

# PCA3—Prostate Cancer Biomarker

## FOR MOLECULAR QUANTIFICATION OF PCA3 MRNA FROM PROSTATE CANCER CELLS IN URINE

### Test Highlights

- Detects prostate cancer gene 3 (*PCA3*) and prostate-specific antigen (PSA) mRNAs in first-catch urine following an attentive digital rectal examination (DRE).
- Higher specificity than serum PSA for prostate cancer detection by biopsy.
- Utilizes PSA mRNA for normalization and confirmation of prostate-specific mRNA presence in urine.
- Aids in the management of patients having elevated serum PSA and a negative biopsy result.

### Disease Overview

- Prostate cancer is the second most common cancer and second leading cause of cancer death in American men.
- Early detection traditionally relies on DRE and serum PSA concentration, which have low disease specificity.
- The majority of patients with elevated PSA have negative biopsies, potentially due to prostate enlargement or benign prostatic hyperplasia (BPH).
- A more accurate test will aid in the management of patients with indeterminate PSA (3-10 ng/mL) and will decrease the number of unnecessary prostate biopsies.
- The *PCA3* noncoding mRNA is a promising new molecular biomarker to aid in the diagnosis of prostate cancer. *PCA3* is highly overexpressed in >95 percent of prostate cancer tissue with a median 66-fold up-regulation compared with adjacent non-neoplastic prostatic tissue.

### Indications for Ordering

- Individuals with elevated serum PSA and a negative prostate biopsy.
- Individuals with indeterminate serum PSA (3–10 ng/mL).

### Interpretation

- The *PCA3* score is calculated as the ratio of *PCA3* mRNA copies to PSA mRNA copies, multiplied by 1,000.
- A *PCA3* score  $\geq 35$  correlates with a high likelihood of prostate cancer on biopsy and is reported as positive.
- A *PCA3* score  $< 35$  correlates with a low likelihood of prostate cancer on biopsy and is reported as negative.
- If no PSA mRNA is detected, the urine contains insufficient prostate cells and the result is reported as indeterminate.

### Limitations

- A sufficient number of prostate cells must be present in the urine for analysis.

- The U.S. Food and Drug Administration (FDA) has not approved this test. However, FDA approval is currently not required for clinical use of this test. The results are not intended to be used as the sole means for clinical diagnosis or patient management decisions.

### Methodology

*PCA3* and PSA mRNAs are quantified using the Gen-Probe APTIMA *PCA3* assay. Immediately after performing an attentive DRE, urine specimens are collected and transported in urine-transport medium to stabilize the mRNA. Magnetic beads coupled with target-specific oligonucleotides are utilized to purify the target mRNAs (*PCA3* and PSA) from urine. Transcription mediated amplification (TMA) amplifies *PCA3* exons 3 and 4 and PSA exons 2 and 3. Amplicons are detected by a hybridization protection assay using acridinium ester-labeled probes and quantified with a luminometer.

### Related Tests

- Prostate Specific Antigen, Total (PSA) (0070121)
- Prostate Specific Antigen, Free Percentage (PSA FP) (0080206)
- Prostate Specific Antigen, Ultrasensitive (PSA ULTRA) (0098581)

### References

1. Bussemakers MJG, et al. DD3: A new prostate-specific gene, highly overexpressed in prostate cancer. *Cancer Res* 1999;59:5975–9.
2. Groskopf J, et al. APTIMA *PCA3* molecular urine test: development of a method to aid in the diagnosis of prostate cancer. *Clin Chem* 2006;52:1089–95.
3. Marks LS, et al. *PCA3* molecular urine assay for prostate cancer in men undergoing repeat biopsy. *Urology* 2007;69:532–5.
4. Shappell SB, et al. *PCA3* urine mRNA testing for prostate carcinoma: patterns of use by community urologists and assay performance in reference laboratory setting. *Urology* 2009;73:363–8.

## Test Information

**2001999**

**PCA3- Prostate Cancer Biomarker**

For specific collection, transport, and testing information, refer to the ARUP Web site at [www.aruplab.com](http://www.aruplab.com).

For information on test selection, ordering, and interpretation, refer to ARUP Consult® at [www.arupconsult.com](http://www.arupconsult.com).