BCRP), multidrug resistance proteins (MRP2, MRP4), bile salt extrusion pump (BSEP), organic anion transporting polypeptides (OATP1B1, OATP1B3), organic anion transporters (OAT1, OAT3), organic cation transporters (OCT1, OCT2), or multidrug and toxin extrusion 1 (MATE1).

**Effect of Eribulin on Transporters:** *In vitro* data suggest that eribulin at clinically relevant concentrations may inhibit P-gp, but does not inhibit BCRP, OATP1B1, OCT1, OAT1, OAT3, or MATE1.

## 13 NONCLINICAL TOXICOLOGY

### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Carcinogenicity studies have not been conducted with eribulin mesylate. Eribulin mesylate was not mutagenic in *in vitro* bacterial reverse mutation assays (Ames test). Eribulin mesylate was positive in mouse lymphoma mutagenesis assays, and was clastogenic in an *in vivo* rat bone marrow micronucleus assay.

Fertility studies have not been conducted with eribulin mesylate in humans or animals; however, nonclinical findings in repeat-dose dog and rat toxicology studies suggest that male fertility may be compromised by treatment with eribulin mesylate. Rats exhibited testicular toxicity (hypocellularity of seminiferous epithelium with hypospermia/aspermia) following dosing with eribulin mesylate at or above 0.43 times the recommended human dose (based on body surface area) given once weekly for 3 weeks, or at or above 0.21 times the recommended human dose (based on body surface area) given once weekly for 3 out of 5 weeks, repeated for 6 cycles. Testicular toxicity was also observed in dogs given 0.64 times the recommended human dose (based on body surface area) weekly for 3 out of 5 weeks, repeated for 6 cycles.

## 14 CLINICAL STUDIES

### 14.1 Metastatic Breast Cancer

Study 1 was an open-label, randomized, multicenter trial of 762 patients with metastatic breast cancer who received at least two chemotherapeutic regimens for the treatment of metastatic disease and experienced disease progression within 6 months of their last chemotherapeutic regimen. Patients were required to receive prior anthracycline- and taxane-based chemotherapy for adjuvant or metastatic disease. Patients were randomized (2:1) to receive HALAVEN (n=508) or a single agent therapy selected prior to randomization (control arm, n=254). Randomization was stratified by geographic region, HER2/*neu* status, and prior capecitabine exposure.

HALAVEN was administered at a dose of 1.4 mg/m<sup>2</sup> on Days 1 and 8 of a 21-day cycle. HALAVEN-treated patients received a median of 5 cycles (range: 1 to 23 cycles) of therapy. Control arm therapy consisted of 97% chemotherapy (26% vinorelbine, 18% gemcitabine, 18% capecitabine, 16% taxane, 9% anthracycline, 10% other chemotherapy), and 3% hormonal therapy. The main efficacy outcome was overall survival.

Patient demographic and baseline characteristics were comparable between the treatment arms. The median age was 55 (range: 27 to 85 years) and 92% were White. Sixty-four percent of patients were enrolled in North America/Western Europe/Australia, 25% in Eastern Europe/Russia, and 11% in Latin America/South Africa. Ninety-one percent of patients had a baseline ECOG performance status of 0 or 1. Tumor prognostic characteristics, including estrogen receptor status (positive: 67%, negative: 28%), progesterone receptor status (positive: 49%, negative: 39%), HER2/*neu* receptor status (positive: 16%, negative: 74%), triple negative status (ER, PR, HER2/*neu*: 19%), presence of visceral disease (82%, including 60% liver and 38% lung) and bone disease (61%), and number of sites of metastases (greater than two: 50%), were also similar in the HALAVEN and control arms. Patients received a median of four prior chemotherapy regimens in both arms.

In Study 1, a statistically significant improvement in overall survival was observed in patients randomized to the HALAVEN arm compared to the control arm (see Table 5). An updated, unplanned survival analysis, conducted when 77% of events had been observed (see Figure 1), was consistent with the primary analysis. In patients randomized to HALAVEN, the objective response rate by the RECIST criteria was 11% (95% CI: 8.6%, 14.3%) and the median response duration was 4.2 months (95% CI: 3.8, 5.0 months).

**Table 5: Comparison of Overall Survival in HALAVEN and Control Arm - Study 1**

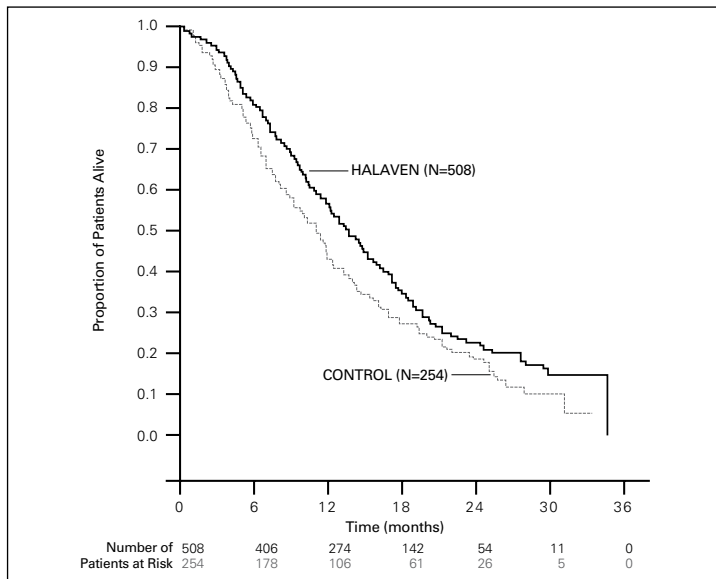
Overall Survival	HALAVEN (n=508)	Control Arm (n=254)
<b>Primary survival analysis</b>		
Number of deaths	274	148
Median, months (95% CI)	13.1 (11.8, 14.3)	10.6 (9.3, 12.5)
Hazard Ratio (95% CI) <sup>a</sup>	0.81 (0.66, 0.99)	
P value <sup>b</sup>	0.041	
<b>Updated survival analysis</b>		
Number of deaths	386	203
Median, months (95% CI)	13.2 (12.1, 14.4)	10.6 (9.2, 12.0)

CI = confidence interval

<sup>a</sup>Based on Cox proportional hazards model stratified by geographic region, HER2 status, and prior capecitabine therapy.

<sup>b</sup>Based on a log-rank test stratified by geographic region, HER2 status, and prior capecitabine therapy.

**Figure 1: Updated Overall Survival Analysis for Study 1**



**14.2 Liposarcoma**

The efficacy and safety of HALAVEN were evaluated in Study 2, an open-label, randomized (1:1), multicenter, active-controlled trial. Eligible patients were required to have unresectable, locally advanced or metastatic liposarcoma or leiomyosarcoma, at least two prior systemic chemotherapies (one of which must have included an anthracycline), and disease progression within 6 months of the most recent chemotherapy regimen. Patients were randomized to HALAVEN 1.4 mg/m<sup>2</sup> administered intravenously on Days 1 and 8 of a 21-day cycle or to dacarbazine at a dose of 850 mg/m<sup>2</sup>, 1000 mg/m<sup>2</sup>, or 1200 mg/m<sup>2</sup> administered intravenously every 21 days (dacarbazine dose was selected by the investigator prior to randomization). Treatment continued until disease progression or unacceptable toxicity. Randomization was stratified by histology (liposarcoma or leiomyosarcoma), number of prior therapies (2 vs. > 2), and geographic region (U.S. and Canada vs. Western Europe, Australia, and Israel vs. Eastern Europe, Latin America, and Asia). The major efficacy outcome measure was overall survival (OS). Additional efficacy outcome measures were progression-free survival (PFS) and confirmed objective response rate (ORR) as assessed by the investigator according to Response Evaluation Criteria in Solid Tumors (RECIST v1.1). Patients in the dacarbazine arm were not offered HALAVEN at the time of disease progression.

A total of 446 patients were randomized, 225 to the HALAVEN arm and 221 to the dacarbazine arm. The median age was 56 years (range: 24 to 83); 33% were male; 73% were White; 44% had ECOG performance status (PS) 0 and 53% had ECOG PS 1; 68% had leiomyosarcoma and 32% had liposarcoma; 39% were enrolled in U.S. and Canada (Region 1) and 46% were enrolled in Western Europe, Australia, and Israel (Region 2); and 47% received more than two prior systemic chemotherapies. The most common (>40%) prior systemic chemotherapies were doxorubicin (90%), ifosfamide (62%), gemcitabine (59%), trabectedin (50%), and docetaxel (48%). Of the 143 patients with liposarcoma, the median age was 55 years (range: 32 to 83); 62% were male, 72% were White; 41% had ECOG PS of 0 and 53% had ECOG PS of 1; 35% were enrolled in Region 1 and 51% were enrolled in Region 2; and 44% received more than two prior systemic chemotherapies. The distribution of subtypes of liposarcoma, based on local histologic assessment, were 45% dedifferentiated, 37% myxoid/round cell, and 18% pleomorphic. Study 2 demonstrated a statistically significant improvement in OS in patients randomized to HALAVEN compared with dacarbazine (see Table 6). There was no significant difference in progression-free survival in the overall population. Treatment effects of HALAVEN were limited to patients with liposarcoma based on pre-planned, exploratory subgroup analyses of OS and PFS (see Tables 6 and 7 and Figure 2). There was no evidence of efficacy of HALAVEN in patients with advanced or metastatic leiomyosarcoma in Study 2 (see Table 7).

**Table 6: Efficacy Results for the Liposarcoma Stratum and All Patients\* in Study 2<sup>a</sup>**

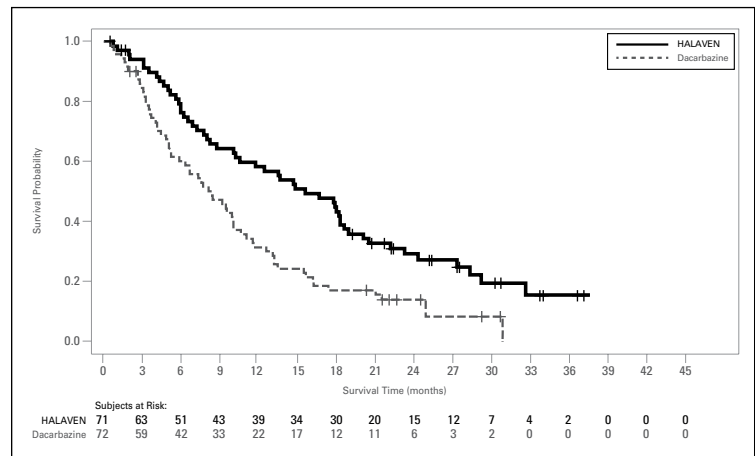
	Liposarcoma Stratum		All Patients*	
	Halaven (n=71)	Dacarbazine (n=72)	Halaven (n=225)	Dacarbazine (n=221)
<b>Overall Survival</b>				
Deaths, n (%)	52 (73)	63 (88)	173 (77)	179 (81)
Median, months (95% CI)	15.6 (10.2, 18.6)	8.4 (5.2, 10.1)	13.5 (11.1, 16.5)	11.3 (9.5, 12.6)
Hazard ratio (HR) (95% CI)	0.51 (0.35, 0.75)		0.75 (0.61, 0.94)	
Stratified log-rank p value	N/A <sup>†</sup>		0.011	
<b>Progression-free survival</b>				
Events, n (%)	57 (80)	59 (82)	194 (86)	185 (84)
Disease progression	53	52	180	170
Death	4	7	14	15
Median, months (95% CI)	2.9 (2.6, 4.8)	1.7 (1.4, 2.6)	2.6 (2.0, 2.8)	2.6 (1.7, 2.7)
HR (95% CI)	0.52 (0.35, 0.78)		0.86 (0.69, 1.06)	
<b>Objective response rate</b>				
Objective response rate (%) (95% CI)	1.4 (0, 7.6)	0 (0, 4.2)	4.0 (1.8, 7.5)	5.0 (2.5, 8.7)

<sup>a</sup> Efficacy data from one study site enrolling six patients were excluded.

\* All patients = liposarcoma and leiomyosarcoma.

<sup>†</sup> N/A = not applicable

**Figure 2: Kaplan-Meier Curves of Overall Survival in the Liposarcoma Stratum in Study 2**



**Table 7: Efficacy Results for the Leiomyosarcoma Stratum in Study 2<sup>a</sup>**

	Leiomyosarcoma Stratum	
	Halaven (n=154)	Dacarbazine (n=149)
<b>Overall survival</b>		
Deaths, n (%)	121 (79)	116 (78)
Median, months (95% CI)	12.8 (10.3, 14.8)	12.3 (11.0, 15.1)
HR (95% CI)	0.90 (0.69, 1.18)	
<b>Progression-free survival</b>		
Events, n (%)	137 (89)	126 (85)
Disease progression	127	118
Death	10	8
Median, months (95% CI)	2.2 (1.5, 2.7)	2.6 (2.2, 2.9)
HR (95% CI)	1.05 (0.81, 1.35)	
Objective response rate (%) (95% CI)	5.2 (2.3, 10)	7.4 (3.7, 12.8)

<sup>a</sup> Efficacy data from one study site enrolling six patients were excluded.

**16 HOW SUPPLIED/STORAGE AND HANDLING**

NDC 62856-389-01

Injection: 1 mg/2 mL, in a single-use vial. One vial per carton.

Store at 25°C (77°F); excursions permitted to 15° – 30° C (59° – 86° F). Do not freeze. Store the vials in their original cartons.

**17 PATIENT COUNSELING INFORMATION**

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

**Neutropenia**

Advise patients to contact their health care provider for a fever of 100.5°F or greater or other signs or symptoms of infection such as chills, cough, or burning or pain on urination [see Warnings and Precautions (5.1)].

**Peripheral Neuropathy**

Advise patients to inform their healthcare providers of new or worsening numbness, tingling and pain in their extremities [see Warnings and Precautions (5.2)].

**Embryo-Fetal Toxicity**

- Advise females of reproductive potential of the potential risk to a fetus and to inform their healthcare provider of a known or suspected pregnancy [see Warnings and Precautions (5.3), Use in Specific Populations (8.1)].
- Advise females of reproductive potential to use effective contraception during treatment with HALAVEN and for at least 2 weeks after the final dose [see Use in Specific Populations (8.3)].
- Advise males with female partners of reproductive potential to use effective contraception during treatment with HALAVEN and for 3.5 months following the final dose [see Use in Specific Populations (8.3)].

**Lactation**

Advise women not to breastfeed during treatment with HALAVEN and for 2 weeks after the final dose [see Use in Specific Populations (8.2)].

Distributed by:  
Eisai Inc.  
Woodcliff Lake, NJ 07677

HALAVEN® is a registered trademark used by Eisai Inc. under license from Eisai R&D Management Co., Ltd.

© 2016 Eisai Inc. All rights reserved. HALA-US0277(1)  
Printed in USA / October 2016



**PATIENT INFORMATION**  
**HALAVEN® (HAL-ih-ven)**  
**(eribulin mesylate)**  
injection, for intravenous use

**What is the most important information I should know about HALAVEN?**  
**HALAVEN can cause serious side effects, including:**

- **Low white blood cell count (neutropenia).** This can lead to serious infections that could lead to death. Your healthcare provider will check your blood cell counts before you receive each dose of HALAVEN and during treatment. Call your healthcare provider right away if you develop any of these symptoms of infection:
  - fever (temperature above 100.5°F)
  - chills
  - cough
  - burning or pain when you urinate
- **Numbness, tingling, or pain in your hands or feet (peripheral neuropathy).** Peripheral neuropathy is common with HALAVEN and sometimes can be severe. Tell your healthcare provider if you have new or worsening symptoms of peripheral neuropathy.
- Your healthcare provider may delay, decrease your dose, or stop treatment with HALAVEN if you have side effects.

See **“What are possible side effects of HALAVEN?”** for more information about side effects.

**What is HALAVEN?**

HALAVEN is a prescription medicine used to treat people with:

- Breast cancer
  - that has spread to other parts of the body, **and**
  - who have already received certain types of anticancer medicines after the cancer has spread
- Liposarcoma
  - that cannot be treated with surgery or has spread to other parts of the body, **and**
  - who have received treatment with a certain type of anticancer medicine

It is not known if HALAVEN is safe and effective in children under 18 years of age.

**Before you receive HALAVEN, tell your healthcare provider about all of your medical conditions, including if you:**

- have liver or kidney problems
- have heart problems, including a problem called congenital long QT syndrome
- have low potassium or low magnesium in your blood
- are pregnant or plan to become pregnant. HALAVEN can harm your unborn baby. Tell your healthcare provider right away if you become pregnant or think you are pregnant during treatment with HALAVEN.
  - **Females** who are able to become pregnant should use an effective birth control during treatment with HALAVEN and for at least 2 weeks after the final dose of HALAVEN.
  - **Males** should use an effective form of birth control when having sex with female partners who are able to become pregnant during treatment with HALAVEN and for 3 1/2 months (14 weeks) after the final dose of HALAVEN.
- are breastfeeding or plan to breastfeed. It is not known if HALAVEN passes into your breast milk. Do not breastfeed during treatment with HALAVEN and for 2 weeks after the final dose of HALAVEN.

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

**How will I receive HALAVEN?**

- HALAVEN is given by intravenous (IV) injection in your vein.
- HALAVEN is given in “cycles” of treatment, with each cycle lasting 21 days.
- HALAVEN is usually given on day 1 and day 8 of a treatment cycle.

**What are the possible side effects of HALAVEN?**

HALAVEN may cause serious side effects, including:

- See **“What is the most important information I should know about HALAVEN?”**
- **HALAVEN can cause changes in your heartbeat (called QT prolongation).** This can cause irregular heartbeats. Your healthcare provider may do heart monitoring (electrocardiogram or ECG) or blood tests during your treatment with HALAVEN to check for heart problems.

The most common side effects of HALAVEN in people with breast cancer include:

- low white blood cell count (neutropenia)
- low red blood cell count (anemia)
- weakness or tiredness
- hair loss (alopecia)
- nausea
- constipation

The most common side effects of HALAVEN in people with liposarcoma include:

- tiredness
- nausea
- hair loss (alopecia)
- constipation
- stomach pain
- fever

Your healthcare provider will do blood tests before and during treatment while you are taking HALAVEN. The most common changes to blood tests in people with liposarcoma include:

- low white blood cell count (neutropenia)
- decreased blood levels of potassium or calcium

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

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

**General information about HALAVEN**

Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. You can ask your pharmacist or healthcare provider for information about HALAVEN that is written for health professionals.

**What are the ingredients in HALAVEN?**

**Active Ingredient:** eribulin mesylate

**Inactive Ingredients:** ethanol, water

HALAVEN® is a registered trademark used by Eisai Inc. under license from Eisai R&D Management Co., Ltd.

Distributed by:  
Eisai Inc.  
Woodcliff Lake, NJ 07677

For more information, go to [www.HALAVEN.com](http://www.HALAVEN.com) or call Eisai Inc. at 1-877-873-4724. If you would like a leaflet with larger printing, please contact Eisai Inc. at 1-877-873-4724.

This Patient Information has been approved by the U.S. Food and Drug Administration. Revised: 01/2016

