

FULL PRESCRIBING INFORMATION

1. NAME OF THE MEDICINAL PRODUCT

ERLEADA 60mg

ERLEADA 240mg

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Erleada 60mg	Erleada 240mg
Apalutamide 60mg	Apalutamide 240mg

3. PHARMACEUTICAL FORM

Film coated tablets.

4. INDICATIONS AND USAGE

Erleada is indicated in adult men for the treatment of

- metastatic hormone-sensitive prostate cancer (mHSPC) in combination with androgen deprivation therapy (ADT)
- non-metastatic castration-resistant prostate cancer (nm-CRPC).

5 DOSAGE AND ADMINISTRATION

5.1 Recommended Dosage

The recommended dose of ERLEADA is 240 mg administered orally once daily. This could be administered as one 240 mg tablet or four 60 mg tablets. Swallow the tablets whole. Do not crush or split tablets. 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 Dosage Modification

If Grade 3 or greater adverse reactions, or other intolerable adverse reactions occur, withhold ERLEADA. Consider permanent discontinuation of ERLEADA for Grade 3 or 4 cerebrovascular and ischemic cardiovascular events [see *Warnings and Precautions (7.1)*]. Permanently discontinue ERLEADA for confirmed SCARs or for other Grade 4 skin reactions [see *Warnings and Precautions (7.5) and Adverse Reactions (8.1)*]. For other adverse reactions, when symptoms improve to less than or equal to Grade 1 or original grade, resume ERLEADA at the same dose or a reduced dose (180 mg or 120 mg), if warranted.

5.4 DOSAGE FORMS AND STRENGTHS

Tablets:

- 60 mg: slightly yellowish green to greyish green, oblong, film-coated and debossed with “AR 60” on one side.
- 240 mg: bluish grey to grey, oval, film-coated tablet debossed with “E240” on one side.

6 CONTRAINDICATIONS

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

Women who are or may become pregnant [*see Embryo-Fetal Toxicity (7.6); Use in Specific Populations (10.1)*].

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 (8.1)*]. 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 Severe Cutaneous Adverse Reactions

Fatal and life-threatening cases of severe cutaneous adverse reactions (SCARs), including Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN), and drug reaction with eosinophilia and systemic symptoms (DRESS), occurred in patients receiving ERLEADA [see *Adverse Reactions (8.2)*].

Monitor patients for the development of SCARs. Advise patients of the signs and symptoms of SCARs (e.g., a prodrome of fever, flu-like symptoms, mucosal lesions, progressive skin rash, or lymphadenopathy).

If a SCAR is suspected, interrupt ERLEADA until the etiology of the reaction has been determined. Consultation with a dermatologist is recommended. If a SCAR is confirmed, or for other grade 4 skin reactions, permanently discontinue ERLEADA [see *Dosage and Administration (5.2)* and *Adverse Reactions (8.1)*].

7.6 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 ≥ 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 (5.1)*].
- Fractures [see *Warnings and Precautions (7.2)*].
- Falls [see *Warnings and Precautions (7.3)*].

- Seizure [see *Warnings and Precautions* (7.4)].
- Severe Cutaneous Adverse Reactions (SCARs) [see *Warnings and Precautions* (7.5)].

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 %
Musculoskeletal and connective tissue disorders				
Arthralgia ^a	17	0.4	15	0.9
Skin and subcutaneous tissue disorders				
Rash ^b	28	6	9	0.6
Pruritus	11	0.2	4.6	0.2
Vascular disorders				
Hot flush	23	0	16	0
Hypertension	18	8	16	9

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

^b 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, lichenoid 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 ≥ 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 %
Hematology				
White blood cell decreased	27	0.4	19	0.6
Chemistry				
Hypertriglyceridemia ^a	17	2.5	12	2.3

^a 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 ≥ 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 %
General disorders and administration site conditions				
Fatigue ^{a,b}	39	1.4	28	0.3
Musculoskeletal and connective tissue disorders				
Arthralgia ^b	16	0	8	0
Skin and subcutaneous tissue disorders				
Rash ^c	25	5.2	6	0.3
Metabolism and nutrition disorders				
Decreased appetite ^d	12	0.1	9	0
Peripheral edema ^e	11	0	9	0
Injury, poisoning and procedural complications				
Fall ^b	16	1.7	9	0.8
Fracture ^f	12	2.7	7	0.8
Investigations				
Weight decreased ^b	16	1.1	6	0.3
Vascular disorders				
Hypertension	25	14	20	12
Hot flush	14	0	9	0
Gastrointestinal disorders				
Diarrhea	20	1.1	15	0.5
Nausea	18	0	16	0

^a Includes fatigue and asthenia

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

^c 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, lichenoid eruption, mouth ulceration, rash pustular, blister, papule, pemphigoid, skin erosion, dermatitis, and rash vesicular

^d Includes appetite disorder, decreased appetite, early satiety, and hypophagia

^e Includes peripheral edema, generalized edema, edema, edema genital, penile edema, peripheral swelling, scrotal edema, lymphedema, swelling, and localized edema

^f 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 %
Hematology				
Anemia	70	0.4	64	0.5
Leukopenia	47	0.3	29	0
Lymphopenia	41	1.8	21	1.6

Chemistry

Hypercholesterolemia ^a	76	0.1	46	0
Hyperglycemia ^a	70	2	59	1.0
Hypertriglyceridemia ^a	67	1.6	49	0.8
Hyperkalemia	32	1.9	22	0.5

^a 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* (7.2)].

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 (SJS/TEN), drug reaction with eosinophilia and systemic symptoms (DRESS), and lichenoid eruption.

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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

Substrates of CYP3A4, CYP2C9, CYP2C19, P-gp, BCRP, or OATP1B1

Refer to the Prescribing Information for these substrates. Consider alternative agents when possible or evaluate for loss of activity of the substrate if concomitant use cannot be avoided.

Apalutamide is a strong inducer of CYP3A4 and CYP2C19, a weak inducer of CYP2C9, and an inducer of P-gp, BCRP, and OATP1B1. Apalutamide decreases exposure of substrates of CYP3A4, CYP2C19, CYP2C9, P-gp, BCRP, or OATP1B1 [see *Clinical Pharmacology* (12.3)], which may decrease the effectiveness of these substrates.

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 ≥ 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 ≥ 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 ≥ 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.

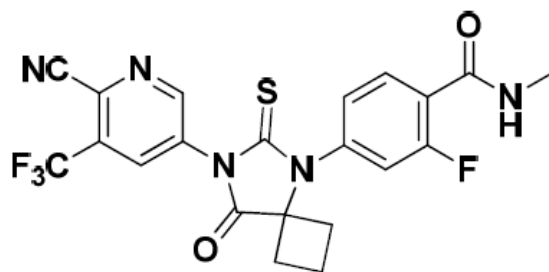
11 OVERDOSAGE

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. Each ERLEADA tablet contains either 60 mg or 240 mg of apalutamide. 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 C₂₁H₁₅F₄N₅O₂S. The structural formula is:



ERLEADA[®] (apalutamide) tablets are available in 240 mg tablets and 60 mg tablets with the following inactive ingredients:

- 240 mg film-coated tablets: colloidal anhydrous silica, croscarmellose sodium, hydroxypropyl methylcellulose-acetate succinate, silicified microcrystalline cellulose, and magnesium stearate. The coating contains glyceryl monocaprylocaprate, iron oxide black, polyvinyl alcohol, talc, titanium dioxide, and vinyl alcohol grafted copolymer.
- 60 mg film-coated tablets: colloidal anhydrous silica, croscarmellose sodium, hydroxypropyl methylcellulose-acetate succinate, magnesium stearate, microcrystalline cellulose, and silicified microcrystalline cellulose. The coating contains 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

ERLEADA 240 mg daily in addition to ADT in patients with mCSPC (TITAN) reduced PSA to undetectable levels (<0.2 ng/mL) in 68% of patients compared to 32% of patients taking ADT alone.

ERLEADA 240 mg daily in addition to ADT in patients with nmCRPC (SPARTAN) reduced PSA to undetectable levels (<0.2 ng/mL) in 38% of patients compared to no patients (0%) taking ADT alone.

The exposure-response relationship and time course of pharmacodynamic response for the safety and effectiveness of apalutamide have not been fully characterized.

Cardiac Electrophysiology

At the approved recommended dosage, 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 and N-desmethyl apalutamide pharmacokinetic parameters were observed at steady state following the approved recommended dosage for ERLEADA and are presented as the mean [standard deviation (SD)] unless otherwise specified. Apalutamide maximum concentration ($C_{\max}$) is 6 mcg/mL (1.7) and total systemic exposure (AUC) is 100 mcg·h/mL (32). Apalutamide $C_{\max}$ and AUC increases in a dose proportional manner following repeated once-daily dosing of 30 to 480 mg (0.125 to 2 times the recommended dosage). Apalutamide steady-state is achieved after 4 weeks and the mean accumulation ratio is approximately 5-fold.

The major active metabolite N-desmethyl apalutamide $C_{\max}$ is 5.9 mcg/mL (1) and AUC is 124 mcg·h/mL (23). Mean AUC metabolite/parent drug ratio for N-desmethyl apalutamide following repeat-dose administration is 1.3. Based on systemic exposure, relative potency, and pharmacokinetic properties, N-desmethyl apalutamide likely contributes to the clinical activity of apalutamide.

Absorption

Apalutamide absolute oral bioavailability is approximately 100%.

Apalutamide median (min, max) time to maximum plasma concentration ($t_{\max}$) is 2 hours (1, 5 hours).

Effect of Food

No clinically significant differences in apalutamide $C_{\max}$ and AUC were observed following administration of a high-fat meal (approximately 500 to 600 fat calories, 250 carbohydrate calories, and 150 protein calories). Median time to reach $t_{\max}$ was delayed approximately 2 hours with food.

Distribution

Apalutamide apparent volume of distribution is approximately 276 L.

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

Elimination

Apalutamide half-life is approximately 3 days. The CL/F of apalutamide is 1.3 L/h after single dosing and increases to 2.0 L/h at steady-state after once-daily dosing likely due to CYP3A4 auto-induction.

Metabolism

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), or eGFR 30-89 mL/min/1.73 m² (estimated by MDRD equation).

The effect of eGFR $\leq$ 29 mL/min/1.73 m² on apalutamide pharmacokinetics is unknown.

Drug Interactions

Clinical Studies and Model-Informed Approaches

Strong CYP2C8 inhibitors

Apalutamide C_{max} 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_{max} 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_{max} increased by 19% and AUC by 23%.

Strong CYP3A4 inhibitors

Apalutamide C_{max} decreased by 22% while AUC was similar following co-administration of ERLEADA 240 as a 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_{max}. Ketoconazole is predicted to increase the steady-state apalutamide C_{max} by 38% and AUC by 51%. For the active moieties, the predicted steady-state C_{max} increased by 23% and AUC by 28%.

Strong CYP3A4 and moderate CYP2C8 inducers:

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

CYP3A4, CYP2C19, CYP2C9, and CYP2C8 substrates:

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_{max}.

In Vitro Studies

CYP450 Enzymes: Apalutamide and N-desmethyl apalutamide induce and inhibit CYP2B6. Apalutamide does not inhibit or induce CYP1A2 and CYP2D6.

Transporter systems: Apalutamide and N-desmethyl apalutamide are substrates for P-gp but not BCRP, OAT1B1, and OATP1B3. Apalutamide and N-desmethyl apalutamide inhibit OCT2, OAT3, and MATEs, but do not inhibit OAT1.

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 ≥ 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 ≥ 25 mg/kg/day in rats (1.4 times the human exposure based on AUC) and ≥ 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 ≥ 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

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

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

^b NE=Not Estimable

^c Hazard ratio is from stratified proportional hazards model. Hazard ratio <1 favors ERLEADA.

^d p-value is from the log-rank test stratified by Gleason score at diagnosis (≤ 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 (≤ 7 vs. > 7).

Consistent improvement in OS was observed across the following patient subgroups: disease volume (high vs low) and Gleason score at diagnosis (≤ 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)

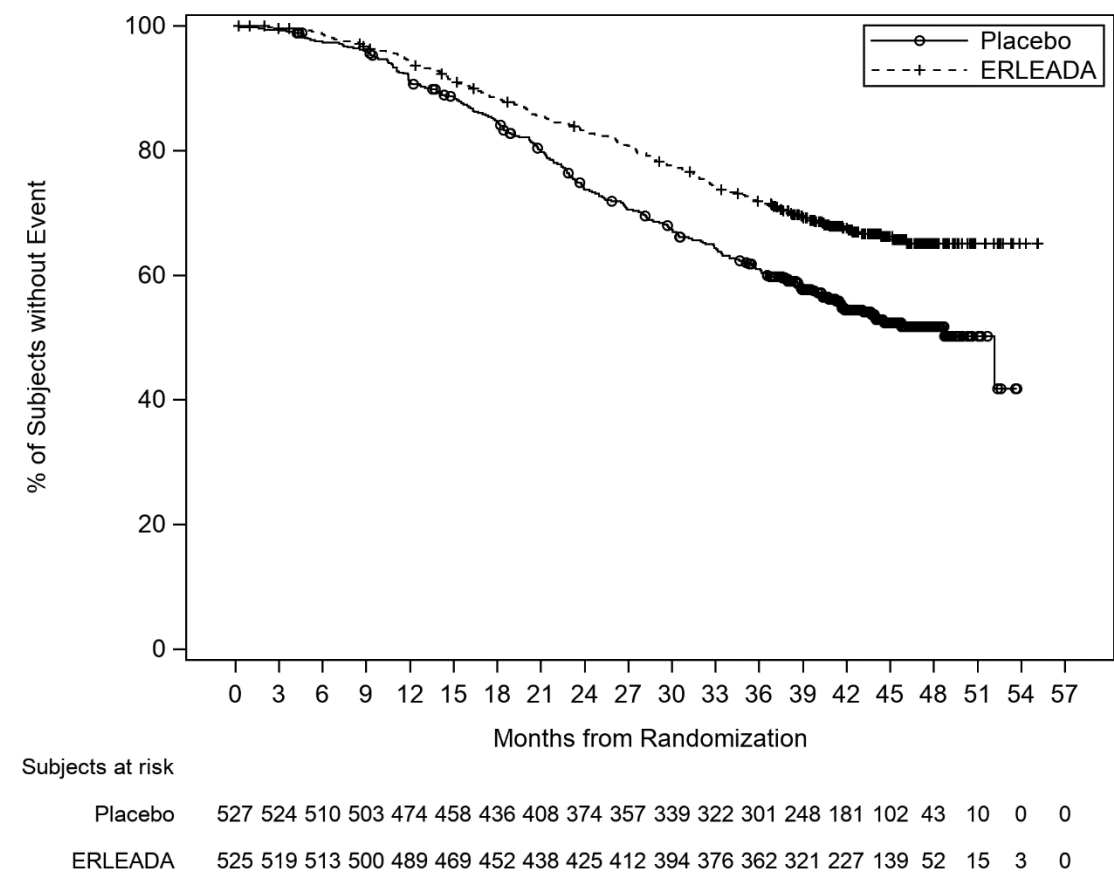
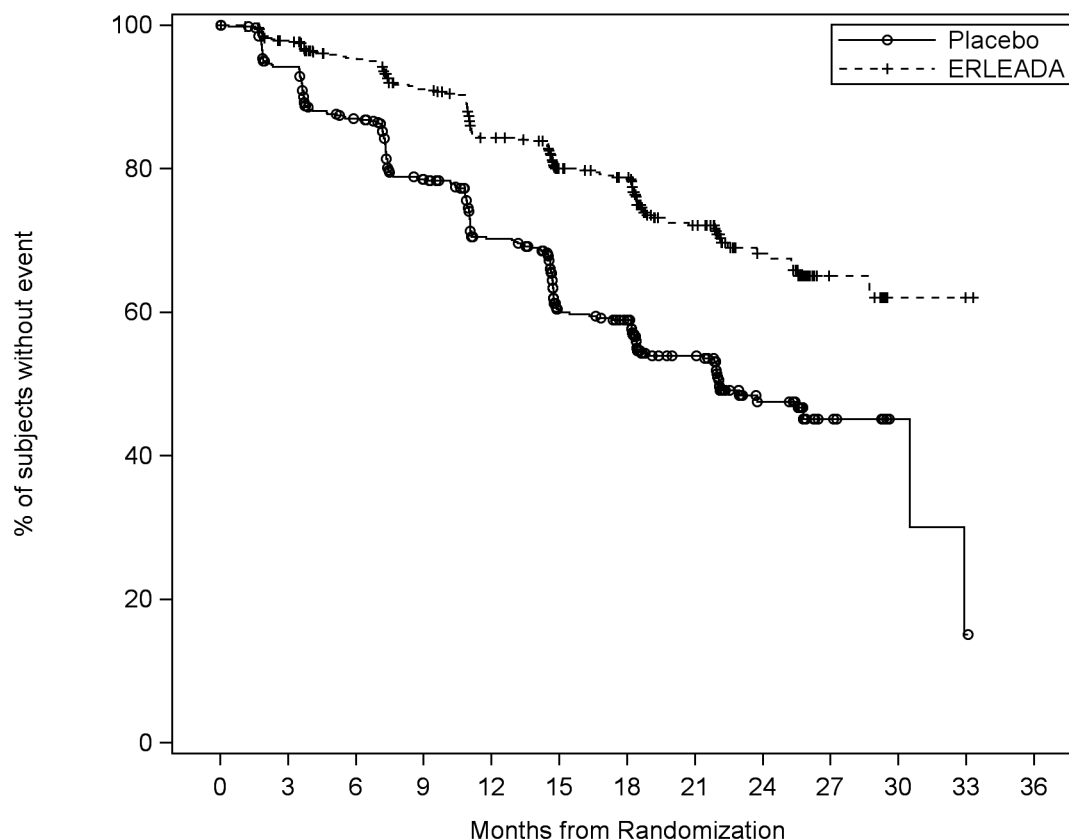


Figure 2: Kaplan-Meier Plot of Radiographic Progression-Free Survival (rPFS); Intent-to-treat mCSPC Population (TITAN)



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

^a All analyses stratified by PSA doubling time, bone-sparing agent use, and locoregional disease status.

^b Confirmed responses assessed by BICR.

^c Locoregional-only progression is observed in 2.4% of patients overall.

^d NE=Not Estimable

Consistent results for MFS were observed across patient subgroups including PSADT (≤ 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)

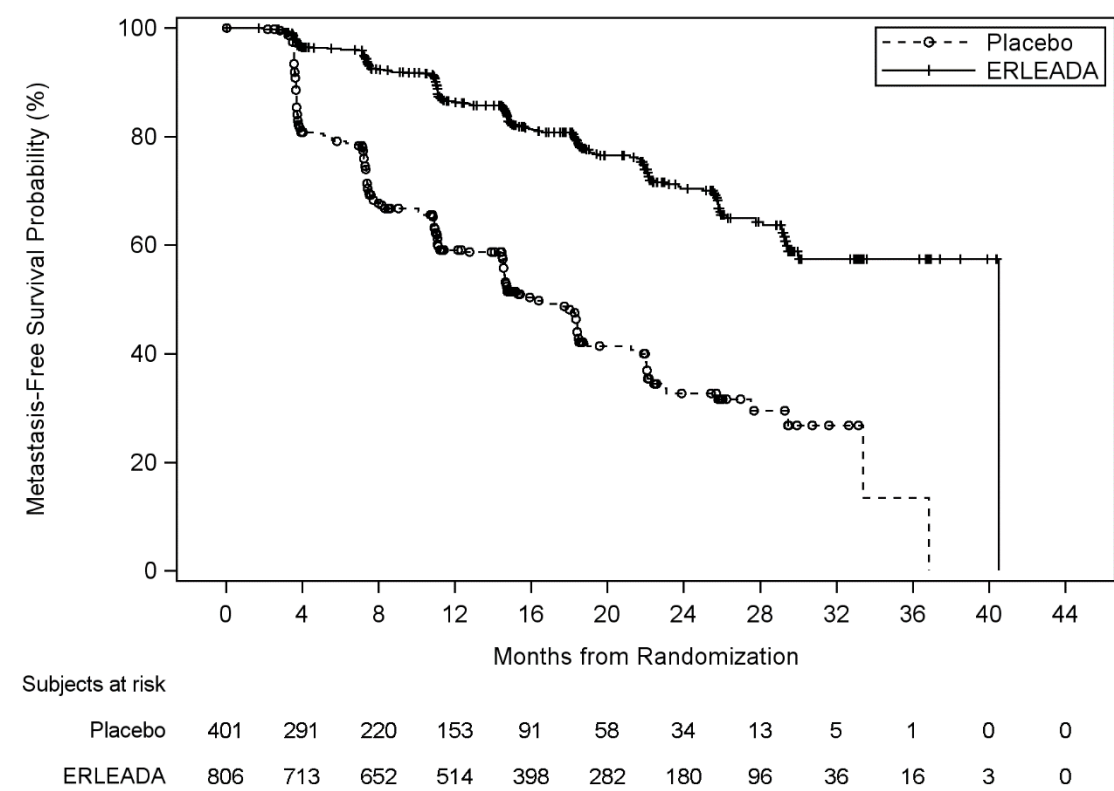
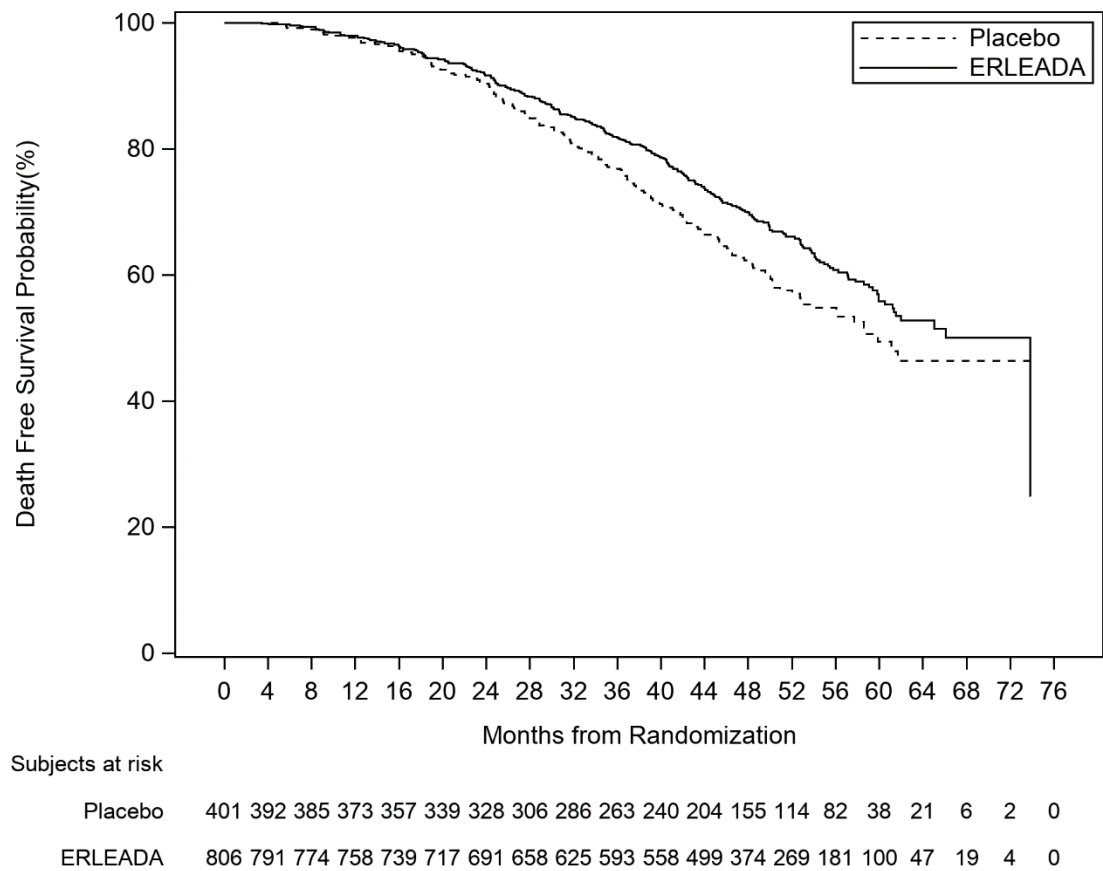


Figure 4: Kaplan-Meier Overall Survival (OS) Curve in SPARTAN (nmCRPC)



16 PHARMACEUTICAL PARTICULARS

16.1 list of excipients

Erleada 60mg

Microcrystalline Cellulose, HPMC-AS (Hydroxypropyl Methylcellulose Acetate Succinate), Silicified Microcrystalline Cellulose, Croscarmellose Sodium, Colloidal Anhydrous Silica, Magnesium Stearate.

Film coating

Opadry II 85F210036 Green: Polyvinyl Alcohol - Partially Hydrolyzed, Titanium Dioxide, Macrogol/Polyethylene Glycol, Talc, Iron Oxide Yellow, Iron Oxide Black.

Erleada 240mg

HPMC-AS (Hydroxypropyl Methylcellulose Acetate Succinate), Silicified Microcrystalline Cellulose, Croscarmellose Sodium, Colloidal Anhydrous Silica, Magnesium Stearate.

Film coating

Opadry QX 321A275010 Gray: Macrogol Poly (vinyl alcohol) Grafted Copolymer, Talc, Titanium Dioxide, Glycerol Monocaprylocaprate Type I, Poly (vinyl alcohol), Iron Oxide Black.

16.2 shelf life

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

17 HOW SUPPLIED/STORAGE AND HANDLING

ERLEADA[®] (apalutamide) tablets are available in the strengths and packages listed below:

- ERLEADA[®] 240 mg Tablets

Film coated, bluish grey to grey, oval film coated tablets debossed with “E240” on one side.

30 tablets available in bottles with a silica gel desiccant and has a child-resistant closure

- ERLEADA[®] 60 mg Tablets

Film coated, slightly yellowish green to greyish green, oblong film coated tablets debossed with “AR 60” on one side.

120 tablets available in bottles with a silica gel desiccant and has a child-resistant closure

Storage and Handling

Do not store above 25°C

Store in original package to protect from light and moisture. Do not discard desiccant.

Manufacturer:

60mg: Janssen Biotech, Inc., 800/850 Ridgeview Drive, Horsham, PA 19044, USA

240mg: Catalent Pharma Solutions, LLC, 1100 Enterprise Drive, Winchester, 40391, Kentucky (KY), USA

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

Registration number:

60mg: 162-84-35698-00

240mg: 177-74-37868-99

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