SIEMENS

CE 0197

ADVIA Centaur® XP
ADVIA Centaur® XPT
Immunoassay Systems

PSA

Current revision and date [a]	Rev. 28, 2022-10	
Product Name	ADVIA Centaur® PSA (500 tests)	REF 02676506 (118157)
	ADVIA Centaur PSA (100 tests)	REF 06574155 (118156)
Systems	ADVIA Centaur XP system ADVIA Centaur XPT system	
Materials Required but Not Provided	ADVIA Centaur Calibrator Q (6 pack)	REF 04847308 (118221)
	ADVIA Centaur Calibrator Q (2 pack)	REF 02484801 (118220)
Specimen Types	Serum	
Assay Range	0.01–100 ng/mL (µg/L)	
Reagent Storage	2–8°C	
Reagent On-System Stability	28 days	

a A vertical bar in the page margin indicates technical content that differs from the previous version.

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.

Intended Use

This *in vitro* diagnostic assay is intended to quantitatively measure prostate-specific antigen (PSA) in human serum using the ADVIA Centaur® XP and ADVIA Centaur® XPT 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.

Summary and Explanation

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]

Principles of the Procedure

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.

Reagents

Reagent	Description	Storage	Reagent 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	**Unopened**: Stable until the expiration date on carton **On-system**: 28 days
ADVIA Centaur PSA ReadyPack primary reagent pack; Solid Phase Reagent	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	**Unopened**: Stable until the expiration date on carton **On-system**: 28 days
ADVIA Centaur ReadyPack ancillary reagent pack; Multi-Diluent 2[a] M·DIL 2	10.0 mL/reagent pack goat serum with sodium azide (0.1%) and preservatives	2–8°C	**Unopened**: Until the expiration date on the pack **On-system**: 28 consecutive days after accessing the ancillary reagent pack.

a See *Optional Materials*

Warnings and Precautions

Safety data sheets (MSDS/SDS) available on siemens-healthineers.com.

The summary of safety and performance for this *in vitro* diagnostic medical device is available to the public in the European Database on Medical Devices (EUDAMED) when this database is available and the information has been uploaded by the Notified Body. The web address of the EUDAMED public website is: https://ec.europa.eu/tools/eudamed.

CAUTION

This device contains material of animal origin and should be handled as a potential carrier and transmitter of disease.

Contains sodium azide as a preservative. Sodium azide can react with copper or lead plumbing to form explosive metal azides. On disposal, flush reagents with a large volume of water to prevent buildup of azides. Disposal into drain systems must be in compliance with prevailing regulatory requirements.

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 prevailing regulatory requirements.

For Professional Use.

CAUTION: Federal (USA) law restricts this device to sale by or on the order of a licensed healthcare professional.

For *in vitro* diagnostic use.

Preparing Reagents

All reagents are liquid and ready to use.

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, see the system operating instructions.

Note

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

Storing and Stability

Store the reagents upright at 2–8°C.

Protect reagent packs from all heat and light sources. Reagent packs loaded on the system are protected from light. Store unused reagent packs at 2–8°C away from heat and light sources.

All reagents are stable at 2–8°C until the expiration date on the packaging.

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 Clinical and Laboratory Standards Institute (CLSI):[1,2]

- 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 2–8°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.

The purpose of handling and storage information is to provide guidance to users. It is the responsibility of the individual laboratory to use all available references and/or its own studies when establishing alternate stability criteria to meet specific needs.

Procedure

Materials Provided

The following materials are provided:

REF	Contents	Number of Tests
02676506 (118157)	5 ReadyPack primary reagent packs containing ADVIA Centaur PSA Lite Reagent and Solid Phase ADVIA Centaur PSA Master Curve card	500
06574155 (118156)	1 ReadyPack primary reagent pack containing ADVIA Centaur PSA Lite Reagent and Solid Phase ADVIA Centaur PSA Master Curve card	100

Materials Required but Not Provided

The following materials are required to perform this assay, but are not provided:

Item		Description	
REF	04847308	ADVIA Centaur Calibrator Q	6 vials of low calibrator CAL L
	(118221)		6 vials of high calibrator CAL H
REF	02484801	ADVIA Centaur Calibrator Q	2 vials of low calibrator CAL L
	(118220)		2 vials of high calibrator CAL H

Optional Materials

The following materials may be used to perform this assay, but are not provided:

Item		Description	
REF	07948423 (110314)	ADVIA Centaur Multi-Diluent 2 M-DIL 2	2 ReadyPack ancillary reagent packs containing 10 mL/pack
REF	118197	ADVIA Centaur PSA Master Curve Material	9 x 1 mL

Assay Procedure

For detailed instructions on performing the procedure, refer to the system operating instructions.

CAUTION

When using the ADVIA Centaur system, do not load more than one size of specimen container in each rack. The rack indicator must be positioned at the correct setting for the size of specimen container.

1. Prepare the specimen container for each specimen, and place barcode labels on the specimen containers, as required.
2. Load each specimen container into a rack, ensuring that the barcode labels are clearly visible.
3. Place the racks in the entry queue.
4. Ensure that the assay reagents are loaded.
5. Start the entry queue, if required.

The system automatically performs the following actions:

- Dispenses 35 µL of sample into a cuvette.
- Dispenses 250 µL of Solid Phase and 100 µL of Lite Reagent and incubates for 7.5 minutes at 37°C.
- Separates, aspirates, and washes the cuvettes with reagent water.

  Note For information about reagent water, refer to the system operating instructions.
- Dispenses 300 µL 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.

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.

Preparing the System

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

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.

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

Preparing the Samples

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 the system operating instructions.

Note The sample volume required to perform onboard dilution differs from the sample volume required to perform a single determination. For detailed information, refer to *Dilutions*.

Before placing samples on the system, ensure that samples have the following characteristics:

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

On-System Stability

The ADVIA Centaur PSA assay reagents are stable unopened until the expiration date on the carton or onboard the system for 28 days.

Performing Calibration

For calibration of the ADVIA Centaur PSA assay, use the ADVIA Centaur Calibrator Q. Perform the calibration as described in the calibrator instructions for use.

Calibration Frequency

Calibrate the assay at the end of the 28-day calibration interval.

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.

Performing 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.

Performing Quality Control

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.

Siemens Healthcare Diagnostics recommends the use of commercially available quality control materials with at least 2 levels (low and high). For assistance in identifying a quality control material, refer to *ADVIA Centaur Quality Control Material Supplement* available on siemens-healthineers.com.

Additional quality control material can be used at the discretion of the laboratory. Use the quality control material in accordance with the quality control instructions for use.

In addition, perform quality control:

- Following a valid calibration
- With use of a new lot of reagent
- When troubleshooting test results that do not match clinical conditions or symptoms

Follow government regulations or accreditation requirements for quality control frequency. Individual laboratory quality control programs and procedures may require more frequent quality control testing.

Acceptable performance is achieved when the analyte values obtained are within the expected control interval for the system, as indicated by the manufacturer of the control material or within the interval determined by an internal laboratory quality control procedure.

Follow your laboratory's quality control procedures if the results obtained do not fall within the acceptable limits. For information about entering quality control definitions, refer to the system online help.

Taking Corrective Action

If the quality control results do not fall within the Expected Values or within the laboratory's established values, do not report results. Take the following actions:

- Verify that the materials are not expired.
- Verify that required maintenance was performed.
- Verify that the assay was performed according to the instructions for use.
- Rerun the assay with fresh quality control samples.
- If necessary, contact your local technical support provider or distributor for assistance.

Results

Calculation of Results

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

The system reports serum total PSA results in ng/mL (common 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

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	75
1:5	30
1:10, 1:50, 1:100	40

The following information pertains to 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.
- 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, 10, 50, 100

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

Interpretation of Results

Results of this assay should always be interpreted in conjunction with patient's medical history, clinical presentation and other findings.

Limitations

WARNING

Do not predict disease recurrence solely on serial PSA values.

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.

The PSA assay is intended to be used as an aid in the detection of prostate cancer and as an aid in the management (monitoring) of prostate cancer patients, in accordance with current clinical practice guidelines. These guidelines define biochemical recurrence of prostate cancer as a detectable or rising PSA value post-radical prostatectomy that is ≥ 0.20 ng/mL (µg/L) with a second confirmatory level of ≥ 0.20 ng/mL (µg/L), thus use of PSA values < 0.20 ng/mL (µg/L) is not recommended to identify patients at risk of biochemical recurrence of prostate cancer.[13,14]

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.[15,16] Also, men treated for benign prostatic hyperplasia with inhibitors of 5α-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.

Equimolarity

Equimolar-response PSA assays recognize both forms of immunodetectable PSA, both free PSA and PSA-ACT, equally.[21] The antibodies used in the ADVIA Centaur PSA assay recognize free PSA and PSA-ACT on an equimolar basis in the range of 10-50% free PSA/total PSA which is representative of men with prostate cancer, no disease, and benign prostate hyperplasia.[22]

Expected Values

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[a]	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

a Includes sera from treated patients.

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 µg/L). Refer to *Accuracy / 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 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.[23]

Performance Characteristics

Analytical Measuring Range

The ADVIA Centaur PSA assay measures prostate-specific antigen concentrations from 0.01–100 ng/mL (µg/L).

Specificity

There are no known cross-reactants for PSA.

Sensitivity

The ADVIA Centaur PSA assay measures total PSA concentrations up to 100 ng/mL (100 µg/L) with a minimum detectable concentration (analytical sensitivity) of 0.01 ng/mL (0.01 µg/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.

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

Based on internal testing, the overall reproducibility is estimated to be ≤ 10% CV or ≤ 0.03 ng/mL SD for samples tested and includes multiple reagent lots, instruments, days, and replicates. Performance of the assay at individual laboratories may vary.

Accuracy / Method Comparison

For 661 samples in the range of 0.07 to 93.3 ng/mL (0.07 to 93.3 µg/L), the relationship between the ADVIA Centaur PSA assay and the ACS:180 PSA assay is described by the following equation:

ADVIA Centaur PSA = 0.99 (ACS:180 PSA) - 0.09 ng/mL

Correlation coefficient (r) = 0.99

Interferences

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

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 ADVIA Centaur 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 CLSI Document EP7-A2.[24]

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

Sample	Dilution	Observed (ng/mL)	Expected (ng/mL)	Observed (µg/L)	Expected (µg/L)	Recovery %
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 5 serum samples with endogenous PSA levels ranging from 0.81 to 3.05 ng/mL (0.81 to 3.05 µg/L). The amount of PSA that was added varied from 24.8 to 63.4 ng/mL (24.8 to 63.4 µg/L). When compared to the expected value, the measured (recovered) values of total PSA averaged 98.8% 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	—	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
4	—	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
5	—	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					**98.8**

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 2,500 ng/mL (2,500 µg/L) will assay greater than 100 ng/mL (100 µg/L).

Standardization

The ADVIA Centaur PSA assay is traceable to an internal standard manufactured using highly purified material. Value (concentration) assignment was based on adjustment to a reference method comparison protocol.[25] The assay standardization is traceable to World Health Organization (WHO) International Standard (96/670). A comparison over the range of the assay gave the following correlation:

ADVIA Centaur PSA = 1.03 (WHO) - 1.2 ng/mL, r = 0.99

Assigned values for calibrators are traceable to this standardization.

Troubleshooting

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.

  Note For information about reagent water, refer to the system operating instructions.
- 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 your local technical support provider or distributor for technical assistance.

Technical Assistance

According to EU regulation 2017/746, any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the EU Member State in which the user and/or patient is established.

For customer support, please contact your local technical support provider or distributor.

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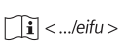
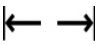
Trademarks

ADVIA Centaur, ReadyPack, and ACS:180 are trademarks of Siemens Healthineers.

Definition of Symbols

The following symbols may appear on the product labeling:

Symbol	Symbol Title	Source	Symbol	Symbol Title	Source
	Manufacturer	5.1.1[a]		Authorized representative in the European Community	5.1.2[a]
	Use-by date	5.1.4[a]		Authorized representative in Switzerland	Proprietary
	Catalog number	5.1.6[a]		Batch code	5.1.5[a]
	Consult Instructions for Use	5.4.3[a]		Contains sufficient for <n> tests	5.5.5[a]
	Internet URL address to access the electronic instructions for use	Proprietary		Version of Instructions for Use	Proprietary
	*In vitro* diagnostic medical device	5.5.1[a]		Revision	Proprietary
	Prescription device (US only)	FDA[c]		Unique Device Identifier	5.7.10[b]
	CE Marking with Notified Body	EU IVDR[d]		CE Marking	EU IVDR[d]
	Temperature limit	5.3.7[a]		Keep away from sunlight	5.3.2[a]
	Upper limit of temperature	5.3.6[a]		Lower limit of temperature	5.3.5[a]
	Do not re-use	5.4.2[a]		Do not freeze	Proprietary
	Recycle	1135[e]		This way up	0623[e]
	Biological risks	5.4.1[a]		Caution	5.4.4[a]

Symbol	Symbol Title	Source	Symbol	Symbol Title	Source
UNITS C	Common Units	Proprietary		Document face up[f]	1952[e]
YYYY-MM-DD	Date format (year-month-day)	N/A	UNITS SI	International System of Units	Proprietary
	Target	Proprietary	YYYY-MM	Date format (year-month)	N/A
				Interval	Proprietary
	Handheld barcode scanner	Proprietary	CHECKSUM	Variable hexadecimal number that ensures the Master Curve and Calibrator definition values entered are valid.	Proprietary
LOT DTL	Lot details	Proprietary	MC DEF	Master Curve definition	Proprietary
CAL LOT VAL	Calibrator lot value	Proprietary	CONTROL LOT VAL	Quality control lot value	Proprietary

a International Standard Organization (ISO). ISO 15223-1 Medical Devices- Symbols to be used with medical device labels, labelling and information to be supplied.

b ISO 15223-1:2020-04

c Federal Register. Vol. 81, No 115. Wednesday, June 15, 2016. Rules and Regulations: 38911.

d IVDR REGULATION (EU) 2017/746

e International Standard Organization (ISO). ISO 7000 Graphical symbols for use on equipment.

f Indicates Assay-eNote

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