

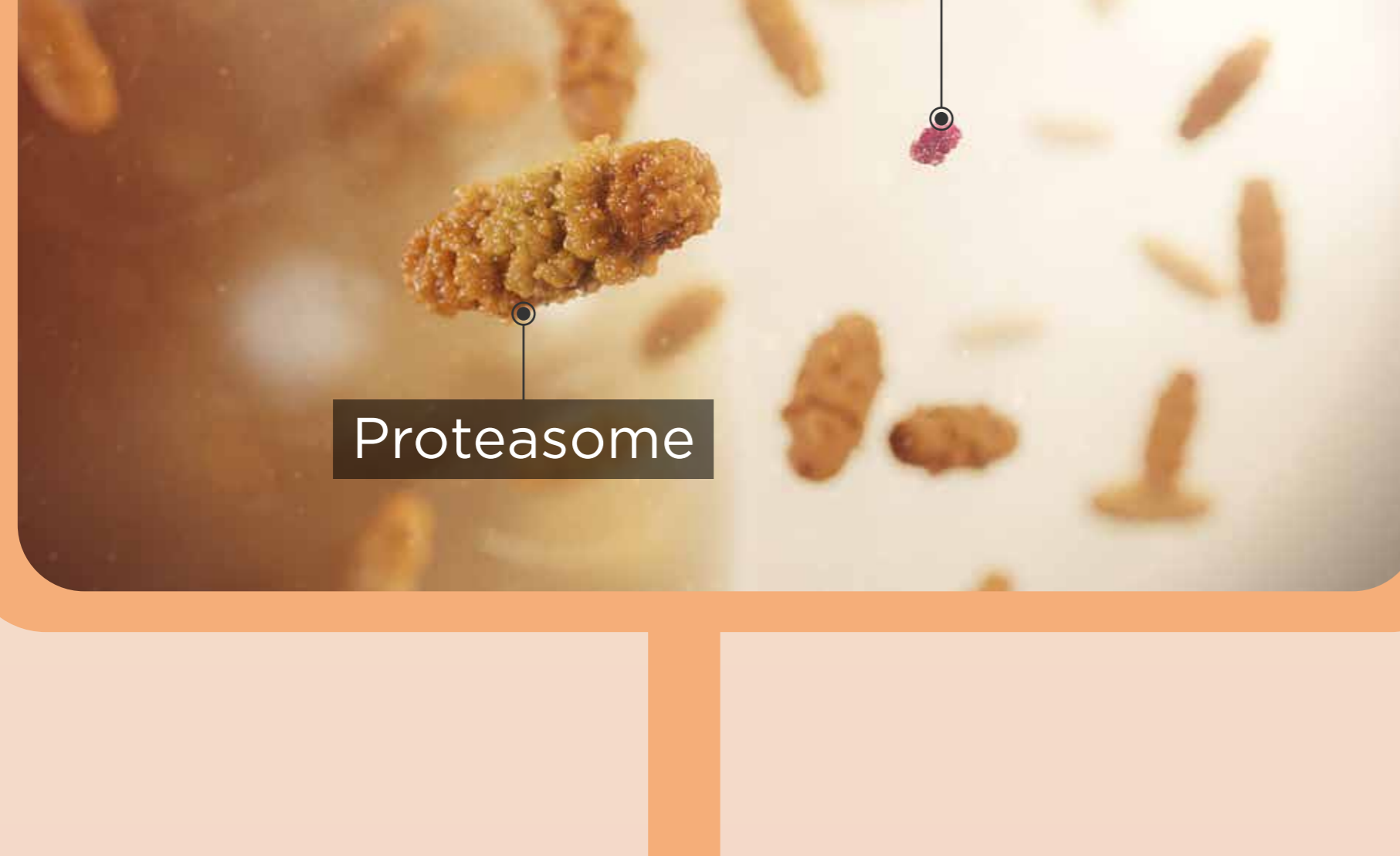
## Mechanism of Action

Therapies targeting the proteasome are a cornerstone of multiple myeloma treatment.<sup>1,2</sup>

The disruption of proteasome activity arrests cell growth and causes cell death.<sup>1</sup>



The ubiquitin-proteasome pathway allows for the degradation of proteins. The 26S proteasome is composed of a 20S proteolytic core.<sup>1</sup>

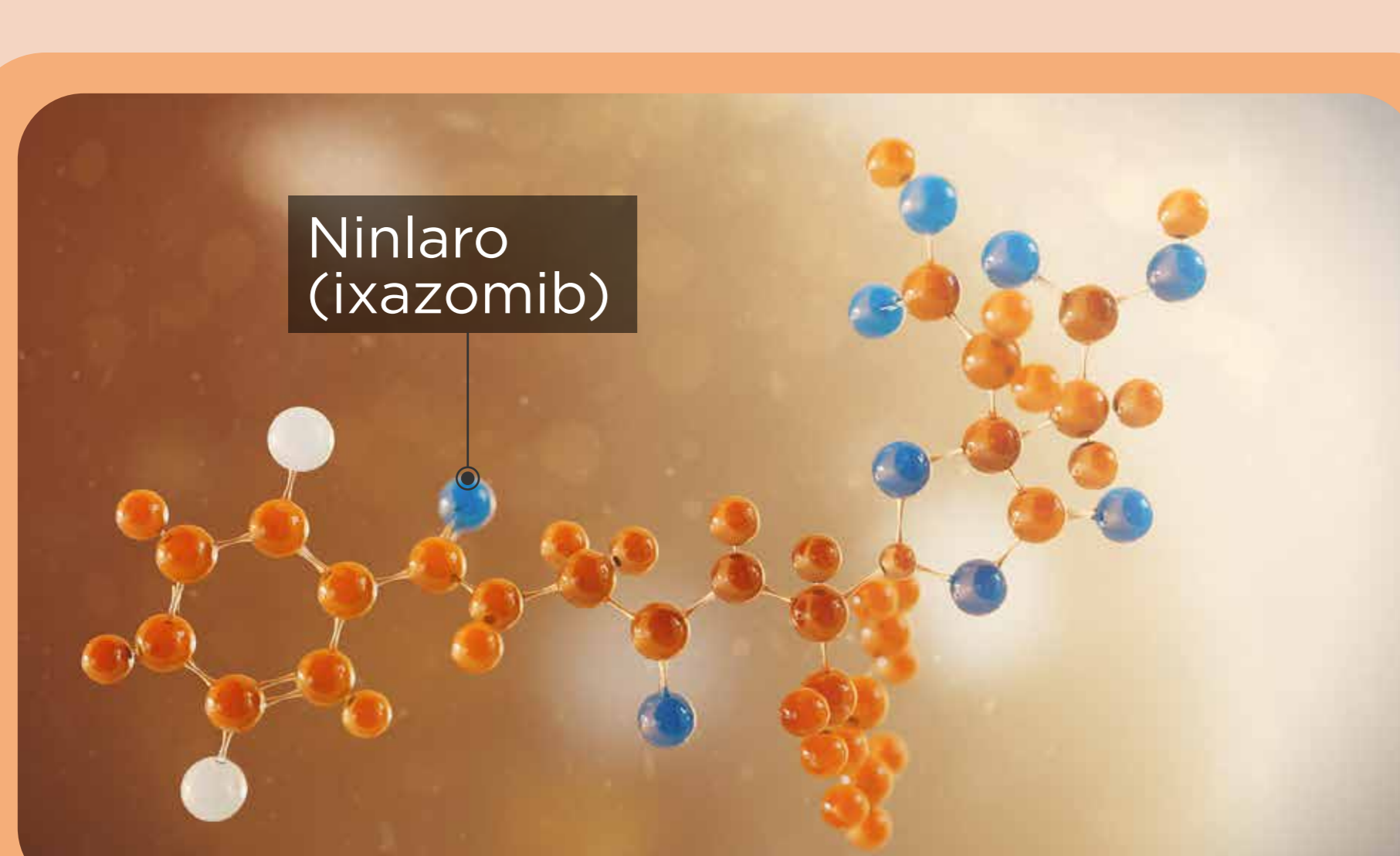


This 20S core is made up of individual subunits which mediate proteolytic cleavage. When proteins are marked for degradation, they are recognized by the 19S cap and directed to the core of the proteasome. Proteolytic cleavage is mediated through beta subunits.<sup>1</sup>



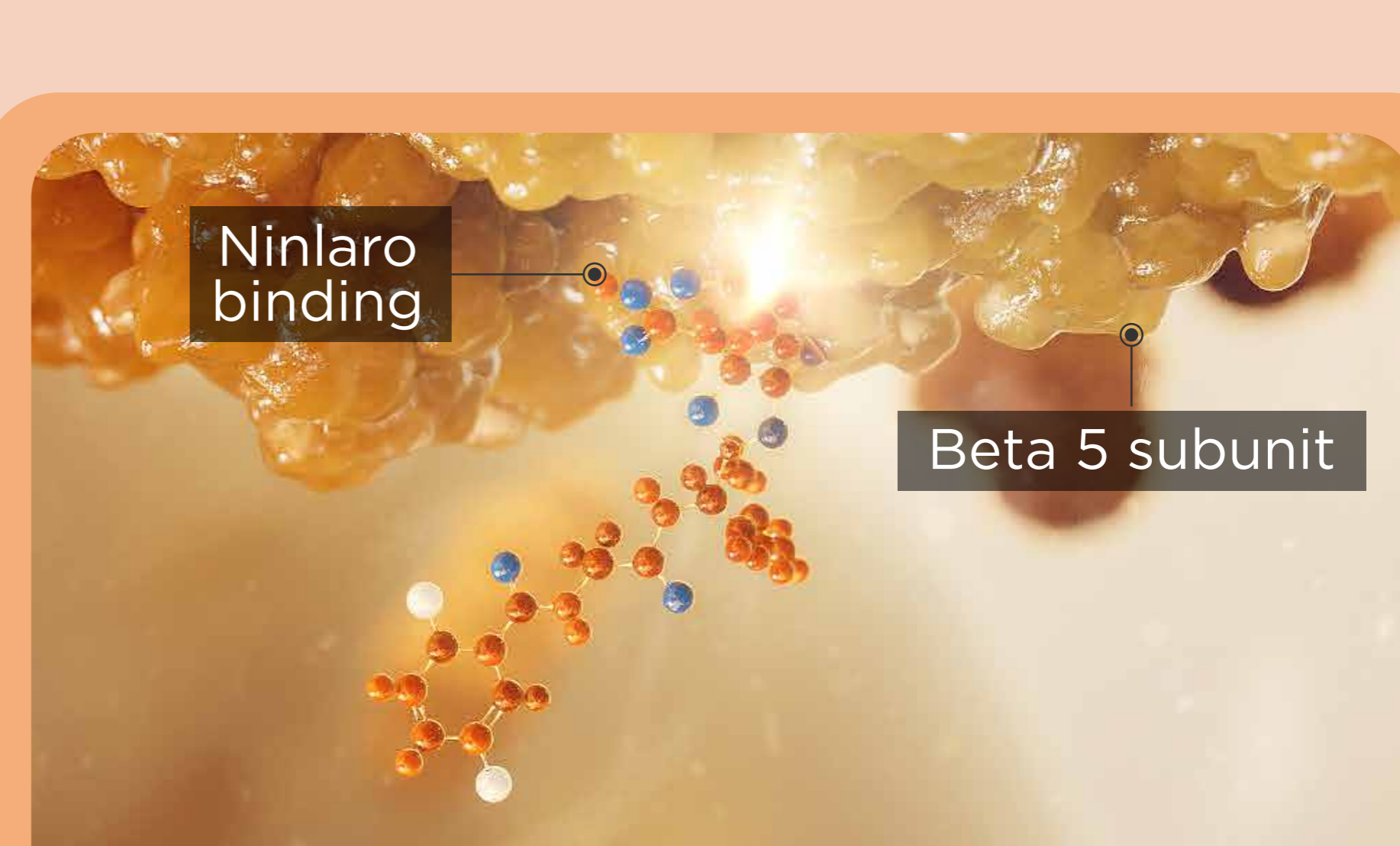
NINLARO is a reversible proteasome inhibitor.

It preferentially binds to the beta 5 subunit of the 20S proteasome core.<sup>3</sup>



NINLARO inhibits the chymotrypsin-like activity of the beta 5 subunit,<sup>3</sup>

which disrupts the elimination of proteins and causes cytotoxicity.<sup>3</sup>



This induces the apoptotic cascade and causes myeloma cell death.<sup>1,3</sup>

For more information please visit [ninlarohcp.com](http://ninlarohcp.com)

### REFERENCES

- Moreau P, Richardson P G, Cavo M, Orlowski R Z, San Miguel J F, Palumbo A, Harousseau J L; Proteasome inhibitors in multiple myeloma: 10 years later. *Blood* 2012; 120 (5): 947-959.
- Gandolfi S, Laubach JP, Hideshima T, Chauhan D, Anderson KC, Richardson PG. The proteasome and proteasome inhibitors in multiple myeloma. *Cancer Metastasis Rev*. 2017;36(4):561-584.
- NINLARO. Prescribing Information. Takeda Pharmaceuticals America, Inc.; 03/2024: <https://www.ninlaro.com/prescribing-information.pdf>. Accessed May 2024.

### INDICATION AND USAGE

**Indication:** NINLARO is indicated in combination with lenalidomide and dexamethasone for the treatment of patients with multiple myeloma who have received at least one prior therapy.

**Limitations of Use:** NINLARO is not recommended for use in the maintenance setting or in newly diagnosed multiple myeloma in combination with lenalidomide and dexamethasone outside of controlled clinical trials.

Please see below for Important Safety Information and full [Prescribing Information](#).

### IMPORTANT SAFETY INFORMATION

#### WARNINGS AND PRECAUTIONS

- Thrombocytopenia** has been reported with NINLARO. Platelet nadirs typically occurred between Days 14-21 of each 28-day cycle and recovered to baseline by the start of the next cycle. Grade 3 thrombocytopenia was reported in 17% of patients in the NINLARO regimen and Grade 4 thrombocytopenia was reported in 13% of patients in the NINLARO regimen. During treatment, monitor platelet counts at least monthly, and consider more frequent monitoring during the first three cycles. Manage thrombocytopenia with dose modifications and platelet transfusions as per standard medical guidelines.
- Gastrointestinal Toxicities**, including diarrhea, constipation, nausea and vomiting were reported with NINLARO and may occasionally require the use of anti-diarrheal and antiemetic medications, and supportive care. Diarrhea resulted in the discontinuation of one or more of the three drugs in 3% of patients in the NINLARO regimen and 2% of patients in the placebo regimen. Adjust dosing for Grade 3 or 4 symptoms.
- Peripheral Neuropathy** was reported with NINLARO. The most commonly reported reaction was peripheral sensory neuropathy (24% and 17% in the NINLARO and placebo regimens, respectively). Peripheral motor neuropathy was not commonly reported in either regimen (<1%). Peripheral neuropathy resulted in discontinuation of one or more of the three drugs in 4% of patients in the NINLARO regimen and <1% of patients in the placebo regimen. During treatment, monitor patients for symptoms of neuropathy and consider adjusting dosing for new or worsening peripheral neuropathy.
- Peripheral Edema** was reported with NINLARO. Evaluate for underlying causes and provide supportive care, as necessary. Adjust dosing of NINLARO for Grade 3 or 4 symptoms or dexamethasone per its prescribing information.
- Cutaneous Reactions.** Stevens-Johnson syndrome and toxic epidermal necrolysis, including fatal cases, have been reported with NINLARO. If Stevens-Johnson syndrome or toxic epidermal necrolysis occurs, discontinue NINLARO and manage as clinically indicated. Rash, most commonly maculo-papular and macular rash, was reported with NINLARO. Rash resulted in discontinuation of one or more of the three drugs in <1% of patients in both regimens. Manage rash with supportive care or with dose modification if Grade 2 or higher.
- Thrombotic Microangiopathy** has been reported with NINLARO. Fatal cases of thrombotic microangiopathy, including thrombotic thrombocytopenic purpura/hemolytic uremic syndrome (TTP/HUS), have been reported in patients who received NINLARO. Monitor for signs and symptoms of TTP/HUS. If the diagnosis is suspected, stop NINLARO and evaluate. If the diagnosis of TTP/HUS is excluded, consider stopping NINLARO. The safety of reinitiating NINLARO therapy in patients previously experiencing TTP/HUS is not known.
- Hepatotoxicity** has been reported with NINLARO. Cholestatic and liver injury, hepatocellular injury, hepatic steatosis, hepatitis cholestatic and hepatotoxicity have each been reported in <1% of patients treated with NINLARO. Hepatotoxicity has been reported (10% in the NINLARO regimen and 9% in the placebo regimen). Monitor hepatic enzymes regularly and adjust dosing for Grade 3 or 4 symptoms.
- Embryo-fetal Toxicity:** NINLARO can cause fetal harm. Advise pregnant women of the potential risk to a fetus. Advise females of reproductive potential to use effective non-hormonal contraception during treatment with NINLARO and for 90 days following the last dose. Advise males with female partners of reproductive potential to use effective contraception during treatment with NINLARO and for 90 days following the last dose.
- Increased Mortality in Patients Treated with NINLARO in the Maintenance Setting:** In two prospective randomized clinical trials in multiple myeloma in the maintenance setting, treatment with NINLARO resulted in increased deaths. Treatment of patients with NINLARO for multiple myeloma in the maintenance setting is not recommended outside of controlled trials.

#### ADVERSE REACTIONS

The most common adverse reactions (≥20%) in the NINLARO regimen compared to placebo in combination with lenalidomide plus dexamethasone, respectively were thrombocytopenia (85%, 67%; pooled from adverse event and laboratory data), neutropenia (74%, 70%; pooled from adverse event and laboratory data), diarrhea (52%, 43%), constipation (35%, 28%), peripheral neuropathy (32%, 24%), nausea (32%, 23%), edema peripheral (27%, 21%), rash (27%, 16%), vomiting (26%, 13%), and bronchitis (22%, 17%). Serious adverse reactions reported in ≥2% of patients in the NINLARO regimen included diarrhea (3%), thrombocytopenia (2%), and bronchitis (2%).

**DRUG INTERACTIONS:** Avoid concomitant administration of NINLARO with strong CYP3A inducers.

#### USE IN SPECIFIC POPULATIONS

- Lactation:** Advise women not to breastfeed during treatment with NINLARO and for 90 days after the last dose.
- Hepatic Impairment:** Reduce the NINLARO starting dose to 3 mg in patients with moderate or severe hepatic impairment.
- Renal Impairment:** Reduce the NINLARO starting dose to 3 mg in patients with severe renal impairment or end-stage renal disease requiring dialysis. NINLARO is not dialyzable.

To report SUSPECTED ADVERSE REACTIONS, contact Takeda Pharmaceuticals at 1-844-617-6468 or the FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

Please see NINLARO (ixazomib) full [Prescribing Information](#).

