SIEMENS Healthineers

Prolactin (PRL)

Current Revision and Date[a]	Rev. 05, 2023-03	
Product Name	Atellica IM Prolactin (PRL)	REF 10995656 (50 tests) REF 10995655 (250 tests)
Abbreviated Product Name	Atellica IM PRL	
Test Name/ID	PRL	
Systems	Atellica IM Analyzer	
Materials Required but Not Provided	Atellica IM CAL B	REF 10995503 (2-pack) REF 10995504 (6-pack)
Optional Materials	Atellica IM Multi-Diluent 1	REF 10995637 (2-pack) REF 10995638 (6-pack) REF 10995639 (vial)
	Atellica IM PRL MCM	REF 10995657
Specimen Types	Serum, EDTA plasma, lithium heparin plasma	
Sample Volume	25 µL	
Measuring Interval	0.30–200.00 ng/mL (6.36–4240.00 µIU/mL)	

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

CE 0197

Intended Use

The Atellica® IM Prolactin (PRL) assay is for *in vitro* diagnostic use in the quantitative determination of prolactin in human serum and plasma (EDTA and lithium heparin) using the Atellica® IM Analyzer.

Summary and Explanation

Prolactin is a single-chain polypeptide hormone secreted by the anterior pituitary[1] under the control of prolactin-inhibiting factors and prolactin-releasing factors. These inhibiting and releasing factors are secreted by the hypothalamus.[2] Prolactin is also synthesized by the placenta and is present in amniotic fluid.

Prolactin initiates and maintains lactation in females.[3] It also plays a role in regulating gonadal function in both males and females. In adults, basal circulating prolactin is present in concentrations up to 30 ng/mL (636 µIU/mL). During pregnancy and postpartum lactation, serum prolactin can increase 10- to 20-fold. Exercise, stress, and sleep also cause transient increases in prolactin levels.

Measurements of prolactin are used in the diagnosis and treatment of disorders of the anterior pituitary gland or the hypothalamus. Consistently elevated serum prolactin levels > 30 ng/mL (> 636 µIU/mL) in the absence of pregnancy and postpartum lactation are indicative of hyperprolactinemia, which is the most common hypothalamic-pituitary dysfunction encountered in clinical endocrinology. Hyperprolactinemia often results in galactorrhea, amenorrhea, and infertility in females, and in impotence and hypogonadism in males.[4] Renal failure, hypothyroidism, and prolactin-secreting pituitary adenomas are also common causes of abnormally elevated prolactin levels.[1,5,6]

Principles of the Procedure

The Atellica IM Prolactin assay is a 2-site sandwich immunoassay using direct chemiluminescent technology, which uses constant amounts of 2 antibodies. The first antibody, in the Lite Reagent, is a goat polyclonal anti-prolactin antibody labeled with acridinium ester. The second antibody, in the Solid Phase, is a mouse monoclonal anti-prolactin antibody, which is covalently coupled to paramagnetic particles.

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

Reagents

Material Description	Storage	Stability[a]
Atellica IM PRL ReadyPack® primary reagent pack **Lite Reagent** 5.0 mL/reagent pack Goat polyclonal anti-prolactin antibody (~0.16 µg/mL) labeled with acridinium ester in buffer; sodium azide (0.11%); preservatives **Solid Phase** 22.5 mL/reagent pack Mouse monoclonal anti-prolactin antibody (~3.67 µg/mL) covalently coupled to paramagnetic particles in buffer; protein stabilizers; sodium azide (0.11%); preservatives	Unopened at 2–8°C Onboard	Until expiration date on product 28 days
Atellica IM Multi-Diluent 1 ReadyPack ancillary reagent pack[b] 25.0 mL/pack Equine serum; sodium azide (0.1%); preservatives	Unopened at 2–8°C Onboard	Until expiration date on product 28 days
Atellica IM Multi-Diluent 1[b] 50.0 mL/vial Equine serum; sodium azide (0.1%); preservatives	At 2–8°C	Until expiration date on product

[a] Refer to *Storage and Stability*.

[b] Refer to *Optional Materials*.

Warnings and Precautions

For *in vitro* diagnostic use.

For Professional Use.

CAUTION

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

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

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.

Note For information about reagent preparation, refer to *Preparing the Reagents* in the *Procedure* section.

Storage and Stability

Store reagents in an upright position. Protect the product from heat and light sources. Unopened reagents are stable until the expiration date on the product when stored at 2–8°C.

Store Atellica IM Multi-Diluent 1 in an upright position. Atellica IM Multi-Diluent 1 is stable until the expiration date on the product when stored at 2–8°C.

Do not use products beyond the expiration date printed on the product labeling.

Onboard Stability

Reagents are stable onboard the system for 28 days. Discard reagents at the end of the onboard stability interval.

Atellica IM Multi-Diluent 1 is stable onboard the system for 28 days.

Do not use products beyond the expiration date printed on the product labeling.

Specimen Collection and Handling

Serum and plasma (EDTA and lithium heparin) are the recommended sample types for this assay.

Collecting the Specimen

- Observe universal precautions when collecting specimens. Handle all specimens as if they are capable of transmitting disease.[7]
- Follow recommended procedures for collection of diagnostic blood specimens by venipuncture.[8]
- Follow the instructions provided with your specimen collection device for use and processing.[9]

- Allow blood specimens to clot completely before centrifugation.[10]
- Keep tubes capped at all times.[10]

Storing the Specimen

- 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 ≤ -20°C if the sample is not assayed within 48 hours.
- Freeze samples only 1 time and mix thoroughly after thawing.

The handling and storage information provided here is based on data or references maintained by the manufacturer. 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.

Transporting the Specimen

Package and label specimens for shipment in compliance with applicable federal and international regulations covering the transport of clinical specimens and etiological agents.

Preparing the Samples

This assay requires 25 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 information about determining the minimum required volume, refer to the online help.

The sample volume required to perform onboard dilution differs from the sample volume required to perform a single determination. Refer to *Dilutions*.

Note Do not use specimens with apparent contamination.

Before placing samples on the system, ensure that samples are free of:

- Bubbles or foam.
- Fibrin or other particulate matter.

Note Remove particulates by centrifugation according to CLSI guidance and the collection device manufacturer's recommendations.[10]

Note For a complete list of appropriate sample containers, refer to the online help.

Procedure

Materials Provided

The following materials are provided:

REF	Contents	Number of Tests
10995656	1 ReadyPack primary reagent pack containing Atellica IM PRL Lite Reagent and Solid Phase Atellica IM PRL master curve and test definition MC TDEF	50
10995655	5 ReadyPack primary reagent packs containing Atellica IM PRL Lite Reagent and Solid Phase Atellica IM PRL master curve and test definition MC TDEF	250

Materials Required but Not Provided

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

REF	Description	
	Atellica IM Analyzer[a]	
10995503	Atellica IM CAL B (calibrator)	2 x 5.0 mL low calibrator CAL L 2 x 5.0 mL high calibrator CAL H Calibrator lot-specific value sheet CAL LOT VAL
10995504	Atellica IM CAL B (calibrator)	6 x 5.0 mL low calibrator CAL L 6 x 5.0 mL high calibrator CAL H Calibrator lot-specific value sheet CAL LOT VAL

[a] Additional system fluids are required to operate the system: Atellica IM Wash, Atellica IM Acid, Atellica IM Base, and Atellica IM Cleaner. For system fluid instructions for use, refer to the Document Library.

Optional Materials

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

REF	Description	
10995637	Atellica IM Multi-Diluent 1 (diluent)	2 ReadyPack ancillary reagent packs containing 25.0 mL/pack DIL
10995638	Atellica IM Multi-Diluent 1 (diluent)	6 ReadyPack ancillary reagent packs containing 25.0 mL/pack DIL
10995639	Atellica IM Multi-Diluent 1 (diluent)	50 mL/vial
10995657	Atellica IM PRL MCM (master curve material)	10 x 1.0 mL levels of master curve material MCM

Assay Procedure

The system automatically performs the following steps:

1. Dispenses 25 µL of sample into a cuvette.
2. Dispenses 100 µL of Lite Reagent, then incubates for 6 minutes at 37°C.
3. Dispenses 450 µL of Solid Phase, then incubates for 6 minutes at 37°C.
4. Separates, aspirates, then washes the cuvette with Atellica IM Wash.
5. Dispenses 300 µL each of Atellica IM Acid and Atellica IM Base to initiate the chemiluminescent reaction.
6. Reports results.

Preparing the Reagents

All reagents are liquid and ready to use. Before loading primary reagent packs onto the system, mix them by hand and visually inspect the bottom of the reagent pack to ensure that all particles are resuspended. For information about preparing the reagents for use, refer to the online help.

Preparing the System

Ensure that the system has sufficient reagent packs loaded in the reagent compartment. The system automatically mixes reagent packs to maintain homogeneous suspension of the reagents. For information about loading reagent packs, refer to the online help.

For automated dilutions, ensure that Atellica IM Multi-Diluent 1 is loaded in the reagent compartment.

Master Curve Definition

Before initiating calibration on each new lot of reagent, load the assay master curve and test definition values by scanning the MC TDEF 2D barcodes. For loading instructions, refer to the online help.

Performing Calibration

For calibration of the Atellica IM PRL assay, use Atellica IM CAL B. Use the calibrators in accordance with the calibrator instructions for use.

Calibration Frequency

Perform a calibration if one or more of the following conditions exist:

- When changing lot numbers of primary reagent packs.
- At the end of the lot calibration interval, for a specified lot of calibrated reagent on the system.
- At the end of the pack calibration interval, for calibrated reagent packs on the system.
- When indicated by quality control results.
- After major maintenance or service, if indicated by quality control results.

At the end of the onboard stability interval, replace the reagent pack on the system with a new reagent pack. Recalibration is not required, unless the lot calibration interval is exceeded.

Stability Interval	Days
Lot Calibration	34
Pack Calibration	28
Reagent Onboard Stability	28

For information about lot calibration and pack calibration intervals, refer to the online help.

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

Performing Quality Control

For quality control of the Atellica IM PRL assay, use an appropriate quality control material of known analyte concentration with at least 2 levels at least once during each day that samples are analyzed. For assistance in identifying a quality control material, refer to *Atellica® IM 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 assigned values, do not report results. Perform corrective actions in accordance with established laboratory protocol. For suggested protocol, refer to the online help.

Results

Calculation of Results

The system determines the result using the calculation scheme described in the online help. The system reports results in ng/mL (common units) or µIU/mL (SI units), depending on the units defined when setting up the assay.

Conversion formula: 1.00 ng/mL = 21.20 µIU/mL

For information about results outside the specified measuring interval, refer to *Measuring Interval*.

Dilutions

The measuring interval for Atellica IM PRL is 0.30–200.00 ng/mL (6.36–4240.00 µIU/mL). For information about dilution options, refer to the online help.

Dilute and retest samples with prolactin levels > 200.00 ng/mL (4240.00 µIU/mL) to obtain accurate results.

For automated dilutions, ensure that Atellica IM Multi-Diluent 1 is loaded in the reagent compartment. Ensure that sufficient sample volume is available to perform the dilution and that the appropriate dilution factor is selected when scheduling the test, as indicated in the table below.

For automatic dilutions, enter a dilution setpoint ≤ 200 ng/mL (4240 µIU/mL).

Sample	Dilution	Sample Volume (µL)
Serum and plasma	1:2	100
Serum and plasma	1:5	40

If patient results exceed the measuring interval of the assay when using automated dilution, or if laboratory protocol requires manual dilution, manually dilute the patient sample.

For manual dilutions, perform the following actions:

- Use Atellica IM Multi-Diluent 1 (vial) to prepare a manual dilution.
- For information about ordering tests for manually diluted samples, refer to the online help.
- Ensure that results are mathematically corrected for dilution. If a dilution factor is entered when scheduling the test, the system automatically calculates the result.

Interpretation of Results

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

Limitations

The following information pertains to limitations of the assay:

- Pregnancy, lactation, and the administration of oral contraceptives can increase prolactin concentrations.[1]
- Patient samples may contain heterophilic antibodies that could react in immunoassays to give falsely elevated or depressed results. This assay is designed to minimize interference from heterophilic antibodies.[11,12] Additional information may be required for diagnosis.

Expected Values

The reagent formulations used on the Atellica IM Analyzer are the same as those used on the ADVIA Centaur® and ACS:180™ systems. Expected values were established using the ADVIA Centaur and ACS:180 systems and confirmed by assay comparison. Refer to *Assay Comparison*.

The expected results for the Prolactin assay were established in accordance with CLSI Document C28-A2[13] using the ACS:180 system. Data were obtained on serum samples from 661 apparently healthy individuals. Based on a central 95% interval, the following reference intervals were established:

Category	N[a]	Mean (ng/mL)	Interval (ng/mL)	Mean (µIU/mL)	Interval (µIU/mL)
Females					
Nonpregnant	202	9.6	2.8–29.2	204	59–619
Pregnant	216	61.7	9.7–208.5	1308	206–4420
Postmenopausal	104	6.9	1.8–20.3	146	38–430
Males	139	7.0	2.1–17.7	148	45–375

[a] Number of samples tested.

Reference intervals for the pediatric population (children and adolescents) were established in accordance with the CLSI guideline EP28-A3c[14] using the ADVIA Centaur system. Samples were collected prospectively from apparently healthy pediatric subjects, using predefined inclusion criteria. Reference values were generated for subpopulations based on age and Tanner stage subgroups based on physiological development. The study was designed to establish reference values across genders, and to include approximately equal numbers of males and females within each age or Tanner stage subgroup. The subject's Tanner stage was assessed based on pubic hair and genitalia/breast development.

The reference intervals and Tanner values are based on the central 90% (5th and 95th percentiles). Where sample sizes were insufficient to calculate the 5th or 95th percentile, the minimum or maximum observed values are presented, as denoted in the tables below.

Prolactin Pediatric Reference Intervals by Age

Age (Years)	N[a]	Median (ng/mL)	Interval (ng/mL)	Median (µIU/mL)	Interval (µIU/mL)
Male					
2–3	12	8.6	3.6[b]–28.6[c]	183.4	76.3[b]–606.3[c]
4–9	57	7.3	4.5–18.0	154.8	95.4–382.2
10–16	203	6.3	3.2–13.5	133.6	67.8–284.9
17–21	37	7.9	5.4–15.4	167.5	115.1–326.7
Female					
2–3	18	7.4	3.1[b]–15.7[c]	156.9	65.7[b]–332.8[c]
4–9	47	7.1	3.1–15.8	150.5	66.6–334.1
10–12	93	7.2	3.5–18.2	152.6	75.0–386.7
13–21	127	9.2	4.3–23.1	195.0	89.9–489.7

[a] Number of samples tested.
[b] Value presented is the minimum reportable value observed; insufficient sample size to calculate a 5th percentile limit.
[c] Value presented is the maximum value observed; insufficient sample size to calculate a 95th percentile limit.

Prolactin Pediatric Reference Values Characterized by Tanner Stage

Tanner Stage	N[a]	Median (ng/mL)	Interval (ng/mL)	Median (µIU/mL)	Interval (µIU/mL)
Male					
1	74	7.2	3.7–18.5	153.7	78.4–391.1
2	65	5.9	2.4–13.7	125.1	49.4–289.4
3	63	5.7	3.5–11.9	120.8	74.2–252.7
4	59	7.4	3.2–15.5	156.9	67.8–328.6
5	48	7.7	4.9–14.5	162.2	105.6–306.9
Female					
1	74	7.2	3.1–18.7	152.6	65.7–395.9
2	47	6.9	3.7–21.8	146.3	78.9–461.7
3	65	8.5	4.0–18.2	180.2	84.0–386.5
4	47	9.2	4.0–20.8	195.0	84.8–439.3
5	52	8.8	4.3–24.9	185.5	90.4–526.4

[a] Number of samples tested.

As with all *in vitro* diagnostic assays, each laboratory should determine its own reference interval for the diagnostic evaluation of patient results.[14] Consider these values as guidance only.

Performance Characteristics

The reagent formulations used on the Atellica IM Analyzer are the same as those used on the ADVIA Centaur and ACS:180 systems. Some performance characteristics for the Atellica IM assay were established using the ADVIA Centaur or ACS:180 systems.

Measuring Interval

The Atellica IM PRL assay provides results from 0.30–200.00 ng/mL (6.36–4240.00 µIU/mL). The lower end of the measuring interval is defined by the design requirement for the analytical sensitivity. Report results below the measuring interval as < 0.30 ng/mL (6.36 µIU/mL). When sample results exceed the measuring interval, refer to *Dilutions*.

Specificity

Cross-reactivity was determined in accordance with CLSI Document EP7-A2[15] using the ADVIA Centaur system. Potential cross-reactants were added to serum samples containing prolactin. The following results were obtained.

	Prolactin Value		Prolactin Value	
	Without Cross-Reactant	With Cross-Reactant	Without Cross-Reactant	With Cross-Reactant
Cross-Reactant	(ng/mL)	(ng/mL)	(µIU/mL)	(µIU/mL)
TSH; 1000 µIU/mL	8.16	8.55	173	181
	42.82	43.40	908	920
	109.68	107.30	2325	2275
LH; 250 mIU/mL	8.16	8.84	173	187
	42.82	43.13	908	914
	109.68	104.88	2325	2223
hCG; 200,000 mIU/mL	8.16	8.30	173	176
	42.82	40.28	908	854
	109.68	109.60	2325	2324
FSH; 250 mIU/mL	8.16	8.40	173	178
	42.82	42.66	908	904
	110.08	105.05	2325	2227
hGH; 500 ng/mL	4.51	4.56	96	97
	42.82	42.22	908	895
	109.68	108.22	2325	2294
hPL; 12.5 µg/mL	2.50	2.51	53	53

Cross-Reactant	Prolactin Value Without Cross-Reactant (ng/mL)	Prolactin Value With Cross-Reactant (ng/mL)	Prolactin Value Without Cross-Reactant (µIU/mL)	Prolactin Value With Cross-Reactant (µIU/mL)
	35.13	36.40	745	772
	88.67	88.18	1880	1869

Assay results obtained at individual laboratories may vary from the data presented.

Detection Capability

Detection capability was determined in accordance with CLSI Document EP17-A2.[16] The assay is designed to have an analytical sensitivity of ≤ 0.30 ng/mL (6.36 µIU/mL), a limit of blank (LoB) ≤ 0.30 ng/mL (6.36 µIU/mL), and a limit of detection (LoD) ≤ 0.60 ng/mL (12.72 µIU/mL).

Representative detection capability data are shown below. Assay results obtained at individual laboratories may vary from the data presented.

Analytical sensitivity is defined as the concentration of prolactin that corresponds to the RLUs that are 2 standard deviations more than the mean RLUs of 20 replicate determinations of the prolactin zero standard. This response is an estimate of the minimum detectable concentration with 95% confidence. The analytical sensitivity for the Atellica IM PRL assay is 0.20 ng/mL (4.24 µIU/mL).

The LoB corresponds to the highest measurement result that is likely to be observed for a blank sample. The LoB of the Atellica IM PRL assay is 0.06 ng/mL (1.27 µIU/mL).

The LoD corresponds to the lowest concentration of prolactin that can be detected with a probability of 95%. The LoD for the Atellica IM PRL assay is 0.35 ng/mL (7.42 µIU/mL), and was determined using 384 determinations, with 320 blank and 64 low-level replicates, and an LoB of 0.06 ng/mL (1.27 µIU/mL).

Precision

Precision was determined in accordance with CLSI Document EP05-A3.[17] Samples were assayed on an Atellica IM Analyzer in duplicate in 2 runs per day for 20 days. The assay was designed to have within-laboratory precision of ≤ 0.21 ng/mL (4.45 µIU/mL) SD for samples < 3.00 ng/mL (63.60 µIU/mL), ≤ 7% CV for samples from 3.00–99.00 ng/mL (63.60–2098.80 µIU/mL), and ≤ 12% CV for samples from 100.00–200.00 ng/mL (2120.00–4240.00 µIU/mL). The following results were obtained:

Sample Type	N[a]	Mean (ng/mL)	Mean (µIU/mL)	Repeatability SD[b] (ng/mL)	Repeatability SD[b] (µIU/mL)	Repeatability CV[c] (%)	Within-Laboratory Precision SD (ng/mL)	Within-Laboratory Precision SD (µIU/mL)	Within-Laboratory Precision CV (%)
Serum A	80	2.30	48.76	0.04	0.85	N/A[d]	0.09	1.91	N/A[d]
Serum B	80	182.25	3863.70	5.72	121.26	3.1	8.91	188.89	4.9
Control 1	80	5.72	121.26	0.10	2.12	1.7	0.20	4.24	3.5

		Mean		Repeatability			Within-Laboratory Precision		
				SD[b]		CV[c]	SD		CV
Sample Type	N[a]	(ng/mL)	(µIU/mL)	(ng/mL)	(µIU/mL)	(%)	(ng/mL)	(µIU/mL)	(%)
Control 2	80	16.69	353.83	0.24	5.09	1.4	0.56	11.87	3.3
Control 3	80	37.23	789.28	0.55	11.66	1.5	0.87	18.44	2.3

[a] Number of samples tested.
[b] Standard deviation.
[c] Coefficient of variation.
[d] Not applicable.

Based on internal testing on the Atellica IM Analyzer, the overall reproducibility is estimated to be ≤ 7% CV for samples tested (≤ 99 ng/mL) and includes multiple reagent lots, instruments, days, and replicates. Performance of the assay at individual laboratories may vary.

Assay Comparison

The Atellica IM PRL assay is designed to have a correlation coefficient of ≥ 0.95 and a slope of 1.0 ± 0.1 compared to the ADVIA Centaur PRL assay. Assay comparison was determined using the weighted least squares linear regression model in accordance with CLSI Document EP09-A3.[18] The following results were obtained:

The relationship between the Atellica IM and ADVIA Centaur PRL assays is described by this equation:

Specimen	Comparative Assay (x)	Regression Equation	Sample Interval	N[a]	r[b]
Serum	ADVIA Centaur PRL	y = 0.94x + 0.26 ng/mL (y = 0.94x + 5.51 µIU/mL)	0.99–198.43 ng/mL (20.99–4206.72 µIU/mL)	113	1.00

[a] Number of samples tested.
[b] Correlation coefficient.

The relationship between the ADVIA Centaur and ACS:180 Prolactin assays is described by this equation:

Specimen	Comparative Assay (x)	Regression Equation	Sample Interval	N[a]	r[b]
Serum	ACS:180 PRL	y = 1.00x + 0.56 ng/mL (y = 1.00x + 11.87 µIU/mL)	1.4–185.1 ng/mL (29.3–3925.0 µIU/mL)	279	0.99

[a] Number of samples tested.
[b] Correlation coefficient.

Agreement of the assays may vary depending on the study design, comparative assay, and sample population used. Assay results obtained at individual laboratories may vary from the data presented.

Specimen Equivalency

Specimen equivalency was determined with the Deming linear regression model in accordance with CLSI Document EP09-A3.[18] The following results were obtained:

Tube (y) vs. Serum (x)	N[a]	Sample Interval	Slope	Intercept	r[b]
EDTA plasma	66	2.71–180.00 ng/mL (57.45–3816.00 µIU/mL)	1.01	-0.18 ng/mL (-3.82 µIU/mL)	0.99
Lithium heparin plasma	64	2.71–196.91 ng/mL (57.45–4174.49 µIU/mL)	1.02	0.10 ng/mL (2.12 µIU/mL)	0.99

[a] Number of samples tested.

[b] Correlation coefficient.

The assay is designed to have a slope of 0.90–1.10 for alternate tube types versus serum.

Agreement of the specimen types may vary depending on the study design and sample population used. Assay results obtained at individual laboratories may vary from the data presented.

Interferences

Interference testing was performed using the ADVIA Centaur XP system in accordance with CLSI Document EP07-ed3.[19] The following results were obtained:

Substance	Substance Test Concentration	Analyte Concentration ng/mL (µIU/mL)	Bias (%)
EDTA	5.4 mg/mL	10.59 (224.51)	3
		134.40 (2849.28)	-4
Heparin	45 U/mL	12.58 (266.70)	-1
		128.68 (2728.02)	1

Assay results obtained at individual laboratories may vary from the data presented.

Hemolysis, Icterus, and Lipemia (HIL)

Interference testing was performed in accordance with CLSI Document EP7-A2.[15] The following results were obtained:

Serum specimens that are . . .	Have an insignificant effect on the assay up to . . .
hemolyzed	500 mg/dL of hemoglobin
icteric	20 mg/dL of bilirubin
lipemic	1000 mg/dL of triglycerides

Results were established using the ADVIA Centaur system.

Dilution Recovery

Six human serum samples in the range of 158.9–178.5 ng/mL (3368.0–3784.4 µIU/mL) of prolactin were diluted 1:2, 1:4, 1:8, and 1:16 with Multi-Diluent 1 and assayed for recovery and parallelism. The recoveries ranged from 89%–108% with a mean of 98%.

Sample	Dilution	Observed (ng/mL)	Expected (ng/mL)	Observed (µIU/mL)	Expected (µIU/mL)	Recovery (%)
1	—	178.5	—	3784.4	—	—
	1:2	87.9	89.3	1863.5	1892.1	98
	1:4	43.0	44.6	911.6	946.2	96
	1:8	20.7	22.3	439.3	473.0	93
	1:16	10.1	11.2	213.5	236.6	90
	Mean					95
2	—	173.5	—	3678.0	—	—
	1:2	83.7	86.7	1773.8	1838.9	97
	1:4	41.1	43.4	870.9	919.4	95
	1:8	19.3	21.7	409.8	459.8	89
	1:16	9.4	10.8	198.9	229.8	90
	Mean					93
3	—	158.9	—	3368.0	—	—
	1:2	81.7	79.4	1731.0	1683.9	103
	1:4	37.4	39.7	792.9	842.1	94
	1:8	19.7	19.9	416.8	421.0	99
	1:16	9.1	9.9	193.8	210.5	92
	Mean					97
4	—	159.9	—	3390.7	—	—
	1:2	78.7	80.0	1667.4	1695.4	98
	1:4	39.7	40.0	842.5	847.8	99
	1:8	18.3	20.0	387.8	423.8	92
	1:16	9.2	10.0	195.7	212.0	92
	Mean					95
5	—	162.9	—	3453.7	—	—
	1:2	86.0	81.5	1823.2	1727.0	106
	1:4	41.5	40.7	880.7	863.5	102
	1:8	22.0	20.4	465.3	431.6	108
	1:16	11.0	10.2	233.0	215.8	108
	Mean					106
6	—	178.0	—	3772.8	—	—
	1:2	93.6	89.0	1984.5	1886.4	105
	1:4	46.9	44.5	993.6	943.2	105

Sample	Dilution	Observed (ng/mL)	Expected (ng/mL)	Observed (µIU/mL)	Expected (µIU/mL)	Recovery (%)
	1:8	23.3	22.2	493.8	471.5	105
	1:16	10.5	11.1	221.5	235.7	95
	Mean					102
Mean						**98**

Results were established using the ADVIA Centaur system. Assay results obtained at individual laboratories may vary from the data presented.

Spiking Recovery

Varying amounts of prolactin were added to 6 samples with endogenous prolactin levels of 4.1–15.2 ng/mL (86.9–322.2 µIU/mL). The recoveries ranged from 94%–109% with a mean of 102%.

Sample	Amount Added (ng/mL)	Observed (ng/mL)	Amount Added (µIU/mL)	Observed (µIU/mL)	Recovery (%)
1	—	4.1	—	86.9	—
	51.7	58.9	1096.0	1248.7	106
	104.1	112.3	2206.9	2380.8	104
	154.0	163.1	3264.8	3457.7	103
	Mean				104
2	—	6.5	—	137.8	—
	51.7	63.0	1096.0	1335.6	109
	104.1	113.0	2206.9	2395.6	102
	154.0	161.2	3264.8	3417.4	101
	Mean				104
3	—	5.0	—	104.9	—
	51.7	60.9	1096.0	1291.1	108
	104.1	114.4	2206.9	2425.3	105
	154.0	160.2	3264.8	3396.2	101
	Mean				105
4	—	14.9	—	315.9	—
	38.6	56.2	818.3	1191.4	107
	77.7	90.1	1647.2	1910.1	97
	115.2	132.5	2442.2	2809.0	102
	Mean				102
5	—	15.2	—	322.2	—
	38.6	55.6	818.3	1178.7	105

Sample	Amount Added (ng/mL)	Observed (ng/mL)	Amount Added (µIU/mL)	Observed (µIU/mL)	Recovery (%)
	77.7	87.9	1647.2	1863.5	94
	115.2	124.8	2442.2	2645.8	95
	Mean				98
6	—	10.2	—	216.2	—
	38.6	51.1	818.3	1083.3	106
	77.7	83.6	1647.2	1772.3	95
	115.2	130.9	2442.2	2775.1	105
	Mean				102
Mean					**102**

Results were established using the ADVIA Centaur system. Assay results obtained at individual laboratories may vary from the data presented.

High-Dose Hook Effect

High prolactin concentrations can cause a paradoxical decrease in the RLUs (high-dose hook effect). In this assay, patient samples with prolactin concentrations as high as 30,000 ng/mL (636,000 µIU/mL) will report > 200 ng/mL (> 4240 µIU/mL). Results were established using the Atellica IM Analyzer.

Standardization

The Atellica IM PRL assay standardization is traceable to the World Health Organization (WHO) 3rd IRP for human Prolactin (84/500). Assigned values for calibrators are traceable to this standardization.

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, contact your local technical support provider or distributor.

siemens-healthineers.com

References

1. Ashby CD. Prolactin. In: Kaplan LA, Pesce AJ, eds. *Methods in Clinical Chemistry*. St. Louis: CV Mosby; 1987:258–265.
2. Vander AJ, Sherman JH, Luciano DS. *Human Physiology: The Mechanisms of Body Function.* New York: McGraw-Hill Inc.; 1985:475.
3. Liwnicz BH, Liwnicz RG. The hypothalamopituitary system. In: Kaplan LA, Pesce AJ, eds. *Clinical Chemistry: Theory, Analysis, Correlation*. 2nd ed. St. Louis, MO: CV Mosby; 1989:613–619.
4. Butt WR, Blunt SM. The role of the laboratory in the investigation of infertility. *Ann Clin Biochem*. 1988;25(pt 6):601–609.
5. Albertsen PC, Chang TSK. Hormone measurements in the assessment of male infertility. *J Clin Immunoassay*. 1983;6(1):51–56.

6. Owens O. Steroidal hormonal evaluation for common gynecological and testicular disorders. In: Kaplan LA, Pesce AJ, eds. *Methods in Clinical Chemistry*. St. Louis: CV Mosby; 1987:216–217.
7. Clinical and Laboratory Standards Institute. *Protection of Laboratory Workers From Occupationally Acquired Infections; Approved Guideline—Fourth Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2014. CLSI Document M29-A4.
8. Clinical and Laboratory Standards Institute. *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard—Sixth Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2007. CLSI Document GP41-A6.
9. Clinical and Laboratory Standards Institute. *Tubes and Additives for Venous and Capillary Blood Specimen Collection; Approved Standard—Sixth Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2010. CLSI Document GP39-A6.
10. Clinical and Laboratory Standards Institute. *Procedures for the Handling and Processing of Blood Specimens for Common Laboratory Tests; Approved Guideline—Fourth Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2010. CLSI Document GP44-A4.
11. Kricka LJ. Human anti-animal antibody interferences in immunological assays. *Clin Chem*. 1999;45(7):942–956.
12. Vaidya HC, Beatty BG. Eliminating interference from heterophilic antibodies in a two-site immunoassay for creatine kinase MB by using F(ab')2 conjugate and polyclonal mouse IgG. *Clin Chem*. 1992;38(9):1737–1742.
13. Clinical and Laboratory Standards Institute. *How to Define and Determine Reference Intervals in the Clinical Laboratory; Approved Guideline—Second Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2000. CLSI Document C28-A2.
14. Clinical and Laboratory Standards Institute. *Defining, Establishing, and Verifying Reference Intervals in the Clinical Laboratory; Approved Guideline—Third Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2010. CLSI Document EP28-A3c.
15. Clinical and Laboratory Standards Institute. *Interference Testing in Clinical Chemistry; Approved Guideline—Second Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2005. CLSI Document EP7-A2.
16. Clinical and Laboratory Standards Institute. *Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline—Second Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2012. CLSI Document EP17-A2.
17. Clinical and Laboratory Standards Institute. *Evaluation of Precision of Quantitative Measurement Procedures; Approved Guideline—Third Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2014. CLSI Document EP05-A3.
18. Clinical and Laboratory Standards Institute. *Measurement Procedure Comparison and Bias Estimation Using Patient Samples; Approved Guideline—Third Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2013. CLSI Document EP09-A3.
19. Clinical and Laboratory Standards Institute. *Interference Testing in Clinical Chemistry; Approved Guideline—Third Edition*. Wayne, PA: Clinical and Laboratory Standards Institute; 2018. CLSI Document EP07-ed3.

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[b]		Unique Device Identifier	5.7.10[c]
	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]
	Common Units	Proprietary		International System of Units	Proprietary
YYYY-MM-DD	Date format (year-month-day)	N/A	**YYYY-MM**	Date format (year-month)	N/A
	Document face up[f]	1952[e]		Handheld barcode scanner	Proprietary
	Target	Proprietary		Mixing of substances	5657[g]

Symbol	Symbol Title	Source	Symbol	Symbol Title	Source
CHECKSUM	Variable hexadecimal number that ensures the Master Curve and Calibrator definition values entered are valid.	Proprietary	←→	Interval	Proprietary
MATERIAL ID	Unique material identification number	Proprietary	MATERIAL	Material	Proprietary
CONTROL TYPE	Type of control	Proprietary	CONTROL NAME	Name of control	Proprietary
CONTROL LOT VAL	Quality control lot value	Proprietary	CAL LOT VAL	Calibrator 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] Federal Register. Vol. 81, No 115. Wednesday, June 15, 2016. Rules and Regulations: 38911.
[c] ISO 15223-1:2020-04
[d] IVDR REGULATION (EU) 2017/746
[e] International Standard Organization (ISO). ISO 7000 Graphical symbols for use on equipment.
[f] Indicates Assay-eNote
[g] International Electrotechnical Commission (IEC). IEC 60417-1 Graphical symbols for use on equipment – Part 1: Overview and Application

Legal Information

Siemens Healthcare Diagnostics Inc.
511 Benedict Avenue
Tarrytown, NY 10591 USA

Siemens Healthineers Headquarters
Siemens Healthcare GmbH
Henkestraße 127
91052 Erlangen
Germany
Phone: +49 9131 84-0
siemens-healthineers.com