I. Intended Use

EZ-PSA™ is a one-step immunoassay for the rapid, qualitative determination of human Prostate Specific Antigen (PSA) in whole blood or serum. The test is intended for professional use as an aid in the diagnosis of prostate cancer. This test is a highly sensitive immunochromatographic assay that utilizes monoclonal antibodies to detect PSA.

II. Summary and Explanation

Prostate cancer is the most common type of cancer found in men in the world. Approximately one out of ten men suffer from this cancer. The incidence of prostate cancer increases with age and accounts for a growing number of newly diagnosed patients. [1]

Prostate Specific Antigen (PSA) is a single chain glycoprotein containing 240 amino acid residues and four carbohydrate side chains.[2] PSA functions as a kallikrein-like serine protease and is produced exclusively by the epithelial cells lining the acini and ducts of the prostate gland.[2-4] It is secreted into the prostatic ducts, and at ejaculation, serves to liquefy the seminal coagulum.[5]

Various quantitative studies have been done to demonstrate the endogenous levels of PSA in humans indicate that normal levels range from 0.1 to 4.8 ng/ml.[5,7,8] Virtually all healthy asymptomatic men under 60 years of age have a PSA concentration under 4.0 ng/ml. Resultant concentrations of PSA in a given specimen change with different methodologies. Results should mention the methodology used, and values should not be interchanged for different methodologies.[7,8,9]

Many studies confirm that PSA is the most useful and meaningful tumor marker known for the diagnosis of prostate cancer.[10]

The EZ-PSA™ One-Step Serum, Plasma or Whole Blood PSA Test is a highly sensitive immunochromatographic assay that utilizes monoclonal antibodies to detect PSA.

III. Principle of the Procedure

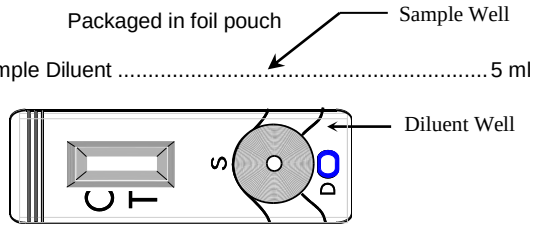
The EZ-PSA™ One-Step Whole Blood Test utilizes multi-layer filtration and sandwich immunoassay systems in a single module, allowing both the pretreatment of a whole blood sample and the immunochromatographic detection of PSA to be performed in one simple assay.

When applied to the sample well, whole blood undergoes vertical capillary action through the porous filtration system. The red blood cells are retained in the top layers while the serum or plasma reaches the bottom membrane layer. The diluent, when applied to the diluent well, flows along the bottom membrane layer, mixes with the serum and migrates horizontally along the test membrane.

If PSA is present in the sample at concentrations above the detection level, a labeled specific antibody-dye conjugate binds to it, forming an antigen-antibody-dye complex. This complex is then captured by another specific antibody immobilized in the Test Zone ("T") of the membrane, producing a visible pink-rose color band on the membrane. A distinct strong color band will always appear at the Control zone ("C") indicating that the test is functioning properly.

IV. Materials Provided

1. Test Device with dropper .....15 pieces
   (Anti-PSA, mouse monoclonal antibody coated membrane and a pad treated with a polyclonal IgG-dye conjugate in a protein matrix containing sodium azide as a preservative.)



2. Sample Diluent .....5 ml
3. Lancets.....15
4. Instruction manual.....1

V. Materials Required but Not Provided

1. Timing device.
2. Specimen collection container (serum).
3. 30 µl delivery device (serum).

VI. Warnings and Precautions

1. **Safety Precautions:** Human blood should be handled as if capable of transmitting infectious agents. It is recommended that these specimens be handled using established good laboratory working practices.
2. **For *in vitro* diagnostic use:** Do not use the kit beyond the expiration date printed on the outside of the foil pouch. Discard all used test devices into a proper biohazard container.
3. Do not use the test within 48 hours of performing competitive sports, bicycle riding, horse riding, and sexual activity. Recent prostate biopsy and some blood thinning medications can also influence PSA levels.
4. Some materials in this product were derived from bovine origins. The product is manufactured, processed, and handled in such a manner as to prevent the transmission of communicable disease pathogens.

VII. Kit Storage

The EZ-PSA™ test kit can be stored refrigerated (2-8°C) or at room temperature (15-30°C). The test is usable until the expiration date stamped on the foil pouch.

VIII. Quality Control

Although EZ-PSA™ contains an internal quality control (pink/rose color band in the Control region); good laboratory practice recommends the daily use of an outside control to ensure proper kit performance. Quality control samples should be tested according to the quality control requirements established by your laboratory.

IX. Test Procedure

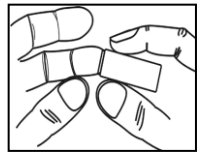
Prior to use, bring test components and patient samples to room temperature.

SERUM OR PLASMA PROCEDURE:

1. Remove the "Test Device" from the foil wrapper by tearing along the "splice".
2. Obtain a serum or plasma sample:
3. Add 30 µl serum or plasma sample into the sample well (S).
4. Wait 90 seconds after serum or plasma delivery into the sample well.
5. Add 3 drops of Diluent into the Diluent Well (D).
6. Read the result at Test Zone (T) exactly 10 minutes after adding the diluent. Test results read after 10 minutes may change and are invalid.

WHOLE BLOOD PROCEDURE:

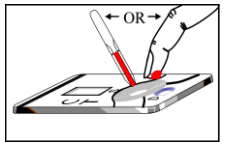
1. Remove the "Test Device" from the foil wrapper by tearing along the "splice".
2. **Obtain a whole blood sample:**



   a. Wipe the finger with an alcohol swab; allow to dry.
   b. Pierce the finger with the Lancet device; properly dispose of the Lancet**.**
   c. Wipe away the first sign of blood. Squeeze the finger from its base to obtain a full drop of blood (50 µl).
   d. Keep dropper horizontal (flat), touch the dropper to the blood drop on the finger (do NOT squeeze the bulb). When blood sample reaches the mark (50 ul) on the dropper, remove the dropper from the finger and immediately deliver the blood sample into the sample well (S) by squeezing the dropper bulb with fingers until the entire blood sample is delivered into the sample well (S).

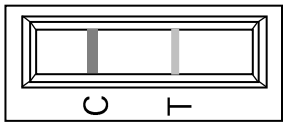
- OR -

Apply free falling blood drop directly into the Sample Well (S) as shown at right.

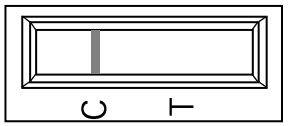


3. **Wait 90 seconds after adding the blood to the Sample Well.**
4. Then add exactly 4 full drops of Diluent into the Diluent Well (D). Start timer.
5. Read the result at Test Zone (T) at exactly 10 minutes after adding Diluent. Results after ten minutes may change and are invalid.

INTERPRETATION OF RESULTS



Positive Result: A strong pink/rose color band in the control region (marked with a "C"), ***and*** a pink/rose color band in the test region (marked with a "T"), indicate that the PSA level present in the specimen is greater than or equal to 4 ng/ml. A color band of any intensity in the test region indicates a positive result. A stronger color band suggests a higher concentration of PSA in the sample.



Negative Result: The absence of a distinct color band in the test area next to the letter "T" indicates the PSA level is below 4 ng/ml.

Invalid Result: If a color band does not appear in the Control zone "C", the test results are invalid. The sample may have been added to the wrong well, or the test device may have deteriorated. The specimen should be re-tested using a new test device.

X. Limitations of the Test

1. The test is for *in vitro* diagnostic use only.
2. The test is limited to the detection of PSA levels in whole blood, serum or plasma.
3. Although the test is very accurate in detecting elevated PSA, a low incidence of false positive results can occur.
4. The test is a qualitative screening assay and is not suggested for use to determine the quantitative PSA level of serum.
5. As with all diagnostic tests, a definitive clinical diagnosis should not be made based on the results of a single test, but should only be made by a physician after all clinical and laboratory findings have been evaluated.

XI. Cut-Off

The cut-off of the EZ-PSA™ One-Step Test is 4 ng/ml.

XII. Performance

A clinical study was performed using 161 confirmed clinical serum samples. The samples were evaluated with the EZ-PSA™ One-Step Test and the results are presented in Table 1.

TABLE 1

		EZ-PSA™	
		+	-
Confirmed Samples	+	80	4
	-	0	77

Relative Accuracy: 97.5%
Relative Specificity: 95.0%
Relative Sensitivity: 100.0%

The present data demonstrate an excellent correlation with confirmed clinical sample values and the clinical significance of this test is comparable with the confirmed values.

XIII. Precision

The precision of the EZ-PSA™ One-Step Test was determined using replicate assays with confirmed samples of 10 patients (both positives and negatives) from two different production lots. Each specimen sample was run through multiple parallel assays with each lot. The results showed 100% correlation with each run of each sample and 100% precision between the tests using test devices from two different lots.

XIV. Interfering Substances

Various substances were tested for cross-reactivity in PSA free serum and in patient's serum containing PSA. None of the following substances showed neither interference nor cross-reactivity with the PSA test.

Substance Added	Concentration
HCG	1,000,000 mIU/ml
Transferrin	5 mg/ml
Prolactin	1 µg/ml
PAP	100 ng/ml
Triglycerides	500 mg/dl
Acetaminophen	20 mg/dl
Bilirubin	10 mg/dl

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EZ-PSA™

One-Step Whole Blood Test

March 2016

REF **1081-15**

Immunoassay for the qualitative determination of human Prostate Specific Antigen (PSA) in whole blood

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