

## FULL PRESCRIBING INFORMATION

### 1. NAME OF THE MEDICINAL PRODUCT

ERLEADA

### 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each tablet contains 60 mg of apalutamide.

### 3. PHARMACEUTICAL FORM

Film coated tablets; greenish, oblong shaped, film-coated tablets, debossed with "AR 60" on one side.

### 4. INDICATIONS AND USAGE

ERLEADA is indicated for the treatment of patients with Non-metastatic castration-resistant prostate cancer (nmCRPC)

Erleada is indicated in adult men for the treatment of metastatic hormone-sensitive prostate cancer (mHSPC) in combination with androgen deprivation therapy (ADT).

### 5. DOSAGE AND ADMINISTRATION

#### 5.1 Recommended Dosage

The recommended dose of ERLEADA is 240 mg (four 60 mg tablets) administered orally once daily. Swallow the tablets whole. ERLEADA can be taken with or without food.

Patients should also receive a gonadotropin-releasing hormone (GnRH) analog concurrently or should have had a bilateral orchiectomy.

#### 5.2 Dose Modification

If a patient experiences a greater than or equal to Grade 3 toxicity or an intolerable side effect, hold dosing until symptoms improve to less than or equal to Grade 1 or original grade, then resume at the same dose or a reduced dose (180 mg or 120 mg), if warranted.

### 6. CONTRAINDICATIONS

Hypersensitivity to the active substances or to any of the excipients listed in section 16.1.

### 7. WARNINGS AND PRECAUTIONS

#### 7.1 Cerebrovascular and Ischemic Cardiovascular Events

Cerebrovascular and ischemic cardiovascular events, including events leading to death, occurred in patients receiving ERLEADA. Monitor for signs and symptoms of ischemic heart disease and cerebrovascular disorders. Optimize management of cardiovascular risk factors, such as hypertension, diabetes, or dyslipidemia. Consider discontinuation of ERLEADA for Grade 3 and 4 events.

In a randomized study (SPARTAN) of patients with nmCRPC, ischemic cardiovascular events occurred in 3.7% of patients treated with ERLEADA and 2% of patients treated with placebo. In a randomized study (TITAN) in patients with mCSPC, ischemic cardiovascular events occurred in 4.4% of patients treated with ERLEADA and 1.5% of patients treated with placebo. Across the SPARTAN and TITAN studies, 4 patients (0.3%) treated with ERLEADA, and 2 patients (0.2%) treated with placebo died from an ischemic cardiovascular event.

In the SPARTAN study, cerebrovascular events occurred in 2.5% of patients treated with ERLEADA and 1% of patients treated with placebo [see *Adverse Reactions (6.1)*]. In the TITAN study, cerebrovascular events occurred in 1.9% of patients treated with ERLEADA and 2.1% of patients treated with placebo. Across the SPARTAN and TITAN studies, 3 patients (0.2%) treated with ERLEADA, and 2 patients (0.2%) treated with placebo died from a cerebrovascular event.

Patients with history of unstable angina, myocardial infarction, congestive heart failure, stroke, or transient ischemic attack within six months of randomization were excluded from the SPARTAN and TITAN studies.

## 7.2 Fractures

Fractures occurred in patients receiving ERLEADA. Evaluate patients for fracture risk. Monitor and manage patients at risk for fractures according to established treatment guidelines and consider use of bone-targeted agents.

In a randomized study (SPARTAN) of patients with non-metastatic castration-resistant prostate cancer, fractures occurred in 12% of patients treated with ERLEADA and in 7% of patients treated with placebo. Grade 3-4 fractures occurred in 2.7% of patients treated with ERLEADA and in 0.8% of patients treated with placebo. The median time to onset of fracture was 314 days (range: 20 to 953 days) for patients treated with ERLEADA. Routine bone density assessment and treatment of osteoporosis with bone-targeted agents were not performed in the SPARTAN study.

In a randomized study (TITAN) of patients with metastatic castration-sensitive prostate cancer, fractures occurred in 9% of patients treated with ERLEADA and in 6% of patients treated with placebo. Grade 3-4 fractures were similar in both arms at 1.5%. The median time to onset of fracture was 56 days (range: 2 to 111 days) for patients treated with ERLEADA. Routine bone density assessment and treatment of osteoporosis with bone-targeted agents were not performed in the TITAN study.

## 7.3 Falls

Falls occurred in patients receiving ERLEADA with increased frequency in the elderly [see *Use in Specific Populations (10.5)*]. Evaluate patients for fall risk.

In a randomized study (SPARTAN), falls occurred in 16% of patients treated with ERLEADA compared to 9% of patients treated with placebo. Falls were not associated with loss of consciousness or seizure.

## 7.4 Seizure

Seizure occurred in patients receiving ERLEADA. Permanently discontinue ERLEADA in patients who develop a seizure during treatment. It is unknown whether anti-epileptic medications will prevent seizures with ERLEADA. Advise patients of the risk of developing a seizure while receiving ERLEADA and of engaging in any activity where sudden loss of consciousness could cause harm to themselves or others.

In two randomized studies (SPARTAN and TITAN), five patients (0.4%) treated with ERLEADA and one patient treated with placebo (0.1%) experienced a seizure. Seizure occurred from 159 to 650 days after initiation of ERLEADA. Patients with a history of seizure, predisposing factors for seizure, or receiving drugs known to decrease the seizure threshold or to induce seizure were excluded. There is no clinical experience in re-administering ERLEADA to patients who experienced a seizure.

## 7.5 Embryo-Fetal Toxicity

The safety and efficacy of ERLEADA have not been established in females. Based on findings from animals and its mechanism of action, ERLEADA can cause fetal harm and loss of pregnancy when administered to a pregnant female. In an animal reproduction study, oral administration of apalutamide to pregnant rats during and after organogenesis resulted in fetal abnormalities and embryo-fetal lethality at maternal exposures  $\geq 2$  times the human clinical exposure (AUC) at the recommended dose. Advise males with female partners of reproductive potential to use effective contraception during treatment and for 3 months after the last dose of ERLEADA [see *Use in Specific Populations (10.1, 10.3) and Clinical Pharmacology (13.1)*].

## 8 ADVERSE REACTIONS

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

- Cerebrovascular and Ischemic Cardiovascular Events [see *Warnings and Precautions (7.1)*].
- Fractures [see *Warnings and Precautions (7.2)*].
- Falls [see *Warnings and Precautions (7.3)*].
- Seizure [see *Warnings and Precautions (7.4)*].

### 8.1 Clinical Trial Experience

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

The most common adverse reactions ( $\geq 10\%$ ) that occurred more frequently in the ERLEADA-treated patients ( $\geq 2\%$  over placebo) from the randomized placebo-controlled clinical trials (TITAN and SPARTAN) were fatigue, arthralgia, rash, decreased appetite, fall, weight decreased, hypertension, hot flush, diarrhea, and fracture.

#### Metastatic Castration-sensitive Prostate Cancer (mCSPC)

TITAN, a randomized (1:1), double-blind, placebo-controlled, multi-center clinical study, enrolled patients who had mCSPC. In this study, patients received either ERLEADA at a dose of 240 mg daily or placebo. All patients in the TITAN study received a concomitant gonadotropin-releasing hormone (GnRH) analog or had prior bilateral orchiectomy. The median duration of exposure was 20 months (range: 0 to 34 months) in patients who received ERLEADA and 18 months (range: 0.1 to 34 months) in patients who received placebo.

Ten patients (1.9%) who were treated with ERLEADA died from adverse reactions. The reasons for death were ischemic cardiovascular events (n=3), acute kidney injury (n=2), cardio-respiratory arrest (n=1), sudden cardiac death (n=1), respiratory failure (n=1), cerebrovascular accident (n=1), and large intestinal ulcer perforation (n=1). ERLEADA was discontinued due to adverse reactions in 8% of patients, most commonly from rash (2.3%). Adverse reactions leading to dose interruption or reduction of ERLEADA occurred in 23% of patients; the most

frequent (>1%) were rash, fatigue, and hypertension. Serious adverse reactions occurred in 20% of ERLEADA-treated patients and 20% in patients receiving placebo.

Table 1 shows adverse reactions occurring in  $\geq 10\%$  on the ERLEADA arm in TITAN that occurred with a  $\geq 2\%$  absolute increase in frequency compared to placebo. Table 2 shows laboratory abnormalities that occurred in  $\geq 15\%$  of patients, and more frequently (>5%) in the ERLEADA arm compared to placebo.

**Table 1: Adverse Reactions in TITAN (mCSPC)**

System/Organ Class Adverse reaction	ERLEADA N=524		Placebo N=527	
	All Grades %	Grade 3-4 %	All Grades %	Grade 3-4 %
<b>Musculoskeletal and connective tissue disorders</b>				
Arthralgia <sup>a</sup>	17	0.4	15	0.9
<b>Skin and subcutaneous tissue disorders</b>				
Rash <sup>b</sup>	28	6	9	0.6
Pruritus	11	0.2	4.6	0.2
<b>Vascular disorders</b>				
Hot flush	23	0	16	0
Hypertension	18	8	16	9

<sup>a</sup> Per the Common Terminology Criteria for Adverse Reactions (CTCAE), the highest severity for these events is Grade 3

<sup>b</sup> Includes rash, rash maculo-papular, rash generalized, urticaria, rash pruritic, rash macular, conjunctivitis, erythema multiforme, rash papular, skin exfoliation, genital rash, rash erythematous, stomatitis, drug eruption, mouth ulceration, rash pustular, blister, papule, pemphigoid, skin erosion, dermatitis, and rash vesicular

Additional adverse reactions of interest occurring in 2%, but less than 10% of patients treated with ERLEADA included diarrhea (9% versus 6% on placebo), muscle spasm (3.1% versus 1.9% on placebo), dysgeusia (3.2% versus 0.6% on placebo), and hypothyroidism (3.6% versus 0.6% on placebo).

**Table 2: Laboratory Abnormalities Occurring in  $\geq 15\%$  of ERLEADA-Treated Patients and at a Higher Incidence than Placebo (Between Arm Difference > 5% All Grades) in TITAN (mCSPC)**

Laboratory Abnormality	ERLEADA N=524		Placebo N=527	
	All Grades %	Grade 3-4 %	All Grades %	Grade 3-4 %
<b>Hematology</b>				
White blood cell decreased	27	0.4	19	0.6
<b>Chemistry</b>				
Hypertriglyceridemia <sup>a</sup>	17	2.5	12	2.3

<sup>a</sup> Does not reflect fasting values

### Non-metastatic Castration-resistant Prostate Cancer (nmCRPC)

SPARTAN, a randomized (2:1), double-blind, placebo-controlled, multi-center clinical study, enrolled patients who had nmCRPC. In this study, patients received either ERLEADA at a dose of 240 mg daily or a placebo. All patients in the SPARTAN study received a concomitant gonadotropin-releasing hormone (GnRH) analog or had a bilateral orchiectomy. The median duration of exposure was 33 months (range: 0.1 to 75 months) in patients who received ERLEADA and 11 months (range: 0.1 to 37 months) in patients who received placebo.

Twenty-four patients (3%) who were treated with ERLEADA died from adverse reactions. The reasons for death with  $\geq 2$  patients included infection (n=7), myocardial infarction (n=3), cerebrovascular event (n=2), and unknown reason (n=3). ERLEADA was discontinued due to adverse reactions in 11% of patients, most commonly

from rash (3.2%). Adverse reactions leading to dose interruption or reduction of ERLEADA occurred in 33% of patients; the most common (>1%) were rash, diarrhea, fatigue, nausea, vomiting, hypertension, and hematuria. Serious adverse reactions occurred in 25% of ERLEADA-treated patients and 23% in patients receiving placebo. The most frequent serious adverse reactions (>2%) were fracture (3.4%) in the ERLEADA arm and urinary retention (3.8%) in the placebo arm.

Table 3 shows adverse reactions occurring in  $\geq 10\%$  on the ERLEADA arm in SPARTAN that occurred with a  $\geq 2\%$  absolute increase in frequency compared to placebo. Table 4 shows laboratory abnormalities that occurred in  $\geq 15\%$  of patients, and more frequently (>5%) in the ERLEADA arm compared to placebo.

**Table 3: Adverse Reactions in SPARTAN (nmCRPC)**

System/Organ Class Adverse reaction	ERLEADA N=803		Placebo N=398	
	All Grades %	Grade 3-4 %	All Grades %	Grade 3-4 %
<b>General disorders and administration site conditions</b>				
Fatigue <sup>a,b</sup>	39	1.4	28	0.3
<b>Musculoskeletal and connective tissue disorders</b>				
Arthralgia <sup>b</sup>	16	0	8	0
<b>Skin and subcutaneous tissue disorders</b>				
Rash <sup>c</sup>	25	5.2	6	0.3
<b>Metabolism and nutrition disorders</b>				
Decreased appetite <sup>d</sup>	12	0.1	9	0
Peripheral edema <sup>e</sup>	11	0	9	0
<b>Injury, poisoning and procedural complications</b>				
Fall <sup>b</sup>	16	1.7	9	0.8
Fracture <sup>f</sup>	12	2.7	7	0.8
<b>Investigations</b>				
Weight decreased <sup>b</sup>	16	1.1	6	0.3
<b>Vascular disorders</b>				
Hypertension	25	14	20	12
Hot flush	14	0	9	0
<b>Gastrointestinal disorders</b>				
Diarrhea	20	1.1	15	0.5
Nausea	18	0	16	0

<sup>a</sup> Includes fatigue and asthenia

<sup>b</sup> Per the Common Terminology Criteria for Adverse Reactions (CTCAE), the highest severity for these events is Grade 3

<sup>c</sup> Includes rash, rash maculo-papular, rash generalized, urticaria, rash pruritic, rash macular, conjunctivitis, erythema multiforme, rash papular, skin exfoliation, genital rash, rash erythematous, stomatitis, drug eruption, mouth ulceration, rash pustular, blister, papule, pemphigoid, skin erosion, dermatitis, and rash vesicular

<sup>d</sup> Includes appetite disorder, decreased appetite, early satiety, and hypophagia

<sup>e</sup> Includes peripheral edema, generalized edema, edema, edema genital, penile edema, peripheral swelling, scrotal edema, lymphedema, swelling, and localized edema

<sup>f</sup> Includes rib fracture, lumbar vertebral fracture, spinal compression fracture, spinal fracture, foot fracture, hip fracture, humerus fracture, thoracic vertebral fracture, upper limb fracture, fractured sacrum, hand fracture, pubis fracture, acetabulum fracture, ankle fracture, compression fracture, costal cartilage fracture, facial bones fracture, lower limb fracture, osteoporotic fracture, wrist fracture, avulsion fracture, fibula fracture, fractured coccyx, pelvic fracture, radius fracture, sternal fracture, stress fracture, traumatic fracture, cervical vertebral fracture, femoral neck fracture, and tibia fracture

Additional clinically significant adverse reactions occurring in 2% or more of patients treated with ERLEADA included hypothyroidism (8% versus 2% on placebo), pruritus (6% versus 1.5% on placebo), and heart failure (2.2% versus 1% on placebo).

**Table 4: Laboratory Abnormalities Occurring in  $\geq 15\%$  of ERLEADA-Treated Patients and at a Higher Incidence than Placebo (Between Arm Difference  $> 5\%$  All Grades) in SPARTAN (nmCRPC)**

Laboratory Abnormality	ERLEADA N=803		Placebo N=398	
	All Grades %	Grade 3-4 %	All Grades %	Grade 3-4 %
<b><u>Hematology</u></b>				
Anemia	70	0.4	64	0.5
Leukopenia	47	0.3	29	0
Lymphopenia	41	1.8	21	1.6
<b><u>Chemistry</u></b>				
Hypercholesterolemia <sup>a</sup>	76	0.1	46	0
Hyperglycemia <sup>a</sup>	70	2	59	1.0
Hypertriglyceridemia <sup>a</sup>	67	1.6	49	0.8
Hyperkalemia	32	1.9	22	0.5

<sup>a</sup> Does not reflect fasting values

## Rash

In the combined data of two randomized, placebo-controlled clinical studies, SPARTAN and TITAN, rash associated with ERLEADA was most commonly described as macular or maculo-papular. Adverse reactions of rash were reported for 26% of patients treated with ERLEADA versus 8% of patients treated with placebo. Grade 3 rashes (defined as covering  $> 30\%$  body surface area [BSA]) were reported with ERLEADA treatment (6%) versus placebo (0.5%).

The onset of rash occurred at a median of 83 days of ERLEADA treatment. Rash resolved in 78% of patients within a median of 78 days from onset of rash. Rash was commonly managed with oral antihistamines, topical corticosteroids, and 19% of patients received systemic corticosteroids. Dose reduction or dose interruption occurred in 14% and 28% of patients, respectively. Of the patients who had dose interruption, 59% experienced recurrence of rash upon reintroduction of ERLEADA.

## Hypothyroidism

In the combined data of two randomized, placebo-controlled clinical studies, SPARTAN and TITAN, hypothyroidism was reported for 8% of patients treated with ERLEADA and 1.5% of patients treated with placebo based on assessments of thyroid-stimulating hormone (TSH) every 4 months. Elevated TSH occurred in 25% of patients treated with ERLEADA and 7% of patients treated with placebo. The median onset was at the first scheduled assessment. There were no Grade 3 or 4 adverse reactions. Thyroid replacement therapy was initiated in 4.9% of patients treated with ERLEADA. Thyroid replacement therapy, when clinically indicated, should be initiated or dose-adjusted [see *Drug Interactions (9.2)*].

## **8.2 Post-Marketing Experience**

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

*Respiratory, Thoracic and Mediastinal Disorders:* interstitial lung disease

*Skin and Subcutaneous Tissue Disorders:* Stevens-Johnson syndrome/toxic epidermal necrolysis

## Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorization of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Any suspected adverse events should be reported to the Ministry of Health according to the National Regulation by using an online form <http://sideeffects.health.gov.il>

## 9 DRUG INTERACTIONS

### 9.1 Effect of Other Drugs on ERLEADA

#### Strong CYP2C8 or CYP3A4 Inhibitors

Co-administration of a strong CYP2C8 or CYP3A4 inhibitor is predicted to increase the steady-state exposure of the active moieties (sum of unbound apalutamide plus the potency-adjusted unbound N-desmethyl-apalutamide). No initial dose adjustment is necessary however, reduce the ERLEADA dose based on tolerability [*see Dosage and Administration (5.2)*]. Mild or moderate inhibitors of CYP2C8 or CYP3A4 are not expected to affect the exposure of apalutamide.

### 9.2 Effect of ERLEADA on Other Drugs

#### CYP3A4, CYP2C9, CYP2C19 and UGT Substrates

ERLEADA is a strong inducer of CYP3A4 and CYP2C19, and a weak inducer of CYP2C9 in humans. Concomitant use of ERLEADA with medications that are primarily metabolized by CYP3A4, CYP2C19, or CYP2C9 can result in lower exposure to these medications. Substitution for these medications is recommended when possible or evaluate for loss of activity if medication is continued. Concomitant administration of ERLEADA with medications that are substrates of UDP-glucuronosyl transferase (UGT) can result in decreased exposure. Use caution if substrates of UGT must be co-administered with ERLEADA and evaluate for loss of activity [*see Clinical Pharmacology (13.3)*].

#### P-gp, BCRP or OATP1B1 Substrates

Apalutamide was shown to be a weak inducer of P-glycoprotein (P-gp), breast cancer resistance protein (BCRP), and organic anion transporting polypeptide 1B1 (OATP1B1) clinically. At steady-state, apalutamide reduced the plasma exposure to fexofenadine (a P-gp substrate) and rosuvastatin (a BCRP/OATP1B1 substrate). Concomitant use of ERLEADA with medications that are substrates of P-gp, BCRP, or OATP1B1 can result in lower exposure of these medications. Use caution if substrates of P-gp, BCRP or OATP1B1 must be co-administered with ERLEADA and evaluate for loss of activity if medication is continued [*see Clinical Pharmacology (13.3)*].

## 10 USE IN SPECIFIC POPULATIONS

### 10.1 Pregnancy

#### Risk Summary

The safety and efficacy of ERLEADA have not been established in females. Based on findings from animals and its mechanism of action, ERLEADA can cause fetal harm and loss of pregnancy when administered to a pregnant

female [see *Clinical Pharmacology (13.1)*]. There are no available data on ERLEADA use in pregnant women to inform a drug-associated risk. In an animal reproduction study, oral administration of apalutamide to pregnant rats during and after organogenesis resulted in fetal abnormalities and embryo-fetal lethality at maternal exposures  $\geq 2$  times the human clinical exposure (AUC) at the recommended dose (see *Data*).

## Data

### *Animal Data*

In a pilot embryo-fetal developmental toxicity study in rats, apalutamide caused developmental toxicity when administered at oral doses of 25, 50 or 100 mg/kg/day throughout and after the period of organogenesis (gestational days 6-20). Findings included embryo-fetal lethality (resorptions) at doses  $\geq 50$  mg/kg/day, decreased fetal anogenital distance, misshapen pituitary gland, and skeletal variations (unossified phalanges, supernumerary short thoracolumbar rib(s), and small, incomplete ossification, and/or misshapen hyoid bone) at  $\geq 25$  mg/kg/day. A dose of 100 mg/kg/day caused maternal toxicity. The doses tested in rats resulted in systemic exposures (AUC) approximately 2, 4 and 6 times, respectively, the AUC in patients.

## **10.2 Lactation**

### Risk Summary

The safety and efficacy of ERLEADA have not been established in females. There are no data on the presence of apalutamide or its metabolites in human milk, the effect on the breastfed child, or the effect on milk production.

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

### Contraception

#### *Males*

Based on the mechanism of action and findings in an animal reproduction study, advise male patients with female partners of reproductive potential to use effective contraception during treatment and for 3 months after the last dose of ERLEADA. [see *Use in Specific Populations (10.1)*].

### Infertility

#### *Males*

Based on animal studies, ERLEADA may impair fertility in males of reproductive potential [see *Nonclinical Toxicology (14.1)*].

## **10.4 Pediatric Use**

Safety and effectiveness of ERLEADA in pediatric patients have not been established.

## **10.5 Geriatric Use**

Of the 1327 patients who received ERLEADA in clinical studies, 19% of patients were less than 65 years, 41% of patients were 65 years to 74 years, and 40% were 75 years and over.

No overall differences in effectiveness were observed between older and younger patients.



Of patients treated with ERLEADA (n=1073), Grade 3-4 adverse reactions occurred in 39% of patients younger than 65 years, 41% of patients 65-74 years, and 49% of patients 75 years or older. Falls in patients receiving ERLEADA with androgen deprivation therapy was elevated in the elderly, occurring in 8% of patients younger than 65 years, 10% of patients 65-74 years, and 19% of patients 75 years or older.

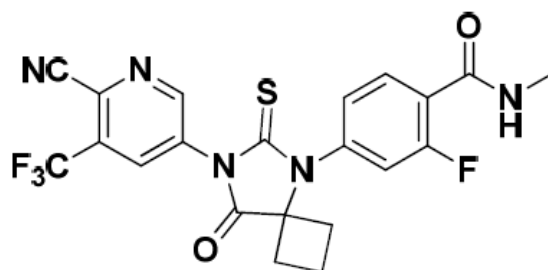
## 11 OVERDOSAGE

There is no known specific antidote for apalutamide overdose. In the event of an overdose, stop ERLEADA, undertake general supportive measures until clinical toxicity has been diminished or resolved.

## 12 DESCRIPTION

Apalutamide, the active ingredient of ERLEADA, is an androgen receptor inhibitor. The chemical name is (4-[7-(6-Cyano-5-trifluoromethylpyridin-3-yl)-8-oxo-6-thioxo-5,7-diazaspiro[3.4]oct-5-yl]-2-fluoro-N-methylbenzamide). Apalutamide is a white to slightly yellow powder. Apalutamide is practically insoluble in aqueous media over a wide range of pH values.

The molecular weight is 477.44 and molecular formula is  $C_{21}H_{15}F_4N_5O_2S$ . The structural formula is:



ERLEADA<sup>®</sup> (apalutamide) is supplied as film-coated tablets for oral administration containing 60 mg of apalutamide. Inactive ingredients of the core tablet are: colloidal anhydrous silica, croscarmellose sodium, hydroxypropyl methylcellulose-acetate succinate, magnesium stearate, microcrystalline cellulose, and silicified microcrystalline cellulose.

The tablets are finished with a commercially available film-coating comprising the following excipients: iron oxide black, iron oxide yellow, polyethylene glycol, polyvinyl alcohol, talc, and titanium dioxide.

## 13 CLINICAL PHARMACOLOGY

### 13.1 Mechanism of Action

Apalutamide is an Androgen Receptor (AR) inhibitor that binds directly to the ligand-binding domain of the AR. Apalutamide inhibits AR nuclear translocation, inhibits DNA binding, and impedes AR-mediated transcription. A major metabolite, N-desmethyl apalutamide, is a less potent inhibitor of AR, and exhibited one-third the activity of apalutamide in an *in vitro* transcriptional reporter assay. Apalutamide administration caused decreased tumor cell proliferation and increased apoptosis leading to decreased tumor volume in mouse xenograft models of prostate cancer.

## 13.2 Pharmacodynamics

### Cardiac Electrophysiology

The effect of apalutamide 240 mg once daily on the QTc interval was assessed in an open-label, uncontrolled, multi-center, single-arm dedicated QT study in 45 patients with CRPC. The maximum mean QTcF change from baseline was 12.4 ms (2-sided 90% upper CI: 16.0 ms). An exposure-QT analysis suggested a concentration-dependent increase in QTcF for apalutamide and its active metabolite.

## 13.3 Pharmacokinetics

Apalutamide pharmacokinetic parameters are presented as the mean [standard deviation (SD)] unless otherwise specified. Apalutamide  $C_{max}$  and area under the concentration curve (AUC) increased proportionally following repeated once-daily dosing of 30 to 480 mg (0.125 to 2 times the recommended dosage). Following administration of the recommended dosage, apalutamide steady-state was achieved after 4 weeks and the mean accumulation ratio was approximately 5-fold. Apalutamide  $C_{max}$  was 6.0 mcg/mL (1.7) and AUC was 100 mcg·h/mL (32) at steady-state. Daily fluctuations in apalutamide plasma concentrations were low, with mean peak-to-trough ratio of 1.63. An increase in apparent clearance (CL/F) was observed with repeat dosing, likely due to induction of apalutamide's own metabolism. The auto-induction effect likely reached its maximum at the recommended dosage because exposure of apalutamide across the dose range of 30 to 480 mg is dose-proportional.

The major active metabolite N-desmethyl apalutamide  $C_{max}$  was 5.9 mcg/mL (1.0) and AUC was 124 mcg·h/mL (23) at steady-state after the recommended dosage. N-desmethyl apalutamide was characterized by a flat concentration-time profile at steady-state with a mean peak-to-trough ratio of 1.27. Mean AUC metabolite/parent drug ratio for N-desmethyl apalutamide following repeat-dose administration was 1.3. Based on systemic exposure, relative potency, and pharmacokinetic properties, N-desmethyl apalutamide likely contributed to the clinical activity of apalutamide.

### Absorption

Mean absolute oral bioavailability was approximately 100%. Median time to achieve peak plasma concentration ( $t_{max}$ ) was 2 hours (range: 1 to 5 hours).

### Effect of Food

Administration of apalutamide to healthy subjects under fasting conditions and with a high-fat meal (approximately 500 to 600 fat calories, 250 carbohydrate calories, and 150 protein calories) resulted in no clinically relevant changes in  $C_{max}$  and AUC. Median time to reach  $t_{max}$  was delayed approximately 2 hours with food.

### Distribution

The mean apparent volume of distribution at steady-state of apalutamide was approximately 276 L.

Apalutamide was 96% and N-desmethyl apalutamide was 95% bound to plasma proteins with no concentration dependency.

### Elimination

The CL/F of apalutamide was 1.3 L/h after single dosing and increased to 2.0 L/h at steady-state after once-daily dosing likely due to CYP3A4 auto-induction. The mean effective half-life for apalutamide in patients was approximately 3 days at steady-state.

## Metabolism

Metabolism is the main route of elimination of apalutamide. Apalutamide is primarily metabolized by CYP2C8 and CYP3A4 to form active metabolite, N-desmethyl apalutamide. The contribution of CYP2C8 and CYP3A4 in the metabolism of apalutamide is estimated to be 58% and 13% following single dose but changes to 40% and 37%, respectively at steady-state.

Apalutamide represented 45% and N-desmethyl apalutamide represented 44% of the total AUC following a single oral administration of radiolabeled apalutamide 240 mg.

## Excretion

Up to 70 days following a single oral administration of radiolabeled apalutamide, 65% of the dose was recovered in urine (1.2% of dose as unchanged apalutamide and 2.7% as N-desmethyl apalutamide) and 24% was recovered in feces (1.5% of dose as unchanged apalutamide and 2% as N-desmethyl apalutamide).

## Specific Populations

No clinically significant differences in the pharmacokinetics of apalutamide or N-desmethyl apalutamide were observed based on age (18-94 years), race (Black, non-Japanese Asian, Japanese), mild to moderate (eGFR 30-89 mL/min/1.73 m<sup>2</sup>, estimated by the modification of diet in renal disease [MDRD] equation) renal impairment, or mild (Child-Pugh A) to moderate (Child-Pugh B) hepatic impairment.

The effect of severe renal impairment or end stage renal disease (eGFR  $\leq$ 29 mL/min/1.73 m<sup>2</sup>, MDRD) or severe hepatic impairment (Child-Pugh C) on apalutamide pharmacokinetics is unknown.

## Drug Interactions

### *Effect of Other Drugs on ERLEADA*

#### **Strong CYP2C8 inhibitors**

Apalutamide C<sub>max</sub> decreased by 21% while AUC increased by 68% following co-administration of ERLEADA as a 240 mg single dose with gemfibrozil (a strong CYP2C8 inhibitor). Gemfibrozil is predicted to increase the steady-state apalutamide C<sub>max</sub> by 32% and AUC by 44%. For the active moieties (sum of unbound apalutamide plus the potency-adjusted unbound N-desmethyl apalutamide), the predicted steady-state C<sub>max</sub> increased by 19% and AUC by 23%.

#### **Strong CYP3A4 inhibitors**

Apalutamide C<sub>max</sub> decreased by 22% while AUC was similar following co-administration of ERLEADA as a 240 mg single dose with itraconazole (a strong CYP3A4 inhibitor). Ketoconazole (a strong CYP3A4 inhibitor) is predicted to increase the single-dose apalutamide AUC by 24% but have no impact on C<sub>max</sub>. Ketoconazole is predicted to increase the steady-state apalutamide C<sub>max</sub> by 38% and AUC by 51%. For the active moieties, the predicted steady-state C<sub>max</sub> increased by 23% and AUC by 28%.

#### **CYP3A4/CYP2C8 inducers**

Rifampin (a strong CYP3A4 and moderate CYP2C8 inducer) is predicted to decrease the steady-state apalutamide C<sub>max</sub> by 25% and AUC by 34%. For the active moieties, the predicted steady-state C<sub>max</sub> decreased by 15% and AUC by 19%.

### **Acid lowering agents**

Apalutamide is not ionizable under relevant physiological pH condition, therefore acid lowering agents (e.g., proton pump inhibitor, H<sub>2</sub>-receptor antagonist, antacid) are not expected to affect the solubility and bioavailability of apalutamide.

### **Drugs affecting transporters**

*In vitro*, apalutamide and N-desmethyl apalutamide are substrates for P-gp but not BCRP, OATP1B1, and OATP1B3. Because apalutamide is completely absorbed after oral administration, P-gp does not limit the absorption of apalutamide and therefore, inhibition or induction of P-gp is not expected to affect the bioavailability of apalutamide.

### **Effect of ERLEADA on Other Drugs**

#### **CYP substrates**

*In vitro* studies showed that apalutamide and N-desmethyl apalutamide are moderate to strong CYP3A4 and CYP2B6 inducers, are moderate inhibitors of CYP2B6 and CYP2C8, and weak inhibitors of CYP2C9, CYP2C19, and CYP3A4. Apalutamide and N-desmethyl apalutamide do not affect CYP1A2 and CYP2D6 at therapeutically relevant concentrations.

Co-administration of ERLEADA with single oral doses of sensitive CYP substrates resulted in a 92% decrease in the AUC of midazolam (a CYP3A4 substrate), 85% decrease in the AUC of omeprazole (a CYP2C19 substrate), and 46% decrease in the AUC of S-warfarin (a CYP2C9 substrate). ERLEADA did not cause clinically significant changes in exposure to a CYP2C8 substrate.

#### **P-gp, BCRP and OATP1B1 substrates**

Co-administration of ERLEADA with single oral doses of transporter substrates resulted in a 30% decrease in the AUC of fexofenadine (a P-gp substrate) and 41% decrease in the AUC of rosuvastatin (a BCRP/OATP1B1 substrate) but had no impact on C<sub>max</sub>.

#### **UGT substrates**

Apalutamide may induce UGT. Concomitant administration of ERLEADA with medications that are substrates of UGT may result in lower exposure to these medications.

#### **OCT2, OAT1, OAT3 and MATEs substrates**

*In vitro*, apalutamide and N-desmethyl apalutamide inhibit organic cation transporter 2 (OCT2), organic anion transporter 3 (OAT3) and multidrug and toxin extrusions (MATEs), and do not inhibit organic anion transporter 1. Apalutamide is not predicted to cause clinically significant changes in exposure to an OAT3 substrate.

#### **GnRH analog**

In mCSPC subjects receiving leuprolide acetate (a GnRH analog) co-administered with apalutamide, PK data indicated that apalutamide had no apparent effect on the steady-state exposure of leuprolide.

## **14 NONCLINICAL TOXICOLOGY**

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

In a 2-year carcinogenicity study in male rats, apalutamide was administered by oral gavage at doses of 5, 15 and 50 mg/kg/day. Apalutamide increased the incidence of Leydig interstitial cell adenoma in the testes at doses  $\geq 5$  mg/kg/day (0.2 times the human exposure based on AUC). The findings in the testes are considered to be related to the pharmacological activity of apalutamide. Rats are regarded as more sensitive than humans to

developing interstitial cell tumors in the testes. Oral administration of apalutamide to male rasH2 transgenic mice for 6 months did not result in increased incidence of neoplasms at doses up to 30 mg/kg/day.

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

In repeat-dose toxicity studies in male rats (up to 26 weeks) and dogs (up to 39 weeks), atrophy of the prostate gland and seminal vesicles, aspermia/hypospermia, tubular degeneration and/or hyperplasia or hypertrophy of the interstitial cells in the reproductive system were observed at  $\geq 25$  mg/kg/day in rats (1.4 times the human exposure based on AUC) and  $\geq 2.5$  mg/kg/day in dogs (0.9 times the human exposure based on AUC).

In a fertility study in male rats, a decrease in sperm concentration and motility, increased abnormal sperm morphology, lower copulation and fertility rates (upon pairing with untreated females) along with reduced weights of the secondary sex glands and epididymis were observed following 4 weeks of dosing at  $\geq 25$  mg/kg/day (0.8 times the human exposure based on AUC). A reduced number of live fetuses due to increased pre- and/or post-implantation loss was observed following 4 weeks of 150 mg/kg/day administration (5.7 times the human exposure based on AUC). Effects on male rats were reversible after 8 weeks from the last apalutamide administration.

## 15 CLINICAL STUDIES

The efficacy and safety of ERLEADA was established in two randomized placebo-controlled clinical trials.

### TITAN (NCT02489318): Metastatic Castration-sensitive Prostate Cancer (mCSPC)

TITAN was a randomized, double-blind, placebo-controlled, multinational, clinical trial in which 1052 patients with mCSPC were randomized (1:1) to receive either ERLEADA orally at a dose of 240 mg once daily (N=525) or placebo once daily (N=527). All patients in the TITAN trial received concomitant GnRH analog or had prior bilateral orchiectomy. Patients were stratified by Gleason score at diagnosis, prior docetaxel use, and region of the world. Patients with both high- and low-volume mCSPC were eligible for the study. High volume of disease was defined as metastases involving the viscera with 1 bone lesion or the presence of 4 or more bone lesions, at least 1 of which must be in a bony structure beyond the vertebral column and pelvic bones.

The following patient demographics and baseline disease characteristics were balanced between the treatment arms. The median age was 68 years (range 43-94) and 23% of patients were 75 years of age or older. The racial distribution was 68% Caucasian, 22% Asian, and 2% Black. Sixty-three percent (63%) of patients had high-volume disease and 37% had low-volume disease. Sixteen percent (16%) of patients had prior surgery, radiotherapy of the prostate or both. A majority of patients had a Gleason score of 8 or higher (67%). Sixty-eight percent (68%) of patients received prior treatment with an anti-androgen (bicalutamide, flutamide, or nilutamide). All patients except one in the placebo group, had an Eastern Cooperative Oncology Group Performance Status (ECOG PS) score of 0 or 1 at study entry.

The major efficacy outcome measures of the study were overall survival (OS) and radiographic progression-free survival (rPFS). Radiographic progression-free survival was based on investigator assessment and was defined as time from randomization to radiographic disease progression or death. Radiographic disease progression was defined by identification of 2 or more new bone lesions on a bone scan with confirmation (Prostate Cancer Working Group 2 criteria) and/or progression in soft tissue disease.

A statistically significant improvement in OS and rPFS was demonstrated in patients randomized to receive ERLEADA compared with patients randomized to receive placebo. The results for OS are based upon a prespecified interim efficacy analysis. An updated OS analysis was conducted at the time of final study analysis when 405 deaths were observed. The median follow-up time was 44 months. Thirty-nine percent of patients in the placebo arm crossed over to receive ERLEADA. Efficacy results of TITAN are summarized in Table 5 and Figures 1 and 2.

**Table 5: Efficacy Results from the TITAN Study**

<b>Endpoint</b>	<b>ERLEADA (N=525)</b>	<b>Placebo (N=527)</b>
<b>Primary Overall Survival<sup>a</sup></b>		
Deaths (%)	83 (16%)	117 (22%)
Median, months (95% CI) <sup>b</sup>	NE (NE, NE)	NE (NE, NE)
Hazard Ratio (95% CI) <sup>c</sup>	0.67 (0.51, 0.89)	
p-value <sup>d</sup>	0.0053	
<b>Updated Overall Survival</b>		
Deaths (%)	170 (32%)	235 (45%)
Median, months (95% CI) <sup>b</sup>	NE (NE, NE)	52 (42, NE)
Hazard Ratio (95% CI) <sup>c</sup>	0.65 (0.53, 0.79)	
<b>Radiographic Progression-free Survival</b>		
Disease progression or death (%)	134 (26%)	231 (44%)
Median, months (95% CI) <sup>b</sup>	NE (NE, NE)	22.1 (18, 33)
Hazard Ratio (95% CI) <sup>c</sup>	0.48 (0.39, 0.60)	
p-value <sup>d</sup>	<0.0001	

<sup>a</sup> Interim analysis is based on 50% of the number of events planned for the final analysis. Allocated alpha = 0.01.

<sup>b</sup> NE=Not Estimable

<sup>c</sup> Hazard ratio is from stratified proportional hazards model. Hazard ratio <1 favors ERLEADA.

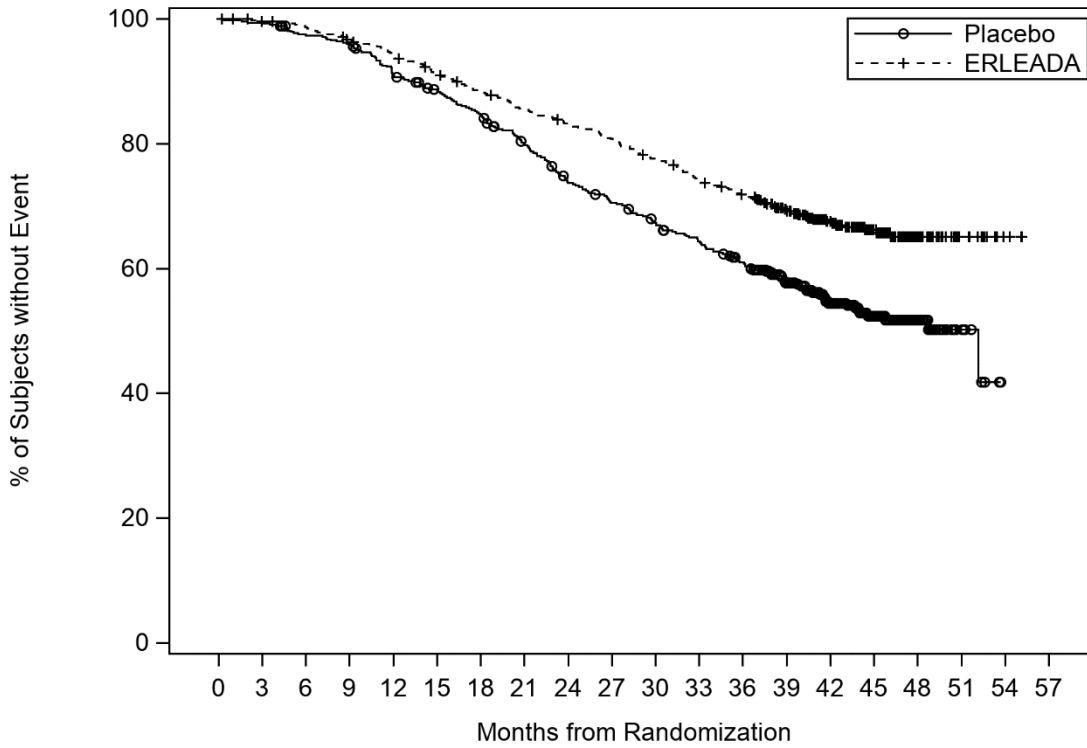
<sup>d</sup> p-value is from the log-rank test stratified by Gleason score at diagnosis ( $\leq 7$  vs.  $>7$ ), Region (NA/EU vs. Other Countries) and Prior docetaxel use (Yes vs. No).

Consistent improvement in rPFS was observed across the following patient subgroups: disease volume (high vs low), prior docetaxel use (yes or no), and Gleason score at diagnosis ( $\leq 7$  vs.  $>7$ ).

Consistent improvement in OS was observed across the following patient subgroups: disease volume (high vs low) and Gleason score at diagnosis ( $\leq 7$  vs.  $>7$ ).

Treatment with ERLEADA resulted in a statistically significant delay in the initiation of cytotoxic chemotherapy (HR = 0.39, 95% CI = 0.27, 0.56;  $p < 0.0001$ ).

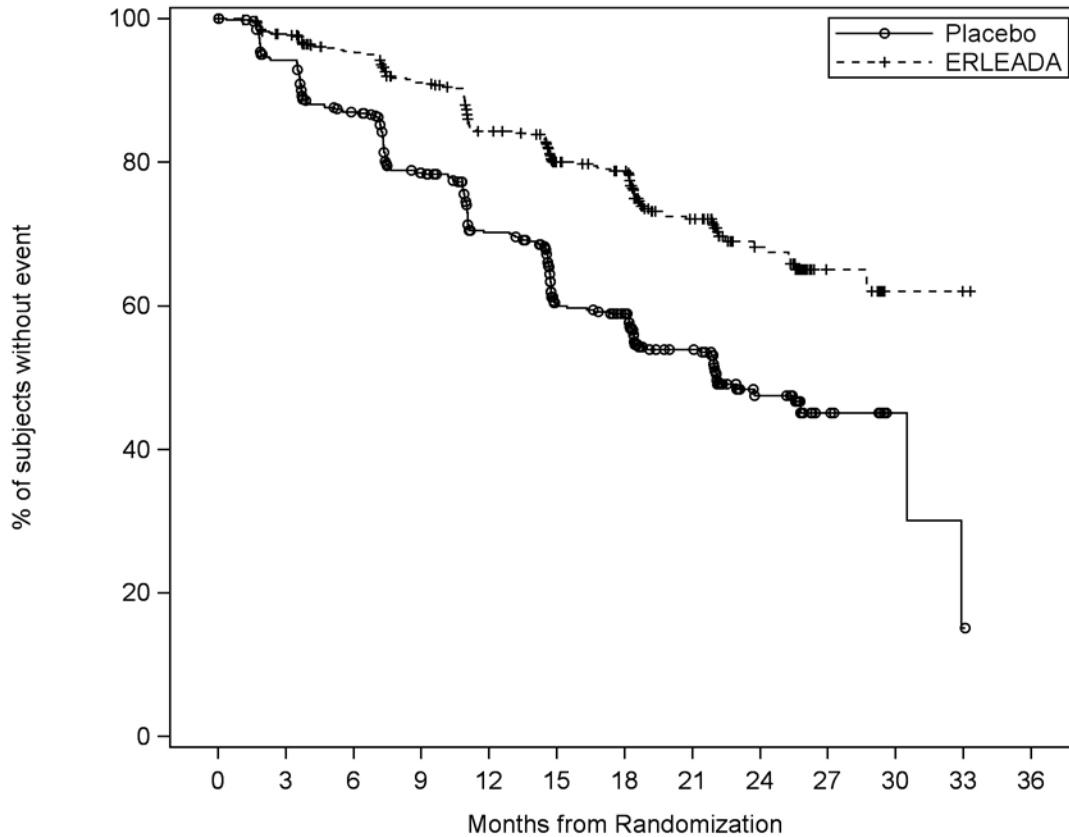
Figure 1: Kaplan-Meier Plot of Updated Overall Survival (OS); Intent-to-treat mCSPC Population (TITAN)



Subjects at risk

Placebo	527	524	510	503	474	458	436	408	374	357	339	322	301	248	181	102	43	10	0	0
ERLEADA	525	519	513	500	489	469	452	438	425	412	394	376	362	321	227	139	52	15	3	0

**Figure 2: Kaplan-Meier Plot of Radiographic Progression-Free Survival (rPFS); Intent-to-treat mCSPC Population (TITAN)**



Subjects at risk

Placebo	527	488	437	381	325	240	229	140	57	14	3	1	0
ERLEADA	525	498	469	434	389	326	315	194	89	21	2	1	0

### SPARTAN (NCT01946204): Non-metastatic, Castration-resistant Prostate Cancer (nmCRPC)

SPARTAN was a multicenter, double-blind, randomized (2:1), placebo-controlled clinical trial in which 1207 patients with nmCRPC were randomized (2:1) to receive either ERLEADA orally at a dose of 240 mg once daily (N=806) or placebo once daily (N=401). All patients in the SPARTAN trial received a concomitant GnRH analog or had a bilateral orchiectomy. Patients were stratified by Prostate Specific Antigen (PSA) Doubling Time (PSADT), the use of bone-sparing agents, and locoregional disease. Patients were required to have a PSADT  $\leq$  10 months and confirmation of non-metastatic disease by blinded independent central review (BICR). PSA results were blinded and were not used for treatment discontinuation. Patients randomized to either arm discontinued treatment for radiographic disease progression confirmed by BICR, locoregional-only progression, initiation of new treatment, unacceptable toxicity, or withdrawal.

The following patient demographics and baseline disease characteristics were balanced between the treatment arms. The median age was 74 years (range 48-97) and 26% of patients were 80 years of age or older. The racial distribution was 66% Caucasian, 12% Asian, and 6% Black. Seventy-seven percent (77%) of patients in both treatment arms had prior surgery or radiotherapy of the prostate. A majority of patients had a Gleason score of 7 or higher (78%). Fifteen percent (15%) of patients had  $<$ 2 cm pelvic lymph nodes at study entry. Seventy-three percent (73%) of patients received prior treatment with an anti-androgen; 69% of patients received bicalutamide



and 10% of patients received flutamide. All patients had an Eastern Cooperative Oncology Group Performance Status (ECOG PS) score of 0 or 1 at study entry.

The major efficacy outcome measure of the study was metastasis-free survival (MFS), defined as the time from randomization to the time of first evidence of BICR-confirmed distant metastasis, defined as new bone or soft tissue lesions or enlarged lymph nodes above the iliac bifurcation, or death due to any cause, whichever occurred first. Additional efficacy endpoints were time to metastasis (TTM), progression-free survival (PFS) which also includes locoregional progression, time to symptomatic progression, overall survival (OS), and time to initiation of cytotoxic chemotherapy.

A statistically significant improvement in MFS and OS was demonstrated in patients randomized to receive ERLEADA compared with patients randomized to receive placebo. The major efficacy outcome (MFS) was supported by improvements in TTM and PFS. The final analysis of OS and time to initiation of cytotoxic chemotherapy was conducted 32 months after the analysis of MFS, TTM and PFS. The efficacy results from SPARTAN are summarized in Table 6 and Figures 3 and 4.

**Table 6: Efficacy Results from the SPARTAN Study**

Endpoint	ERLEADA (N=806)	Placebo (N=401)
<b>Metastasis Free Survival<sup>a,b,c</sup></b>		
Number of Events (%)	184 (23%)	194 (48%)
Median, months (95% CI) <sup>d</sup>	40.5 (NE, NE)	16.2 (15, 18)
Hazard Ratio (95% CI)	0.28 (0.23, 0.35)	
p-value <sup>a</sup>	<0.0001	
<b>Time to Metastasis<sup>a,b</sup></b>		
Number of Events (%)	175 (22%)	191 (48%)
Median, months (95% CI) <sup>d</sup>	40.5 (NE, NE)	16.6 (15, 18)
Hazard Ratio (95% CI)	0.27 (0.22, 0.34)	
p-value <sup>a</sup>	<0.0001	
<b>Progression-Free Survival<sup>a,b</sup></b>		
Number of Events (%)	200 (25%)	204 (51%)
Median, months (95% CI) <sup>d</sup>	40.5 (NE, NE)	14.7 (14, 18)
Hazard Ratio (95% CI)	0.29 (0.24, 0.36)	
p-value <sup>a</sup>	<0.0001	
<b>Overall Survival</b>		
Number of Events (%)	274 (34%)	154 (38%)
Median, months (95% CI) <sup>d</sup>	73.9 (61, NE)	59.9 (53, NE)
Hazard Ratio (95% CI)	0.78 (0.64, 0.96)	
p-value <sup>a</sup>	0.0161	

<sup>a</sup> All analyses stratified by PSA doubling time, bone-sparing agent use, and locoregional disease status.

<sup>b</sup> Confirmed responses assessed by BICR.

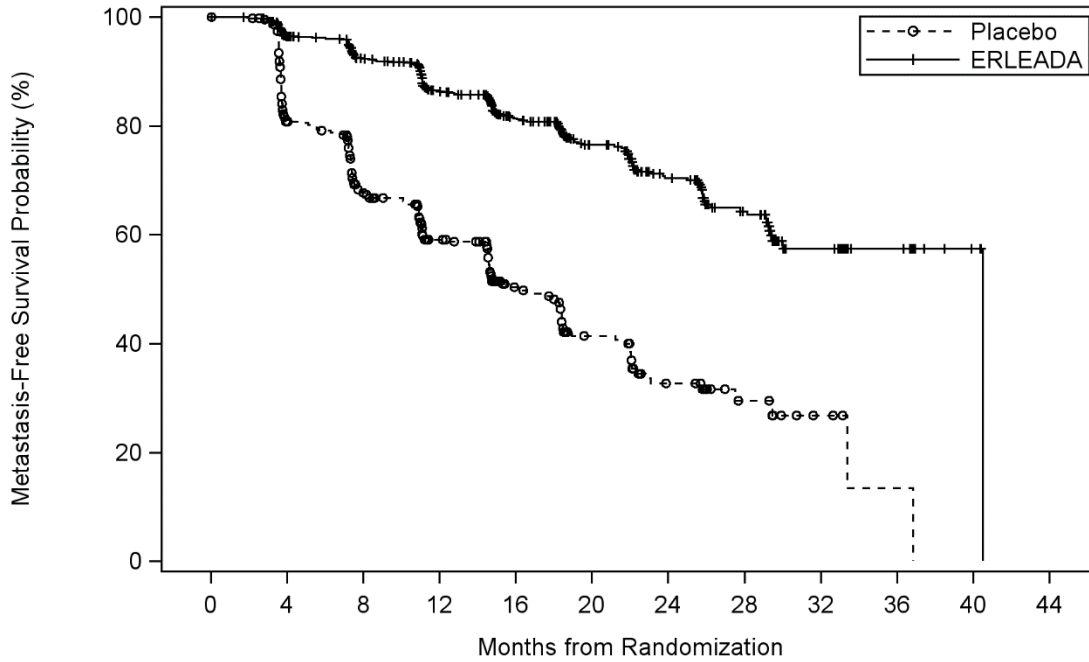
<sup>c</sup> Locoregional-only progression is observed in 2.4% of patients overall.

<sup>d</sup> NE=Not Estimable

Consistent results for MFS were observed across patient subgroups including PSADT ( $\leq 6$  months or  $> 6$  months), use of a prior bone-sparing agent (yes or no), and locoregional disease (N0 or N1).

Treatment with ERLEADA resulted in a statistically significant delay in the initiation of cytotoxic chemotherapy [HR = 0.63 (95% CI:0.49, 0.81), p=0.0002].

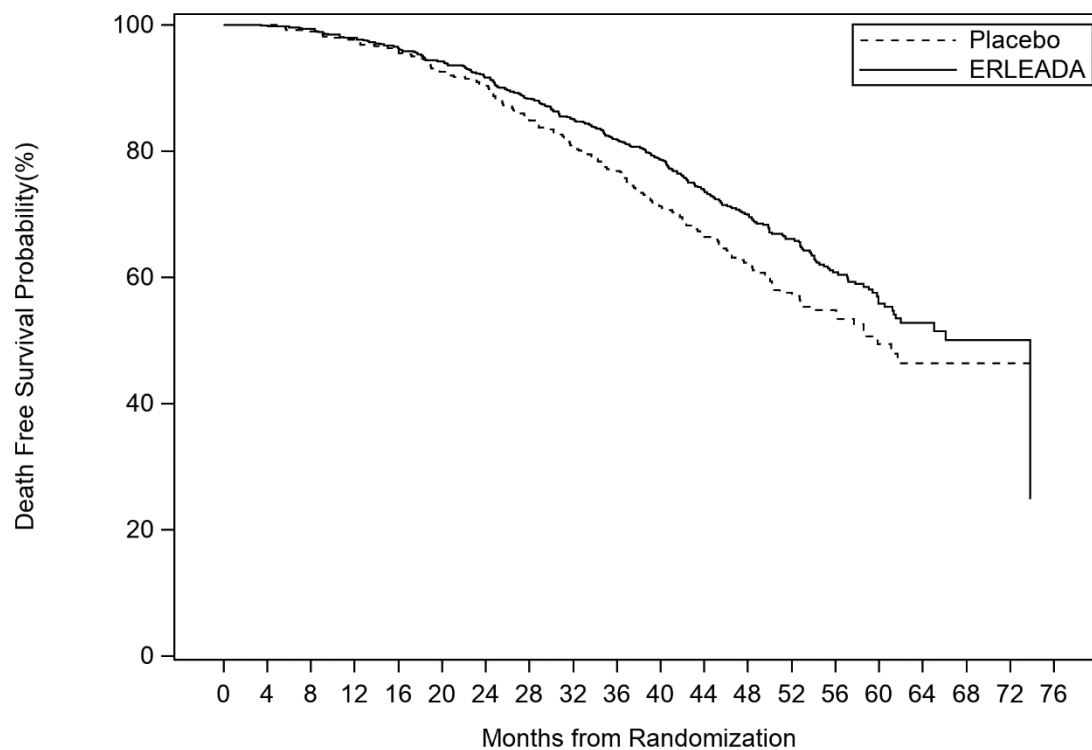
**Figure 3: Kaplan-Meier Metastasis-Free Survival (MFS) Curve in SPARTAN (nmCRPC)**



Subjects at risk

Placebo	401	291	220	153	91	58	34	13	5	1	0	0
ERLEADA	806	713	652	514	398	282	180	96	36	16	3	0

Figure 4: Kaplan-Meier Overall Survival (OS) Curve in SPARTAN (nmCRPC)



Subjects at risk

Placebo	401	392	385	373	357	339	328	306	286	263	240	204	155	114	82	38	21	6	2	0
ERLEADA	806	791	774	758	739	717	691	658	625	593	558	499	374	269	181	100	47	19	4	0

## 16 PHARMACEUTICAL PARTICULARS

### 16.1 list of excipients

#### ***Intragranular phase:***

Microcrystalline Cellulose

HPMC-AS Hydroxypropyl methylcellulose acetate succinate

Croscarmellose Sodium

Colloidal anhydrous Silica

#### ***Extra granular phase:***

Silicified microcrystalline cellulose

Croscarmellose Sodium

Colloidal Anhydrous Silica

Magnesium stearate

#### ***Film coat:***

Opadry II 85F210036 Green

## 16.2 shelf life

The expiry date of the product is indicated on the packaging materials.

## 17 HOW SUPPLIED/STORAGE AND HANDLING

ERLEADA<sup>®</sup> (apalutamide) 60 mg film-coated tablets are slightly yellowish to greyish green, oblong-shaped tablets debossed with “AR 60” on one side. ERLEADA 60 mg tablets are available in bottles of 120 tablets. Each bottle contains silica gel desiccant.

### Storage and Handling

Do not store above 25°C.

Store in the original package. Do not discard desiccant. Protect from light and moisture.

## 18 IMPORTER AND MARKETING AUTHORIZATION HOLDER

J-C Health Care Ltd., Kibbutz Shefayim Mall 6099000, Israel

**Revised on Jun 2022 according to MoH guidelines**