## Prostate Cancer

More than 1.1 million cases of prostate cancer were recorded in 2012, accounting for around 8 percent of all new cancer cases and 15 percent in men. Age-adjusted incidence rates of prostate cancer have increased dramatically and this is largely because of the increased availability of screening for prostate-specific antigen (PSA) in men without symptoms of the disease. This test leads to detection of many prostate cancers that are small and/or would otherwise remain unrecognized, and which may or may not develop further into higher stage disease[1].

## CTCatch™ Clinical Applications in Prostate Cancer

| 1 | 2 | 3 |
|---|---|---|
| **Diagnosis** | **Monitoring** | **Treatment** |
| • PSMA | • CSV<br>• nPD-L1 | • AR-V7 |

Consult your physicians about CTCatch™ test.

## CTCatch™ Test Process

1. Consult your physicians about CTCatch™ test
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4. Generate your report in 7 days
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# CTC Liquid Biopsy for Prostate Cancer

**Abnova Diagnostics Japan**
**CTCatch™ Test**

# 1 Diagnosis

## PSMA

Prostate-specific membrane antigen (PSMA) is a transmembrane protein expressed on the whole prostate tissue.

- PSMA is not affected by the molecular and phenotypical changes in circulating tumor cells (CTCs) during their epithelial-mesenchymal transition (EMT).
- PSMA has been considered as a specific marker on prostate tissue and used in various clinical diagnosis.
- Use of capture antibody targeting PSMA leads to a better clinical outcome[2].

# 2 Monitoring

## Recurrence and Metastasis

Cell-surface vimentin (CSV) has been proved as an important protein overexpressed during EMT.

- It is expressed on surface of various middle- and late-stage cancer cells. Also, due to its strong association with recurrence, metastasis and prognosis, it becomes a general marker targeting EMT CTCs.
- In prostate cancer research, it has been proved that CSV is a highly sensitive and specific marker which is helpful to predict treatment efficacy and drug resistance[3].

## Prognosis

Programmed cell death protein 1 (PD-1) and its ligand PD-L1 are responsible for modifying immune response. Aberrant expression of PD-L1 is detectable in various cancers and localized in the membrane, cytoplasm and nucleus. It is related to a poor survival rate.

- Prostate cancer research has indicated that patients with nuclear PD-L1 (nPD-L1) in CTCs have poor prognosis[4].
- nPD-L1 expression on CTCs can be a prognostic biomarker.

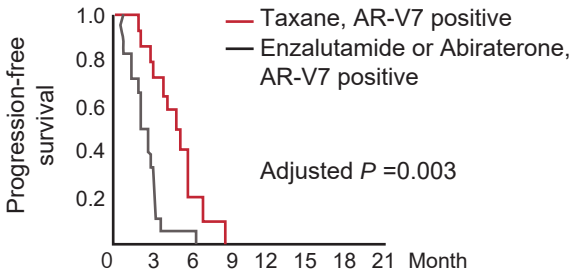
# 3 Treatment

Among treatments for metastasis castration-resistant prostate cancer (mCRPC), it is critical to choose hormone therapy, androgen receptor signaling inhibitor (ARSi) or taxane-based chemotherapy. Although both therapies are qualified and can effectively extend lifespan, the efficacy differs from one person to another. Accordingly, predictive biomarkers aiding treatments play an important role in drug selection.

## Chemotherapy Guidance

Androgen receptor variants (AR-Vs) are alternatively spliced isoforms of the androgen receptor (AR). They are able to promote transcription of target genes. Taxane chemotherapies can damage microtube network in cancer cells to exert their antitumor activities in mCRPC (at least partially). In addition, research has shown that in patients with taxane-sensitive disease, treatment generates microtubule bundling resulting in exclusion of the AR from the nucleus. Conversely, in patients with taxane-resistant disease, AR often remains in the nucleus. Moreover, patients with androgen receptor variant 7 (AR-V7) positive in CTC nucleus can stay highly sensitive to taxane chemotherapies and have higher survival rate.

- Statistically, taxane chemotherapy is more effective than hormone therapies such as enzalutamide or abiraterone in AR-V7 positive patients.
- AR-V7 in CTCs can serve as a biomarker and be detected to determine chemotherapies for CRPC[5,6].

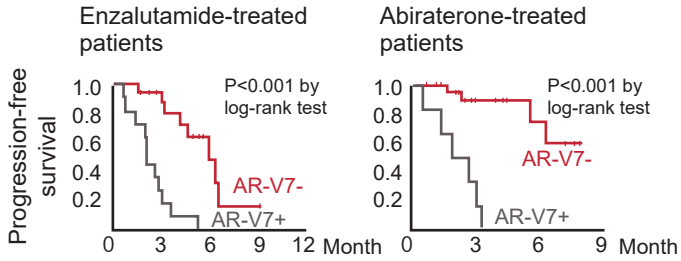



In AR-V7 positive patients, taxanes lead to longer progression-free survival (PFS) than enzalutamide or abiraterone do.

## Hormone Therapy Resistance

Enzalutamide and abiraterone are the common hormone therapies for mCRPC. Although enzalutamide and abiraterone are breakthrough treatments of mCRPC, approximately 20% to 40% of patients have no response to these prostate-specific agents. Among patients who initially have responses to enzalutamide or abiraterone, nearly all eventually acquire secondary resistance. One plausible interpretation for the resistance to both agents may involve the presence of AR-V7. This protein lacks ligand-binding domain to combine with the agents, but remains active as a transcription factor to activate target genes and cause deterioration.

- Detectable AR-V7 expression in CTCs might be associated with resistance to enzalutamide and abiraterone in CRPC patients[7].




After taking enzalutamide and abiraterone, patients with detectable AR-V7 have shorter PFS.

## Reference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5. Antonarakis, Emmanuel S., et al. "Androgen receptor splice variant 7 and efficacy of taxane chemotherapy in patients with metastatic castration–resistant prostate cancer." JAMA oncology1.5 (2015): 582–591.
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