

Marketed Drugs for Prostate Cancer

Drug	Sponsor	Mechanism of Action	Efficacy/Safety Data	Indication
Casodex (Bicalutamide)	AstraZeneca	Non-steroidal androgen receptor antagonist	Efficacy: as a monotherapy, significant increases in progression free survival $P=0.001$, but no improvements in overall survival $p= 0.77$ when compared to placebo. Safety: well tolerated. Common sides effects are breast pain and gynaecomastia	Hormone sensitive prostate cancer
Cytadren (Aminoglutethimide)	Novartis (NVS)	Blocks steroid production from cholesterol	Efficacy: n/a Safety: well tolerated with these common side effects- drowsiness, fatigue, and mild nausea	CRPC
Eligard (Leuprolide Acetate)	Sanofi /Tolmar Therapeutics	Gonadotropin releasing hormone agonist	Efficacy: significant reduction in serum testosterone and PSA levels. No data on progression free survival or overall survival Safety: few minor side effects. Injection site hematoma and irritation, and flushing	Hormone sensitive prostate cancer
Emcyt (Estramustine)	Pfizer (PFE)	Precise mechanism unknown; disrupts cell division	Efficacy: Emcyte combination therapy with taxotere significantly reduces PSA levels, tumor size, and extends survival by a median of 22 months. Safety: Side effects include, blood clotting, neutropenia, granulocytopenia, edema	CRPC
Eulexin (Flutamide)	Merck (MRK)	Non-steroidal androgen receptor antagonist	Efficacy: Stage B2-prostate cancer - when used as a co-therapy with radiation and goserelin treatments moderated distant metastasis $p=0.058$ and increased survival rate (4.4 vs 2.6 years) $p<0.001$ when compared to radiation alone.	Hormone sensitive prostate cancer
Firmagon (Degaralix)	Ferring Pharmaceuticals	Gonadotropin releasing hormone antagonist	Efficacy: Studies have shown improved progression free survival and a reduction of PSA levels when compared to leuprolide Safety/Side effects: Well tolerated overall. Common side effects include: injection site reactions (pain, swelling, and irritation), hot flashes, weight gain, fatigue, and serum increases of transaminase and gamma-glutamyltransferase.	Hormone sensitive prostate cancer

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Jevtana (Cabazitaxel)	Sanofi	Microtubule inhibitor; disrupts cell division	<p>Efficacy: In Taxotere resistant patients, studies have shown the median survival rates of 15.1 months for Jevtana treated group vs 12.7 months for mitoxantrone treated patients $p < 0.0001$. Progression free survival rates were 2.8 months for the Jevtana groups vs 1.4 months for mitoxantrone group $p < 0.0001$</p> <p>Safety/Side effects include neutropenia, anemia, diarrhea, and fatigue.</p>	mCRPC
Nilandron (Nilutamide)	Sanofi	Non-steroidal androgen receptor antagonist	<p>Efficacy: A small study has shown that in advanced prostate cancer patients, in whom androgen ablation failed, there was a significant reduction in PSA levels. Overall or progression free survival was not assessed.</p> <p>Safety/Side Effects: Headache, nausea, fatigue, and dizziness.</p>	Hormone Sensitive Prostate Cancer
Provenge (Sipuleucel-T)	Dendreon	Cancer immunotherapy product; promotes immune response on distinct prostate cancer antigen.	<p>Efficacy: Effectiveness was studied in 512 patients with metastatic castrate resistant prostate cancer. Study showed an increase in overall survival of 4 months of patients on Provenge versus control.</p> <p>Safety: Common side effects include chills, fatigue, fever, nausea, joint ache and headache.</p>	mCRPC
Taxotere (Docetaxel)	Sanofi	Anti-mitotic ; interferes with cell division	<p>Efficacy: First drug in advanced prostate cancer to show a survival advantage. Studies have shown that 25.8% of patients were alive at 3yrs with Taxotere vs. mitoxantrone $p = 0.004$</p> <p>Safety: Side effects include nausea, vomiting, alopecia, diarrhea, joint pain, fatigue, anemia, and an overall reduction in white blood cell count.</p>	mCRPC
Vantas (Histrelin)	Endo Pharmaceuticals (ENDP)	Gonadotropin releasing analogue	<p>Efficacy: Clinical studies have shown a significant reduction in testosterone levels ($< 50 \text{ng/dl}$) in all advanced prostate cancer patients in 4 weeks ($p = 0.001$).</p> <p>Safety: Common side effects include hot flashes, fatigue, weight loss and edema.</p>	Hormone Sensitive Prostate Cancer.

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Xgeva (Denosumab)	Amgen (AMGN)	Anti-RANK ligand monoclonal antibody	<p>Efficacy: Clinical studies have shown Xgeva to significantly delay skeletal related events in advanced metastatic prostate cancer patients by 21 months versus 17 months in the Zometa treated patients.</p> <p>Safety: Common side effects include hypocalcemia and osteonecrosis.</p>	mCRPC
Xtandi (Enzalutamide)	Medivation	Androgen receptor inhibitor	<p>Efficacy: Phase 1 and phase 2 results indicated significant antitumor activity such as reductions in PSA levels, stabilization in tumors that spread to soft tissue or bone and a decrease in circulating tumor cells. Phase 3 (randomized, double-blind multinational trial, evaluating enzalutamide (160 mg/day)) studies have indicated significant improvement in overall survival of metastatic hormone resistant patients who were on taxotere (docetaxel) compared to placebo. Overall survival median of 4.8 months with a survival median of 18.4 months versus 13.6 months for placebo arm $p < 0.0001$)</p> <p>Safety: Very well tolerated for the most part. Side effects include: fatigue, diarrhea, hot flashes, and anemia. A few patients experienced seizures.</p>	mCRPC
Zoladex (Goserelin)	AstraZeneca	Gonadotropin releasing hormone agonist	<p>Efficacy: In combination with flutamide and radiation, Zoladex is associated with a trend toward the reduction in incidence of metastasis compared to radiation alone (27% vs 36%) at 4 years $p = 0.058$. The median disease-free survival was increased in patients who were co-treated with Zoladex, radiation, and flutamide compared to radiation alone (4.4 yrs vs 2.6 yrs) $p < 0.001$</p> <p>Safety: Side effects include: back pain, muscle weakness, fatigue, nausea, urine retention, and blood in urine and stool.</p>	Hormone Sensitive Prostate Cancer

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Zytiga (Abiraterone Acetate)	Johnson and Johnson	Inhibits the enzyme CYP17A1 which is expressed prostate cancer tissue, adrenal gland, and testes	<p>Efficacy: In late stage hormone-resistant prostate cancer patients who had received Taxotere chemotherapy, Zytiga and prednisone combination had median overall survival of 14.5 months compared to 11.9 months in group taking the placebo-prednisone treatment.</p> <p>Safety: Side effects include joint swelling, low potassium, edema, hot flashes, cough, diarrhea, and hypertension.</p>	mCRPC

Source: LifeSci Advisor