

PSA

+Q

Indicates Revised Information

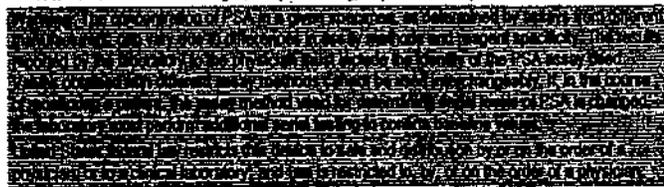
Contents

Catalog Number	Contents	Number of Tests
118154	6 vials of ACS:180® PSA Lite Reagent 6 vials of ACS:180 PSA Solid Phase ACS:180 PSA Master Curve card	300
or		
118152	1 vial of ACS:180 PSA Lite Reagent 1 vial of ACS:180 PSA Solid Phase ACS:180 PSA Master Curve card	50

Preliminary 118159 Rev. B, 7/2000

Intended Use

This *in vitro* diagnostic assay is intended to quantitatively measure prostate-specific antigen (PSA) in human serum using the ACS:180® Automated Chemiluminescence Systems. This assay is indicated for the measurement of serum PSA in conjunction with Digital Rectal Exam (DRE) as an aid in the detection of prostate cancer in men aged 50 years and older. This assay is further indicated as an aid in the management (monitoring) of patients with prostate cancer.



For *In Vitro* Diagnostic Use.

Materials Required But Not Provided

Catalog Number	Description	Contents
118221	Calibrator Q	6 vials of low calibrator 6 vials of high calibrator
or		
118220	Calibrator Q	2 vials of low calibrator 2 vials of high calibrator
672013	Septum Caps	100/package

Optional Reagents

Catalog Number	Description
672260	Multi-Diluent 2
118197	PSA Master Curve Material
986000	Ligand Plus 1, 2, 3
986400	Ligand Plus 1, 2, 3 barcode labels
976700	Tumor Marker Plus 1,2
114925	Tumor Marker Plus 1,2 barcode labels

Summary and Explanation of the Test

Prostate-specific antigen (PSA) is a single-chain glycoprotein normally found in the cytoplasm of the epithelial cells lining the acini and ducts of the prostate gland.¹ PSA is a neutral serine protease of 240 amino acids involved in the lysis of seminal coagulum.^{2,3}

PSA is detected in the serum of males with normal, benign hypertrophic, and malignant prostate tissue. PSA is not detected in the serum of males without prostate tissue (because of radical prostatectomy or cystoprostatectomy) or in the serum of most females. The fact that PSA is unique to prostate tissue makes it a suitable marker for monitoring men with cancer of the prostate. PSA is also useful for determining possible recurrence after therapy when used in conjunction with other diagnostic indices.^{4,5}

Measurement of serum PSA levels is not recommended as a screening procedure for the diagnosis of cancer because elevated PSA levels also are observed in patients with benign prostatic hypertrophy. However, studies suggest that the measurement of PSA in conjunction with digital rectal examination (DRE) and ultrasound provide a better method of detecting prostate cancer than DRE alone.⁶⁻⁸

PSA levels increase in men with cancer of the prostate, and after radical prostatectomy PSA levels routinely fall to the undetectable range.⁴ If prostatic tissue remains after surgery or metastasis has occurred, PSA appears to be useful in detecting residual and early recurrence of tumor.^{1,9} Therefore, serial PSA levels can help determine the success of prostatectomy, and the need for further treatment, such as radiation, endocrine or chemotherapy, and in the monitoring of the effectiveness of therapy.^{4,5A,11}

Assay Principle

The ACS:180 PSA assay is a two-site sandwich immunoassay using direct chemiluminometric technology, which uses constant amounts of two antibodies. The first antibody, in the Lite Reagent, is a polyclonal goat anti-PSA antibody labeled with acridinium ester. The second antibody, in the Solid Phase, is a monoclonal mouse anti-PSA antibody, which is covalently coupled to paramagnetic particles.

The system automatically performs the following steps:

- dispenses 35 µL of sample into a cuvette
- dispenses 250 µL of Solid Phase and 100 µL of Lite Reagent and incubates the reagents for 7.5 minutes at 37°C
- separates, aspirates, and washes the cuvettes with reagent water¹²
- dispenses 300 µL each of Reagent 1 and Reagent 2 to initiate the chemiluminescent reaction
- reports results according to the selected option, as described in the system operating instructions or in the online help system

A direct relationship exists between the amount of PSA present in the patient sample and the amount of relative light units (RLUs) detected by the system.

Specimen Collection and Handling

Serum is the recommended sample type for this assay.

The following recommendations for handling and storing blood samples are furnished by the National Committee for Clinical Laboratory Standards (NCCLS):¹³

- Collect all blood samples observing universal precautions for venipuncture.
- Allow samples to clot adequately before centrifugation.
- Keep tubes stoppered and upright at all times.
- Do not use samples that have been stored at room temperature for longer than 8 hours.
- Tightly cap and refrigerate specimens at 2 to 8°C if the assay is not completed within 8 hours.
- Freeze samples at or below -20°C if the sample is not assayed within 48 hours.
- Freeze samples only once and mix thoroughly after thawing.

Before placing samples on the system ensure that:

- Samples are free of fibrin or other particulate matter.
- Samples are free of bubbles.

Reagents

For *In Vitro* Diagnostic Use.

CAUTION:

- Discard opened assay reagents that are at room temperature (20 to 30°C) for a total of 48 hours. Do not use these reagents to calibrate the system or assay samples.
- Do not use kit components beyond the expiration date.
- Do not mix reagents from different lots.

Reagent	Volume	Ingredients	Storage	Stability
ACS:180 PSA Lite Reagent	5.0 mL/vial	polyclonal goat anti-PSA antibody (~385 ng/vial) labeled with acridinium ester in buffered saline with preservatives	2-8°C	until the expiration date on the vial label or cumulative 48 hours at room temperature
ACS:180 PSA Solid Phase	12.5 mL/vial	monoclonal mouse anti-PSA antibody (~312.5 µg/vial) covalently coupled to paramagnetic particles in buffered saline with preservatives	2-8°C	until the expiration date on the vial label or cumulative 48 hours at room temperature

POTENTIAL BIOHAZARD: Human and/or other biological source material. Handle as if potentially infectious.

This product may contain one or more of the following materials:

- human serum or plasma, or other human source material
- biological source material of non-human origin

While each human serum or plasma donor unit used in the manufacture of this product was tested and found non-reactive for hepatitis B surface antigen (HBsAg), antibody to hepatitis C (HCV), and antibody to HIV-1/2 by FDA-approved methods, all products manufactured using human or non-human source material should be handled as potentially infectious. There are no approved tests for other human and/or non-human source material. Handle this product according to established good laboratory practices.¹⁴⁻¹⁶

Preparing the Reagents

For best results, thoroughly mix the Solid Phase by inverting the vial before each use. Visually inspect the bottom of the vial to ensure that all particles are dispersed and suspended. If foaming occurs, rim the top of the vial with applicator sticks to remove the foam.

- Room temperature (20 to 30°C) equilibration is not required before use.
- Place septum caps on the Lite Reagent and Solid Phase vials.
- Do not mix reagents from different lots.

Calibrating the Assay

For detailed information about entering calibration values, refer to the system operating instructions or to the online help system.

Master Curve Calibration

The ACS:180 PSA assay requires a Master Curve calibration when using a new lot number of Lite Reagent and Solid Phase. For each new lot number of Lite Reagent and Solid Phase, use the barcode wand or keyboard to enter the Master Curve values on the system. The Master Curve card contains the Master Curve values.

Calibration Interval

The ACS:180 PSA assay requires a two-point calibration:

- every 21 days
- when changing lot numbers of assay reagents
- when replacing system components
- when quality control results are repeatedly out of range

Quality Control

For detailed information about entering quality control values, refer to the system operating instructions or to the online help system.

To monitor system performance and chart trends, as a minimum requirement, two levels of quality control material should be assayed on each day that samples are analyzed. Quality control samples should also be assayed when performing a two-point calibration. Treat all quality control samples the same as patient samples.

For quality control of the ACS:180 PSA assay, use Ligand Plus, Tumor Marker Plus, or an equivalent quality control material. Refer to the product inserts for the suggested Expected Values. If the quality control results do not fall within the suggested Expected Values or within the laboratory's established values, then do the following:

- review these instructions to ensure that the assay was performed according to the procedures recommended by Bayer Diagnostics
- verify that the materials are not expired
- verify that required maintenance was performed
- if necessary, rerun the quality control samples or contact Bayer Diagnostics for more assistance

Sample Volume

This assay requires 35 μ L of sample for a single determination. This volume does not include the unusable volume in the sample cup or the additional volume required when performing duplicates or other tests on the same sample.

Assay Procedure

For detailed information about operating the systems, refer to the system operating instructions or to the online help system.

NOTE:

- if automatic tray and cup assignment is on, use the printed worksheet as a guide for loading calibrators, quality control material, and patient samples into the correct tray and cup positions.
 - if automatic tray and cup assignment is off and all quality control and patient samples are barcoded, load samples in any position.
- Schedule the requested tests or profiles for each sample.
 - Prepare and load Calibrator Q, if required:
 - Prepare the low and high calibrators according to the instructions in the Calibrator Q product insert.
 - Dispense the low and high calibrators into sample cups labeled with the appropriate barcode labels.
 - Load the sample cups on the sample tray.

Ensure that the low calibrator precedes the high calibrator on the sample tray.
 - Prepare and load the quality control samples:
 - Prepare the quality control material according to the instructions in the quality control product insert.
 - Dispense the quality control samples into labeled sample cups.
 - Load the sample cups in the appropriate positions on the sample tray.
 - Prepare the primary tubes or sample cups and load them on the sample tray.
 - If dilution is required, dispense Multi-Diluent 2 into a sample cup labeled with the appropriate barcode label and load the sample cup on the sample tray.
 - Load the Uts Reagent and Solid Phase in adjacent positions on the reagent tray.
 - Start the system.

Procedural Notes

Calculations

For detailed information about how the system calculates results, refer to the system operating instructions or to the online help system.

The system reports serum PSA results in ng/mL (mass units) or μ g/L (SI units), depending on the units defined when setting up the assay. The conversion formula is 1 ng/mL = 1 μ g/L.

Dilutions

- Serum samples with levels of PSA greater than 100 ng/mL (100 μ g/L) must be diluted and retested to obtain accurate results. Use Multi-Diluent 2 to dilute samples.
- Patient samples can be automatically diluted by the system or prepared manually. For automatic dilutions, ensure that Multi-Diluent 2 is loaded and set the system parameters as follows:

Dilution setpoint: \leq 100 ng/mL (100 μ g/L)

Dilution factor: 2, 5

For detailed information about automatic dilutions, refer to the system operating instructions or to the online help system.

- Manually dilute the patient samples when patient results exceed the linearity of the assay using automatic dilution, or when laboratory protocol requires manual dilution. Use Multi-Diluent 2 to manually dilute patient samples, and then load the diluted sample on the sample tray, replacing the undiluted sample.

Ensure that results are mathematically corrected for dilution. If a predilution factor is entered when scheduling the test, the system automatically calculates the result.

High Dose Hook Effect

Patient samples with high total PSA levels can cause a paradoxical decrease in the RLUs (high dose hook effect). In this assay, patient samples with total PSA levels as high as 17,000 ng/mL (17,000 μ g/L) will assay greater than 400 ng/mL (400 μ g/L).

Disposal

Dispose of hazardous or biologically contaminated materials according to the practices of your institution. Discard all materials in a safe and acceptable manner, and in compliance with all federal, state, and local requirements.

Limitations

NOTE: Do not interpret the presence of PSA as absolute evidence of the presence or absence of malignant disease. Measurements of PSA should always be used in conjunction with other diagnostic procedures, including information from the patient's medical history. The total amount of PSA in a given specimen determined with assays from different manufacturers can vary due to differences in assay methods, calibration, and reagent specificity. PSA determined with different manufacturers' assays may vary depending on the method of standardization and antibody specificity.

Specimens obtained from patients undergoing prostate manipulation, especially needle biopsy and transurethral resection, may show erroneously high results.⁸ Care should be taken that PSA samples are drawn before these procedures are performed.

Prostate cancer patients under treatment with anti-androgens and LHRH agonists may exhibit markedly reduced levels of PSA. Also, men treated for benign prostatic hyperplasia with inhibitors of 5 α -reductase (finasteride) may demonstrate a significant reduction in PSA levels compared to values prior to treatment.¹¹ Care should be taken when interpreting values from these individuals.

The concentration of PSA in a given specimen determined with assays from different manufacturers can vary because of differences in assay methods, calibration, and reagent specificity.¹⁰ PSA in serum and in seminal fluid exists primarily in complexed and free forms, respectively.¹⁰ Quality control samples may be produced by introducing seminal fluid PSA into serum matrices. PSA levels in these controls, determined with different manufacturers' assays, will vary depending on the method of standardization, antibody specificity, and different reactivity with complexed and free forms of PSA. Therefore, it is important to use assay specific values to evaluate quality control results.

Heterophilic antibodies in human serum can react with reagent immunoglobulins, interfering with in vitro immunoassays.²⁰ Patients routinely exposed to animals or to animal serum products can be prone to this interference and anomalous values may be observed. Additional information may be required for diagnosis.

Serum specimens that are ... Demonstrate \leq 5% change in results up to ...

hemolyzed	500 mg/dL of hemoglobin
lipemic	1000 mg/dL of triglycerides
icteric	40 mg/dL of bilirubin

Equimolarity

To demonstrate the equimolarity of the ACS:180 PSA assay (the assay recognizes free-PSA and the PSA-ACT complex equally well), five samples with free-PSA concentrations ranging from 0 to 100% and a total PSA concentration of ~4 ng/mL were analyzed using the ACS:180 PSA assay. The following data demonstrate that the ACS:180 PSA assay is equimolar.

% free-PSA	% PSA-ACT	ACS:180 PSA (ng/mL)
100	0	4.3
80	20	4.1
60	50	4.2
20	80	4.4
0	100	4.4

Expected Results

To confirm the distribution of total PSA in patients, as shown below, serum samples from healthy subjects and patients with various malignant diseases were analyzed using the ACS:180 PSA reagents. The patients included in this study represent a variety of disease states from active, progressive malignancy to no clinical evidence of disease. The frequency of positive PSA results is significantly lower in patients with no evidence of active disease compared to those with active disease.

% Distribution of PSA by Diagnostic Category

Patient Diagnosis	N	0.0-4.0 (ng/mL) (μ g/L)	4.1-10 (ng/mL) (μ g/L)	10.1-40 (ng/mL) (μ g/L)	> 40 (ng/mL) (μ g/L)	Median PSA (ng/mL) (μ g/L)
Apparently Healthy						
Female	100	100.0	0.0	0.0	0.0	< 0.06
Male < 40	71	100.0	0.0	0.0	0.0	0.73
Male 40-50	50	100.0	0.0	0.0	0.0	0.53
Male 50-60	54	100.0	0.0	0.0	0.0	0.61
Male 60-70	50	100.0	0.0	0.0	0.0	0.85
Male > 70	58	100.0	0.0	0.0	0.0	0.77
Total Males	283	100.0	0.0	0.0	0.0	0.71
Prostate Cancer						
Stage A	42	69.0	26.2	4.8	0.0	3.92
Stage B	50	60.0	32.0	8.0	0.0	3.52
Stage C	43	20.9	72.1	4.7	2.3	5.25
Stage D	46	56.5	21.7	19.6	2.2	3.48
Total Prostate	191	51.6	38.0	9.3	1.1	4.04

% Distribution of PSA by Diagnostic Category

Patient Diagnosis	N	0.0-4.0 (ng/mL) (µg/L)	4.1-10 (ng/mL) (µg/L)	10.1-40 (ng/mL) (µg/L)	> 40 (ng/mL) (µg/L)	Median PSA (ng/mL) (µg/L)
Benign Diseases						
Prostate Hypertrophy (BPH)	152	46.7	32.9	20.4	0.0	4.37
Genitourinary (GU)	50	90.0	8.0	2.0	0.0	1.38
Prostatitis	18	27.8	5.6	5.6	61.1	125.9
Rheumatoid Factor	5	100.0	0.0	0.0	0.0	0.58
Other Cancers						
Breast	10	100.0	0.0	0.0	0.0	0.08
Renal	6	100.0	0.0	0.0	0.0	0.37
Pulmonary	10	100.0	0.0	0.0	0.0	0.08
Misc. GU	39	92.3	5.1	2.6	0.0	0.42
Gastrointestinal	12	91.7	0.0	0.0	8.3	0.90
Other	18	100.0	0.0	0.0	0.0	0.45

Expected Values in the Detection of Prostate Cancer

A n evaluation was conducted to test the effectiveness of PSA along with DRE as an aid in detection of prostate cancer. A total of 291 biopsied men aged 50 years or older were included in the study. In the population of 291 subjects 76 men or 26.1% were found to have cancer. The positive predictive value (PPV) of PSA at the cutoff of 4.0 ng/mL (4.0 µg/L) was 28.4%. This study also demonstrated that PSA testing, when used in conjunction with DRE was more effective than DRE alone.

PSA elevations greater than 4.0 ng/mL (4.0 µg/L) may warrant additional testing even if the DRE is negative. However, the converse is also true: a subject with suspicious DRE and normal PSA may also require additional testing since DRE detected 17% (13/76) of cancers that PSA determinations did not.

Refer to the following table for a summary of the study results:

Summary of Results for ACS:180 PSA

	Number of Subjects	Number of Cancers	% Positive Biopsies
All subjects	291	76	26.1
PSA > 4.0 ng/mL (µg/L)	218	62	28.4
DRE+	127	55	43.3
PSA < 4.0 ng/mL (µg/L), DRE-	32	1	3.1
PSA > 4.0 ng/mL (µg/L), DRE-	132	20	15.2
PSA < 4.0 ng/mL (µg/L), DRE+	41	13	31.7
PSA > 4.0 ng/mL (µg/L), DRE+	86	42	48.8

DRE+ = Suspicious for cancer.

DRE- = Not suspicious for cancer.

As with all in vitro diagnostic assays, each laboratory should determine its own reference range(s) for the diagnostic evaluation of patient results.²¹

Performance Characteristics

Specificity

There are no known cross-reactants for PSA.

The potential interference of chemotherapeutic agents, therapeutic drugs, and tumor marker antigens was tested by adding these substances to serum pools containing PSA ranging from 0.77 to 7.12 ng/mL (0.77 to 7.12 µg/L). The level of PSA in each of these pools was then determined using the ACS:180 PSA assay and normalized to the level without the respective drugs or antigen.

Substance	Amount Added (µg/mL)	Mean % Recovery (Spike/control x 100)
Cyclophosphamide	700	100.5
Doxorubicin Hydrochloride	51.8	100
Methotrexate	22.72	101
Megestrol acetate	39.6	101
Diethylstilbestrol	5.0	100
Leuprolide (LUPRON)	15.0	100
Estramustine Phosphate	81.7	99
Flutamide	10.0	100
Zoladex (Goserelin Acetate)	7.2	98
Trypsin Proscar (Finasteride)	0.37	102
Cardura	0.8	100

Interference testing was determined according to NCCLS Document EP7-P.²²

Sensitivity and Assay Range

The ACS:180 PSA assay measures total PSA concentrations up to 100 ng/mL (100 µg/L) with a minimum detectable concentration (analytical sensitivity) of 0.06 ng/mL (0.06 µg/L). Analytical sensitivity is defined as the concentration of PSA that corresponds to the RLU's that are two standard deviations greater than the mean RLU's of 20 replicate determinations of the PSA zero standard.

Method Comparison

For 390 samples in the range of 0.06 to 100 ng/mL (0.06 to 100 µg/L), the relationship between the ACS:180 PSA assay and an alternate method is described by the equation:

$$\text{ACS:180 PSA} = 0.994 (\text{alternate method}) + 0.098 \text{ ng/mL}$$

$$\text{Correlation coefficient (r)} = 0.985$$

Dilution Recovery

Six human serum samples in the range of 3.02 to 85.88 ng/mL (3.02 to 85.88 µg/L) of total PSA were diluted 1:2, 1:4, and 1:8 with Multi-Diluent 2 and assayed for recovery and parallelism. The recoveries ranged from 97.4% to 112.2% with a mean of 103.6%.

Sample	Dilution	Observed (ng/mL)	Expected (ng/mL)	Observed (µg/L)	Expected (µg/L)	% Recovery
1	—	3.02		3.02		
	1:2	1.54	1.51	1.54	1.51	102.0
	1:4	0.79	0.76	0.79	0.76	103.9
	1:8	0.39	0.38	0.39	0.38	102.6
	Mean					102.9
2	—	10.87		10.87		
	1:2	5.30	5.44	5.30	5.44	97.4
	1:4	2.76	2.72	2.76	2.72	101.5
	1:8	1.43	1.36	1.43	1.36	105.1
	Mean					101.3
3	—	18.15		18.15		
	1:2	9.20	9.07	9.20	9.07	101.4
	1:4	4.64	4.54	4.64	4.54	102.2
	1:8	2.31	2.27	2.31	2.27	101.8
	Mean					101.8
4	—	38.45		38.45		
	1:2	19.50	19.22	19.50	19.22	101.5
	1:4	9.89	9.61	9.89	9.61	102.9
	1:8	5.19	4.81	5.19	4.81	107.9
	Mean					104.1
5	—	67.49		67.49		
	1:2	34.00	33.74	34.00	33.74	100.8
	1:4	17.48	16.87	17.48	16.87	103.6
	1:8	9.47	8.44	9.47	8.44	112.2
	Mean					105.6
6	—	85.88		85.88		
	1:2	43.95	42.94	43.95	42.94	102.4
	1:4	22.85	21.47	22.85	21.47	106.4
	1:8	11.73	10.74	11.73	10.74	109.2
	Mean					106.0
Mean					103.6	

Spiking Recovery

Varying amounts of PSA were added to six serum samples with endogenous PSA levels ranging from < 0.06 to 3.05 ng/mL (< 0.06 to 3.05 µg/L). The amount of PSA that was added varied from 17.5 to 63.4 ng/mL (17.5 to 63.4 µg/L). When compared to the expected value, the measured (recovered) values of total PSA averaged 99.4% with a range of 92.6 to 107.3%.

Sample	Amount Added (ng/mL)	Observed (ng/mL)	Amount Added (µg/L)	Observed (µg/L)	% Recovery
1	—	0.81	—	0.81	
	24.8	25.39	24.8	25.39	99.1
	43.7	47.68	43.7	47.68	107.3
	63.4	61.31	63.4	61.31	96.4
	Mean				100.6
2	—	1.05	—	1.05	
	24.8	24.66	24.8	24.66	99.2
	43.7	43.38	43.7	43.38	96.9
	63.4	59.73	63.4	59.73	92.6
	Mean				94.9
3	—	< 0.06	—	< 0.06	
	17.5	18.26	17.5	18.26	104.3
	30.4	32.56	30.4	32.56	107.1
	44.3	42.42	44.3	42.42	95.8
	Mean				102.4
4	—	2.31	—	2.31	
	24.8	27.51	24.8	27.51	101.6
	43.7	47.68	43.7	47.68	103.8
	63.4	61.31	63.4	61.31	93.1
	Mean				99.5

Sample	Amount Added (ng/mL)	Observed (ng/mL)	Amount Added (µg/L)	Observed (µg/L)	% Recovery
5	—	2.73	—	2.73	—
	24.8	26.90	24.8	26.90	97.5
	43.7	47.97	43.7	47.97	103.5
	63.4	66.13	63.4	66.13	100.0
	Mean				100.3
6	—	3.05	—	3.05	—
	24.8	27.81	24.8	27.81	99.8
	43.7	46.28	43.7	46.28	98.9
	63.4	64.74	63.4	64.74	97.3
	Mean				98.7
Mean					99.4

Precision

Eight samples were assayed 3 times in 6 assays, on each of 4 systems (n = 72 for each sample), over a period of 3 days. The following results were obtained:

Mean (ng/mL)	Mean (µg/L)	Within-run % CV	Run-to-run % CV	Total % CV
0.70	0.70	3.4	3.2	5.9
0.91	0.91	3.4	3.6	5.3
1.83	1.83	2.8	3.3	5.0
17.55	17.55	2.8	2.7	4.2
18.23	18.23	2.9	3.1	4.6
29.73	29.73	3.2	3.0	5.1
54.34	54.34	3.5	3.3	5.3
76.25	76.25	3.7	3.4	6.3

Carry-over

No significant carry-over was detected (less than the analytical sensitivity) when a sample containing 8000 ng/mL (8000 µg/L) of PSA was assayed.

Standardization

The ACS:180 PSA assay was standardized using highly purified PSA. Value (concentration) assignment was based on adjustment to a reference method comparison protocol.²³

Evaluating Results

For detailed information about evaluating the ACS:180 PSA assay, refer to the system operating instructions or to the online help system.

The following is recommended when you observe poor reproducibility of total PSA values at low levels or if you are not satisfied with assay performance:

- Ensure that the assay reagent and calibrator lot numbers and expiration dates match those entered in the system.
- Ensure that the calibrators, quality control materials, and assay reagents were prepared according to the recommended procedures.
- Ensure that the recommended sample collection and handling procedures were followed.
- Ensure that the recommended system cleaning procedures were followed.
- Ensure that Type II reagent water was used when operating the system.¹²
- Remove the septum caps from the reagent vials and check for foam or moisture on the septum caps. Replace the septum caps if necessary.
- Visually check the probe and tubing for obstructions, leaks, and deformities such as pinched or crimped tubing.
- Take further corrective action following established laboratory procedures.
- Calibrate the system using new assay reagents, calibrators, and quality control samples.
- Contact the Bayer Diagnostics Technical Assistance Center.

Technical Assistance

For technical assistance, contact your local authorized representative. For customer service or additional information, contact your local authorized distributor.

References

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Manufactured by:
Bayer Corporation
511 Benedict Avenue
Tarrytown, NY 10591-5097 USA
914 631-8000

Bayer S.A.
Produtos Diagnósticos
Rua Domingos Jorge 1100
04779-800 - São Paulo - SP
Brazil
55 11 5694 6574
Bayer Diagnostics
Tour Horizon
52, quai de Dion Boulen
92807 Puteaux Cedex, France
01 49 06 56 00

Bayer Vital GmbH & Co. KG
Geschäftsbereich Diagnostik
Siemensstraße 3
D-35463 Fernwald, Germany
0049-03641-4003-0

Bayer S.p.A.
Divisione Diagnostici
Via Grotte 184
20151 Milano, Italia
+39023078.1
製造元: Bayer Corporation
輸入元: バイエル薬品株式会社
株式会社
: Bayer Medical Ltd.
東京都港区赤坂 1-19-15
Unosawa Tokyu Building 2F
1-19-15, Ebise
Shibuya-Ku
Tokyo 150-0013, Japan
81.3.3440.4881

Química Farmacéutica Bayer, S.A.
División Diagnósticos
Calabria, 260
08029 Barcelona, España
+34 93 485.85.00

Bayer plc
Diagnostics Division
Bayer House
Stambridge Hill
Newbury, RG14 1JA
United Kingdom
+44 (0)1635 563000

Bayer Corporation
Diagnostics Division
511 Benedict Avenue
Tarrytown, NY 10591-5097 USA
914 631-8000

PSA

Indicates Revised Information

Assay Summary

Sample Type	Serum
Sample Volume	35 μL
Calibrator	Q
Sensitivity and Assay Range	0.06 – 100 ng/mL (μg/L)

Contents

Catalog Number	Contents	Number of Tests
118157	5 ReadyPack® primary reagent packs containing ADVIA® Centaur™ PSA Lite Reagent and Solid Phase ADVIA Centaur PSA Master Curve card	500
or		
118156	1 ReadyPack primary reagent pack containing ADVIA Centaur PSA Lite Reagent and Solid Phase ADVIA Centaur PSA Master Curve card	100

Intended Use

This *in vitro* diagnostic assay is intended to quantitatively measure prostate-specific antigen (PSA) in human serum using the ADVIA® Centaur™ system. This assay is indicated for the measurement of serum PSA in conjunction with Digital Rectal Exam (DRE) as an aid in the detection of prostate cancer in men aged 50 years and older. This assay is further indicated as an aid in the management (monitoring) of patients with prostate cancer.

WARNING: The concentration of total PSA in a given specimen as determined by assays from different manufacturers can vary due to differences in assay methods and reagent specificity. The results reported by the laboratory to the physician must include the identity of the assay for total PSA used. Values obtained with different assay methods cannot be used interchangeably. If, in the course of monitoring a patient, the assay method used for determining serial levels of total PSA is changed, the laboratory must perform additional testing to confirm baseline values.

United States Federal Law restricts this device to sale and distribution by or on the order of a physician, or to a clinical laboratory, and use is restricted to, by, or on the order of a physician.

Materials Required But Not Provided

Catalog Number	Description	Contents
118221	Calibrator Q	6 vials of low calibrator 6 vials of high calibrator
or		
118220	Calibrator Q	2 vials of low calibrator 2 vials of high calibrator

Optional Reagents

Catalog Number	Description	Contents
110314	ADVIA Centaur Multi-Diluent 2	2 ReadyPack ancillary reagent packs containing 10 mL/pack
672260	Multi-Diluent 2	50 mL/vial
986000	Ligand Plus 1, 2, 3 quality control material	5 x 5 mL/level

986400	Ligand Plus 1, 2, 3 barcode labels	60/level
976700	Tumor Marker Plus 1, 2 quality control material	3 x 2 mL/level
114925	Tumor Marker Plus 1, 2 barcode labels	60/level
118197	PSA Master Curve Material	9 x 1 mL

Summary and Explanation of the Test

Prostate-specific antigen (PSA) is a single-chain glycoprotein normally found in the cytoplasm of the epithelial cells lining the acini and ducts of the prostate gland.¹ PSA is a neutral serine protease of 240 amino acids involved in the lysis of seminal coagulum.^{2,3}

PSA is detected in the serum of males with normal, benign hypertrophic, and malignant prostate tissue. PSA is not detected in the serum of males without prostate tissue (because of radical prostatectomy or cystoprostatectomy) or in the serum of most females. The fact that PSA is unique to prostate tissue makes it a suitable marker for monitoring men with cancer of the prostate. PSA is also useful for determining possible recurrence after therapy when used in conjunction with other diagnostic indices.^{4,5}

Measurement of serum PSA levels is not recommended as a screening procedure for the diagnosis of cancer because elevated PSA levels also are observed in patients with benign prostatic hypertrophy. However, studies suggest that the measurement of PSA in conjunction with digital rectal examination (DRE) and ultrasound provide a better method of detecting prostate cancer than DRE alone.⁶⁻⁸

PSA levels increase in men with cancer of the prostate, and after radical prostatectomy PSA levels routinely fall to the undetectable range.⁴ If prostatic tissue remains after surgery or metastasis has occurred, PSA appears to be useful in detecting residual and early recurrence of tumor.^{9,10} Therefore, serial PSA levels can help determine the success of prostatectomy, and the need for further treatment, such as radiation, endocrine or chemotherapy, and in the monitoring of the effectiveness of therapy.^{4,5,8,11}

Assay Principle

The ADVIA Centaur PSA assay is a two-site sandwich immunoassay using direct chemiluminometric technology, which uses constant amounts of two antibodies. The first antibody, in the Lite Reagent, is a polyclonal goat anti-PSA antibody labeled with acridinium ester. The second antibody, in the Solid Phase, is a monoclonal mouse anti-PSA antibody, which is covalently coupled to paramagnetic particles.

The system automatically performs the following steps:

- dispenses 35 μ L of sample into a cuvette
- dispenses 250 μ L of Solid Phase and 100 μ L of Lite Reagent and incubates for 7.5 minutes at 37°C
- separates, aspirates, and washes the cuvettes with reagent water¹²
- dispenses 300 μ L each of Acid Reagent and Base Reagent to initiate the chemiluminescent reaction
- reports results according to the selected option, as described in the system operating instructions or in the online help system

A direct relationship exists between the amount of PSA present in the patient sample and the amount of relative light units (RLUs) detected by the system.

Specimen Collection and Handling

Serum is the recommended sample type for this assay.

The following recommendations for handling and storing blood samples are furnished by the National Committee for Clinical Laboratory Standards (NCCLS):¹³

- Collect all blood samples observing universal precautions for venipuncture.
- Allow samples to clot adequately before centrifugation.
- Keep tubes stoppered and upright at all times.
- Do not use samples that have been stored at room temperature for longer than 8 hours.
- Tightly cap and refrigerate specimens at 2 to 8°C if the assay is not completed within 8 hours.
- Freeze samples at or below -20°C if the sample is not assayed within 48 hours.
- Freeze samples only once and mix thoroughly after thawing.

Before placing samples on the system ensure that:

- Samples are free of fibrin or other particulate matter. Remove particulates by centrifugation at 1000 x g for 15 to 20 minutes.
- Samples are free of bubbles.

Reagents

Reagent Pack	Reagent	Volume	Ingredients	Storage	Stability
ADVIA Centaur PSA ReadyPack primary reagent pack	Lite Reagent	10.0 mL/ reagent pack	polyclonal goat anti-PSA antibody (~77 ng/mL) labeled with acridinium ester in buffered saline with preservatives	2-8°C	until the expiration date on the pack label. For onboard stability, refer to <i>Onboard Stability and Calibration Interval</i> .
	Solid Phase	25.0 mL/ reagent pack	monoclonal mouse anti- PSA antibody (~25 µg/mL) covalently coupled to paramagnetic particles in buffered saline with preservatives	2-8°C	until the expiration date on the pack label. For onboard stability, refer to <i>Onboard Stability and Calibration Interval</i> .
ADVIA Centaur Multi-Diluent 2 ReadyPack ancillary reagent pack	Multi- Diluent 2	10.0 mL/ reagent pack	goat serum with sodium azide (0.1%) and preservatives	2-8°C	until the expiration date on the pack label or 28 consecutive days after accessing the ancillary reagent pack.

POTENTIAL BIOHAZARD: Human and/or other biological source material. Handle as if potentially infectious.

This product may contain one or more of the following materials:

- human serum or plasma, or other human source material
- biological source material of non-human origin

While each human serum or plasma donor unit used in the manufacture of this product was tested and found non-reactive for hepatitis B surface antigen (HBsAg), antibody to hepatitis C (HCV), and antibody to HIV-1/2 by FDA-approved methods, all products manufactured using human or non-human source material should be handled as potentially infectious. There are no approved tests for other human and/or non-human source material. Handle this product according to established good laboratory practices. 14-16

Loading Reagents

Ensure that the system has sufficient primary and ancillary reagent packs. For detailed information about preparing the system, refer to the system operating instructions or to the online help system.

CAUTION: Mix all primary reagent packs by hand before loading them onto the system. Visually inspect the bottom of the reagent pack to ensure that all particles are dispersed and resuspended. For detailed information about preparing the reagents for use, refer to Appendix C, *Handling Reagents*.

Load the ReadyPack reagent packs in the primary reagent area using the arrows as a placement guide. The system automatically mixes the primary reagent packs to maintain homogeneous suspension of the reagents. For detailed information about loading reagents, refer to the system operating instructions or to the online help system.

If automatic dilution of a sample is required, load ADVIA Centaur Multi-Diluent 2 in the ancillary reagent entry.

Onboard Stability and Calibration Interval

<i>Onboard Stability</i>	<i>Calibration Interval</i>
28 days	28 days

Additionally, the ADVIA Centaur PSA assay requires a two-point calibration:

- when changing lot numbers of primary reagent packs
- when replacing system components
- when quality control results are repeatedly out of range

CAUTION:

- Discard the primary reagent packs at the end of the onboard stability interval.
- Do not use reagents beyond the expiration date.

Master Curve Calibration

The ADVIA Centaur PSA assay requires a Master Curve calibration when using a new lot number of Lite Reagent and Solid Phase. For each new lot number of Lite Reagent and Solid Phase, use the barcode reader or keyboard to enter the Master Curve values on the system. The Master Curve card contains the Master Curve values. For detailed information about entering calibration values, refer to the system operating instructions or to the online help system.

Quality Control

For detailed information about entering quality control values, refer to the system operating instructions or to the online help system.

To monitor system performance and chart trends, as a minimum requirement, two levels of quality control material should be assayed on each day that samples are analyzed. Quality control samples should also be assayed when performing a two-point calibration. Treat all quality control samples the same as patient samples.

For quality control of the ADVIA Centaur PSA assay, use Ligand Plus, Tumor Marker Plus, or an equivalent quality control material. Refer to the quality control product insert for the suggested Expected Values. If the quality control results do not fall within the suggested Expected Values or within the laboratory's established values, then do the following:

- review these instructions to ensure that the assay was performed according to the procedures recommended by Bayer Diagnostics
- verify that the materials are not expired
- verify that required maintenance was performed
- if necessary, rerun the quality control samples or contact Bayer Diagnostics for more assistance

Sample Volume

This assay requires 35 μL of sample for a single determination. This volume does not include the unusable volume in the sample container or the additional volume required when performing duplicates or other tests on the same sample. For detailed information about determining the minimum required volume, refer to *Sample Volume Requirements* in the *ADVIA Centaur Reference Manual*.

NOTE: The sample volume required to perform onboard dilution differs from the sample volume required to perform a single determination. Refer to the following information for the sample volume required to perform onboard dilutions:

Dilution	Sample Volume (μL)
1:2	100
1:5	30

Assay Procedure

For detailed procedural information, refer to the system operating instructions or to the online help system.

CAUTION: Do not load more than one size of sample container in each rack. The rack indicator must be positioned at the correct setting for the size of sample container.

1. Prepare the sample container for each sample, and place barcode labels on the sample containers, as required.
2. Load each sample container into a rack, ensuring that the barcode labels are clearly visible through the slot in the rack.
3. Place the racks in the entry queue.
4. Start the entry queue, if required.

Procedural Notes

Calculations

For detailed information about how the system calculates results, refer to the system operating instructions or to the online help system.

The system reports serum total PSA results in ng/mL (mass units) or µg/L (SI units), depending on the units defined when setting up the assay. The conversion formula is 1 ng/mL = 1 µg/L.

Dilutions

- Serum samples with total PSA levels greater than 100 ng/mL (100 µg/L) must be diluted and retested to obtain accurate results.
- Patient samples can be automatically diluted by the system or prepared manually.
- For automatic dilutions, ensure that ADVIA Centaur Multi-Diluent 2 is loaded and set the system parameters as follows:

Dilution point: ≤ 100 ng/mL (100 µg/L)

Dilution factor: 2, 5

For detailed information about automatic dilutions, refer to the system operating instructions or to the online help system.

- Manually dilute the patient samples when patient results exceed the linearity of the assay using automatic dilution, or when laboratory protocol requires manual dilution.
- Use Multi-Diluent 2 to manually dilute patient samples, and then load the diluted sample in the sample rack, replacing the undiluted sample.
- Ensure that results are mathematically corrected for dilution. If a dilution factor is entered when scheduling the test, the system automatically calculates the result.

High Dose Hook Effect

Patient samples with high total PSA levels can cause a paradoxical decrease in the RLUs (high dose hook effect). In this assay, patient samples with total PSA levels as high as 17,000 ng/mL (17,000 µg/L) will assay greater than 400 ng/mL (400 µg/L).

Disposal

Dispose of hazardous and biologically contaminated materials according to the practices of your institution. Discard all materials in a safe and acceptable manner and in compliance with all federal, state, and local requirements.

Limitations

NOTE: Do not interpret levels of PSA as absolute evidence of the presence or the absence of malignant disease. Before treatment, patients with confirmed prostate carcinoma frequently have levels of PSA within the range observed in healthy individuals. Elevated levels of PSA can be observed in patients with nonmalignant diseases. Measurements of PSA should always be used in conjunction with other diagnostic procedures, including information from the patient's clinical evaluation.

The concentration of total PSA in a given specimen determined with assays from different manufacturers can vary due to differences in assay methods, calibration, and reagent specificity. Total PSA determined with different manufacturers' assays will vary depending on the method of standardization and antibody specificity.

WARNING: Do not use this assay as a screening test or for diagnosis. Do not predict disease recurrence solely on serial PSA values.

Specimens obtained from patients undergoing prostate manipulation, especially needle biopsy and transurethral resection, may show erroneously high results.⁶ Care should be taken that PSA samples are drawn before these procedures are performed.

Prostate cancer patients under treatment with anti-androgens and LHRH agonists may exhibit markedly reduced levels of PSA. Also, men treated for benign prostatic hyperplasia with inhibitors of 5 α -reductase (finasteride) may demonstrate a significant reduction in PSA levels compared to values prior to treatment.¹⁷ Care should be taken when interpreting values from these individuals.

The concentration of PSA in a given specimen determined with assays from different manufacturers can vary because of differences in assay methods, calibration, and reagent specificity.¹⁸ PSA in serum and in seminal fluid exists primarily in complexed and free forms, respectively.¹⁹ Quality control samples may be produced by introducing seminal fluid PSA into serum matrices. PSA levels in these controls, determined with different manufacturers' assays, will vary depending on the method of standardization, antibody specificity, and different reactivity with complexed and free forms of PSA. Therefore, it is important to use assay specific values to evaluate quality control results.

Heterophilic antibodies in human serum can react with reagent immunoglobulins, interfering with in vitro immunoassays.²⁰ Patients routinely exposed to animals or to animal serum products can be prone to this interference and anomalous values may be observed. Additional information may be required for diagnosis.

Serum specimens that are ...	Demonstrate \leq 5 % change in results up to ...
Hemolyzed	500 mg/dL of hemoglobin
Lipemic	1000 mg/dL of triglycerides
Icteric	40 mg/dL of bilirubin

Equimolarity

To demonstrate the equimolarity of the ADVIA Centaur PSA assay (the assay recognizes free-PSA and the PSA-ACT complex equally well), five samples with free-PSA concentrations ranging from 0 to 100% and a total PSA concentration of ~4 ng/mL were analyzed using the ADVIA Centaur PSA assay. The following data demonstrate that the ADVIA Centaur PSA assay is equimolar.

% free-PSA	% PSA-ACT	ADVIA Centaur PSA (ng/mL)
100	0	4.16
80	20	4.08
50	50	4.46
20	80	4.54
0	100	4.54

Expected Results

To confirm the distribution of total PSA in patients, as shown below, serum samples from healthy subjects and patients with various malignant diseases were analyzed using the ACS:180[®] PSA reagents. The patients included in this study represent a variety of disease states from active, progressive malignancy to no clinical evidence of disease. The frequency of positive PSA results is significantly lower in patients with no evidence of active disease compared to those with active disease.

% Distribution of PSA by Diagnostic Category

Patient Diagnosis	N	0.0-4.0 (ng/mL) (μg/L)	4.1-10 (ng/mL) (μg/L)	10.1-40 (ng/mL) (μg/L)	> 40 (ng/mL) (μg/L)	Median PSA (ng/mL) (μg/L)
Apparently Healthy						
Female	100	100.0	0.0	0.0	0.0	< 0.06
Male < 40	71	100.0	0.0	0.0	0.0	0.73
Male 40-50	50	100.0	0.0	0.0	0.0	0.53
Male 50-60	54	100.0	0.0	0.0	0.0	0.61
Male 60-70	50	100.0	0.0	0.0	0.0	0.85
Male > 70	58	100.0	0.0	0.0	0.0	0.77
Total Males	283	100.0	0.0	0.0	0.0	0.71
Prostate Cancer						
Stage A	42	69.0	26.2	4.8	0.0	3.92
Stage B	50	60.0	32.0	8.0	0.0	3.52
Stage C	43	20.9	72.1	4.7	2.3	5.25
Stage D	46	56.5	21.7	19.6	2.2	3.48
Total Prostate	191	51.6	38.0	9.3	1.1	4.04
Benign Diseases						
Prostate Hypertrophy (BPH)	152	46.7	32.9	20.4	0.0	4.37
Genitourinary (GU)	50	90.0	8.0	2.0	0.0	1.38
Prostatitis	18	27.8	5.6	5.6	61.1	125.9
Rheumatoid Factor	5	100.0	0.0	0.0	0.0	0.58
Other Cancers						
Breast	10	100.0	0.0	0.0	0.0	0.08
Renal	6	100.0	0.0	0.0	0.0	0.37
Pulmonary	10	100.0	0.0	0.0	0.0	0.08
Misc. GU	39	92.3	5.1	2.6	0.0	0.42
Gastrointestinal	12	91.7	0.0	0.0	8.3	0.90
Other	18	100.0	0.0	0.0	0.0	0.45

These results were confirmed for the ADVIA Centaur PSA assay by analyzing 578 samples in the range of 0.06 to 100 ng/mL (0.06 to 100 μ g/L). Refer to *Method Comparison*.

Expected Values in the Detection of Prostate Cancer

An evaluation was conducted to test the effectiveness of PSA along with DRE as an aid in detection of prostate cancer. A total of 291 biopsied men aged 50 years or older were included in the study. In the population of 291 subjects 76 men or 26.1% were found to have cancer. The positive predictive value (PPV) of PSA at the cutoff of 4.0 ng/mL (4.0 μ g/L) was 28.4%. This study also demonstrated that PSA testing, when used in conjunction with DRE was more effective than DRE alone.

PSA elevations greater than 4.0 ng/mL (4.0 μ g/L) may warrant additional testing even if the DRE is negative. However, the converse is also true: a subject with suspicious DRE and normal PSA may also require additional testing since DRE detected 17% (13/76) of cancers that PSA determinations did not.

Refer to the following table for a summary of the study results:

Summary of Results for ACS:180 PSA

	Number of Subjects	Number of Cancers	% Positive Biopsies
All subjects	291	76	26.1
PSA > 4.0 ng/mL ($\mu\text{g/L}$)	218	62	28.4
DRE+	127	55	43.3
PSA < 4.0 ng/mL ($\mu\text{g/L}$), DRE-	32	1	3.1
PSA > 4.0 ng/mL ($\mu\text{g/L}$), DRE-	132	20	15.2
PSA < 4.0 ng/mL ($\mu\text{g/L}$), DRE+	41	13	31.7
PSA > 4.0 ng/mL ($\mu\text{g/L}$), DRE+	86	42	48.8

DRE+ = Suspicious for cancer.

DRE- = Not suspicious for cancer.

As with all in vitro diagnostic assays, each laboratory should determine its own reference range(s) for the diagnostic evaluation of patient results.²¹

Performance Characteristics

Specificity

There are no known cross-reactants for PSA.

The potential interference of chemotherapeutic agents, therapeutic drugs, and tumor marker antigens was tested by adding these substances to serum pools containing PSA ranging from 0.77 to 7.12 ng/mL (0.77 to 7.12 $\mu\text{g/L}$). The level of PSA in each of these pools was then determined using the ADVIA Centaur PSA assay and normalized to the level without the respective drugs or antigen.

Substance	Amount Added ($\mu\text{g/mL}$)	Mean % Recovery (Spike/control x 100)
Cyclophosphamide	700	100.5
Doxorubicin Hydrochloride	51.8	100
Methotrexate	22.72	101
Megestrol acetate	39.6	101
Diethylstilbestrol	5.0	100
Leuprolide (LUPRON)	15.0	100
Estramustine Phosphate	81.7	99
Flutamide	10.0	100
Zoladex (Goserelin Acetate)	7.2	98
Trypsin Proscar (Finasteride)	0.37	102
Cardura	0.8	100

Interference testing was determined according to NCCLS Document EP7-P.²²

Sensitivity and Assay Range

The ADVIA Centaur PSA assay measures total PSA concentrations up to 100 ng/mL (100 $\mu\text{g/L}$) with a minimum detectable concentration (analytical sensitivity) of 0.06 ng/mL (0.06 $\mu\text{g/L}$). Analytical sensitivity is defined as the concentration of total PSA that corresponds to the RLUs that are two standard deviations greater than the mean RLUs of 20 replicate determinations of the PSA zero standard.

Method Comparison

For 578 samples in the range of 0.06 to 100 ng/mL (0.06 to 100 $\mu\text{g/L}$), the relationship between the ADVIA Centaur PSA assay and the ACS:180 PSA assay is described by the equation:

ADVIA Centaur PSA = 1.07 (ACS:180 PSA) - 0.47 ng/mL

Correlation coefficient (r) = 0.99

Dilution Recovery

Six human serum samples in the range of 41.90 to 85.36 ng/mL (41.90 to 85.36 µg/L) of total PSA were diluted 1:2, 1:4, and 1:8 with Multi-Diluent 2 and assayed for recovery and parallelism. The recoveries ranged from 94.4% to 109.0% with a mean of 102.4%.

Sample	Dilution	Observed (ng/mL)	Expected (ng/mL)	Observed (µg/L)	Expected (µg/L)	Recovery %
1	—	41.90		41.90		
	1:2	21.79	20.95	21.79	20.95	104.0
	1:4	11.13	10.48	11.13	10.48	106.2
	1:8	5.67	5.24	5.67	5.24	108.2
	Mean					106.1
2	—	71.44		71.44		
	1:2	38.22	35.72	38.22	35.72	107.0
	1:4	19.25	17.86	19.25	17.86	107.8
	1:8	9.30	8.93	9.30	8.93	104.1
	Mean					106.3
3	—	68.73		68.73		
	1:2	33.41	34.37	33.41	34.37	97.2
	1:4	16.70	17.18	16.70	17.18	97.2
	1:8	8.29	8.59	8.29	8.59	96.5
	Mean					97.0
4	—	85.36		85.36		
	1:2	43.32	42.68	43.32	42.68	101.5
	1:4	23.25	21.34	23.25	21.34	109.0
	1:8	11.62	10.67	11.62	10.67	108.9
	Mean					106.5
5	—	49.79		49.79		
	1:2	24.63	24.90	24.63	24.90	98.9
	1:4	12.38	12.45	12.38	12.45	99.4
	1:8	6.33	6.22	6.33	6.22	101.8
	Mean					100.0
6	—	58.10		58.10		
	1:2	27.42	29.05	27.42	29.05	94.4
	1:4	14.36	14.53	14.36	14.53	98.8
	1:8	7.38	7.26	7.38	7.26	101.7
	Mean					98.3
Mean						102.4

Spiking Recovery

Varying amounts of PSA were added to six serum samples with endogenous PSA levels ranging from < 0.06 to 3.05 ng/mL (< 0.06 to 3.05 µg/L). The amount of PSA that was added varied from 17.5 to 63.4 ng/mL (17.5 to 63.4 µg/L). When compared to the expected value, the measured (recovered) values of total PSA averaged 99.4% with a range of 92.6 to 107.3%.

Sample	Amount Added (ng/mL)	Observed (ng/mL)	Amount Added (µg/L)	Observed (µg/L)	Recovery %
1	—	0.81	—	0.81	
	24.8	25.39	24.8	25.39	99.1
	43.7	47.68	43.7	47.68	107.3
	63.4	61.31	63.4	61.31	95.4
	Mean				100.6
2	—	1.05	—	1.05	
	24.8	24.66	24.8	24.66	95.2
	43.7	43.38	43.7	43.38	96.9
	63.4	59.73	63.4	59.73	92.6
	Mean				94.9
3	—	< 0.06	—	< 0.06	
	17.5	18.26	17.5	18.26	104.3
	30.4	32.56	30.4	32.56	107.1
	44.3	42.42	44.3	42.42	95.8
	Mean				102.4
4	—	2.31	—	2.31	
	24.8	27.51	24.8	27.51	101.6
	43.7	47.68	43.7	47.68	103.8
	63.4	61.31	63.4	61.31	93.1
	Mean				99.5
5	—	2.73	—	2.73	
	24.8	26.90	24.8	26.90	97.5
	43.7	47.97	43.7	47.97	103.5
	63.4	66.13	63.4	66.13	100.0
	Mean				100.3
6	—	3.05	—	3.05	
	24.8	27.81	24.8	27.81	99.8
	43.7	46.28	43.7	46.28	98.9
	63.4	64.74	63.4	64.74	97.3
	Mean				98.7
Mean					99.4

Precision

Six serum samples were assayed 3 times in 8 runs, on 4 systems (n = 24 for each sample), over a period of 3 days. The following results were obtained:

Mean (ng/mL)	Mean (µg/L)	Within-run % CV	Run-to-Run % CV	Total % CV
0.44	0.44	4.38	4.05	5.97
0.708	0.708	3.08	2.07	3.71
1.831	1.831	2.09	4.67	5.12
1.934	1.934	2.08	1.56	2.60
11.308	11.308	2.97	3.61	4.68
17.706	17.706	2.29	2.40	3.31

Standardization

The ADVIA Centaur PSA assay was standardized using highly purified PSA. Value (concentration) assignment was based on adjustment to a reference method comparison protocol.²³

Evaluating Results

The following is recommended when you observe poor reproducibility of total PSA values at low levels or if you are not satisfied with assay performance:

- Ensure that the assay reagent and calibrator lot numbers and expiration dates match those entered in the system.
- Ensure that the calibrators, quality control materials, and assay reagents were prepared according to the recommended procedures.
- Ensure that the recommended sample collection and handling procedures were followed.
- Ensure that the recommended system cleaning procedures were followed.
- Ensure that Type II reagent water was used when operating the system.¹²
- Visually check the probe and tubing for obstructions, leaks, and deformities such as pinched or crimped tubing.
- Take further corrective action following established laboratory procedures.
- Calibrate the system using new assay reagents, calibrators, and quality control samples.
- Contact Bayer Diagnostics for technical assistance.

Technical Assistance

For technical assistance, contact your local authorized representative. For customer service or additional information, contact your local authorized distributor.

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