CRPLX

C-Reactive Protein (Latex)

Specific proteins

Order information

REF	CONTENT		Analyzer(s) on which **cobas c** pack(s) can be used
20764930 322	C-Reactive Protein (Latex) (300 tests)	System-ID 07 6493 0	COBAS INTEGRA 400 plus COBAS INTEGRA 800
11355279 216	Calibrator f.a.s. Proteins (5 × 1 mL)	System-ID 07 6557 0	
11355279 160	Calibrator f.a.s. Proteins (5 × 1 mL, for USA)	System-ID 07 6557 0	
10557897 122	Precinorm Protein (3 × 1 mL)	System-ID 07 9105 9	
10557897 160	Precinorm Protein (3 × 1 mL, for USA)	System-ID 07 9105 9	
11333127 122	Precipath Protein (3 × 1 mL)	System-ID 07 9106 7	
11333127 160	Precipath Protein (3 × 1 mL, for USA)	System-ID 07 9106 7	
05117003 190	PreciControl ClinChem Multi 1 (20 × 5 mL)	System-ID 07 7469 3	
05947626 160	PreciControl ClinChem Multi 1 (4 × 5 mL, for USA)	System-ID 07 7469 3	
05117216 190	PreciControl ClinChem Multi 2 (20 × 5 mL)	System-ID 07 7470 7	
05947774 160	PreciControl ClinChem Multi 2 (4 × 5 mL, for USA)	System-ID 07 7470 7	
20756350 322	NaCl Diluent 9 % (6 × 22 mL)	System-ID 07 5635 0	

English

System information

Test CRPL2
Test ID 0-293 on COBAS INTEGRA 400 plus analyzers
Test ID 0-393 on COBAS INTEGRA 800 analyzers

Intended use

In vitro test for the quantitative immunological determination of C-reactive protein in human serum and plasma on COBAS INTEGRA systems.

Summary[1,2]

Most tissue-damaging processes such as infections, inflammatory diseases and malignant neoplasms are associated with a major acute phase response of the C-reactive protein (CRP) and other acute phase reactants (e.g. AAT, AAGP, C3C, C4, HAPT). The CRP response frequently precedes clinical symptoms, including fever. In normal healthy individuals CRP is a trace protein with a range up to 5 mg/L. After onset of an acute phase response the serum CRP concentration rises rapidly and extensively. Alterations are detectable within 6 to 8 hours and the peak value is reached within 24 to 48 hours. Levels of up to thousandfold the normal value are associated with severe stimuli such as myocardial infarction, major trauma, surgery, or malignant neoplasms. CRP activates the classical complement pathway. CRP has a half-life of only a few hours, making it an ideal tool for clinical monitoring. Postoperative monitoring of CRP levels of patients indicates either the normal recovery process (decreasing levels to normal) or unexpected complications (persisting high levels). Measuring changes in the concentration of CRP provides useful diagnostic information about how acute and how serious a disease is. It also allows the assessment of complications during the disease and judgements about the disease genesis. Persistence of a high serum CRP concentration is usually a grave prognostic sign which generally indicates the presence of an uncontrolled infection. CRP determination may replace the classical determination of Erythrocytes Sedimentation Rate (ESR), due to its prompt response to changes in disease activity and its good correlation to ESR.

Test principle[3,4,5]

Particle enhanced turbidimetric assay

Human CRP agglutinates with latex particles coated with monoclonal anti-CRP antibodies. The precipitate is determined turbidimetrically at 552 nm.

Reagents - working solutions

R1 TRIS buffer with bovine serum albumin and immunoglobulins (mouse); preservative

SR Latex particles coated with anti-CRP (mouse) in glycine buffer; preservative

R1 is in position B and SR is in position C.

Precautions and warnings

Pay attention to all precautions and warnings listed in Section 1 / Introduction of this Method Manual.

For USA: For prescription use only.

Reagent handling

COBAS INTEGRA 400 plus systems

Mix all brand new (non-punctured) **cobas c** packs for 1 minute on a cassette mixer before loading on the analyzer.

COBAS INTEGRA 800 systems

Ready for use

After **cobas c** pack puncture, the analyzer automatically mixes the reagent for 1 minute.

Storage and stability

Shelf life at 2-8 °C	See expiration date on **cobas c** pack label
COBAS INTEGRA 400 plus system	
On-board in use at 10-15 °C	12 weeks
COBAS INTEGRA 800 system	
On-board in use at 8 °C	12 weeks

Specimen collection and preparation

For specimen collection and preparation only use suitable tubes or collection containers.

Only the specimens listed below were tested and found acceptable.
Serum
Plasma: Li-heparin, EDTA, fluoride or citrate plasma.

The sample types listed were tested with a selection of sample collection tubes that were commercially available at the time of testing, i.e. not all available tubes of all manufacturers were tested. Sample collection systems from various manufacturers may contain differing materials which could affect the test results in some cases. When processing samples in primary tubes (sample collection systems), follow the instructions of the tube manufacturer.

Centrifuge samples containing precipitates before performing the assay.

Stability:[6]	11 days at 15-25 °C
	2 months at 2-8 °C
	3 years at (-15)-(-25) °C

Materials provided

See “Reagents – working solutions” section for reagents.

Materials required (but not provided)

NaCl Diluent 9 %, Cat. No. 20756350 322, system-ID 07 5635 0 for automatic postdilution and standard serial dilutions. NaCl Diluent 9 % is placed in its predefined rack position and is stable for 4 weeks on-board COBAS INTEGRA 400 plus/800 analyzers.

CRPLX

C-Reactive Protein (Latex)

cobas®

Specific proteins

Assay

For optimum performance of the assay follow the directions given in this document for the analyzer concerned. Refer to the appropriate operator's manual for analyzer-specific assay instructions.

Application for serum and plasma

COBAS INTEGRA 400 plus test definition

Measuring mode	Absorbance
Abs. calculation mode	Kinetic
Reaction mode	R1-S-SR
Reaction direction	Increase
Wavelength A	552 nm
Calc. first/last	35/48
Typical prozone effect	> 3100 mg/L (> 29512 nmol/L or > 310 mg/dL)
Antigen excess check	No
Unit	mg/L

Pipetting parameters

		Diluent (H_2O)
R1	82 µL	48 µL
Sample	2.5 µL	30 µL
SR	28 µL	14 µL
Total volume	204.5 µL	

COBAS INTEGRA 800 test definition

Measuring mode	Absorbance
Abs. calculation mode	Kinetic
Reaction mode	R1-S-SR
Reaction direction	Increase
Wavelength A	552 nm
Calc. first/last	46/69
Typical prozone effect	> 3100 mg/L (> 29512 nmol/L or > 310 mg/dL)
Antigen excess check	No
Unit	mg/L

Pipetting parameters

		Diluent (H_2O)
R1	82 µL	48 µL
Sample	2.5 µL	30 µL
SR	28 µL	14 µL
Total volume	204.5 µL	

Calibration

Calibrator	Calibrator f.a.s. Proteins
Calibration dilution ratio	**COBAS INTEGRA 400 plus analyzers:** 1:0.5, 1:1, 1:1.5, 1:2.86, 1:10, and 0 mg/L performed automatically by the instrument. **COBAS INTEGRA 800 analyzers:** 1:0.5, 1:0.74, 1:1, 1:2.86, 1:10, and 0 mg/L performed automatically by the instrument.
Calibration mode	Linear interpolation
Calibration replicate	Duplicate recommended
Calibration interval	Each lot and as required following quality control procedures

Enter the assigned lot-specific CRP value for all 6 calibrator points indicated in the package insert for Calibrator f.a.s. Proteins.

Traceability: This method has been standardized with regard to the IFCC/BCR/CAP reference preparation CRM 470 (RPPHS 91/0619) for 14 serum proteins.[7]

Quality control

Reference range	Precinorm Protein or PreciControl ClinChem Multi 1
Pathological range	Precipath Protein or PreciControl ClinChem Multi 2
Control interval	24 hours recommended
Control sequence	User defined
Control after calibration	Recommended

For quality control, use control materials as listed in the "Order information" section. In addition, other suitable control material can be used.

The control intervals and limits should be adapted to each laboratory's individual requirements. Values obtained should fall within the defined limits. Each laboratory should establish corrective measures to be taken if values fall outside the defined limits.

Follow the applicable government regulations and local guidelines for quality control.

Calculation

COBAS INTEGRA analyzers automatically calculate the analyte concentration of each sample. For more details, please refer to Data Analysis in the Online Help (COBAS INTEGRA 400 plus/800 analyzers).

Conversion factors:	mg/L × 9.52 = nmol/L
	mg/L × 0.1 = mg/dL

Limitations - interference

Criterion: Recovery within ± 10 % of initial value.

Serum, plasma

Icterus:[8] No significant interference up to an I index of 60 for conjugated and unconjugated bilirubin (approximate conjugated and unconjugated bilirubin concentration: 1026 µmol/L or 60 mg/dL).

Hemolysis:[8] No significant interference up to an H index of 1000 (approximate hemoglobin concentration: 621 µmol/L or 1000 mg/dL).

Lipemia (Intralipid):[8]
COBAS INTEGRA 400 plus analyzers:
No significant interference up to an L index of 1500 in the lower concentration range (3 mg/L or 28.6 nmol/L). No significant interference up to an L index of 623 in the higher concentration range (80 mg/L or 762 nmol/L).
COBAS INTEGRA 800 system:
No significant interference up to an L index of 1094 in the lower concentration range (3 mg/L or 28.6 nmol/L). No significant interference up to an L index of 797 in the higher concentration range (80 mg/L or 762 nmol/L).
There is poor correlation between the L index (corresponds to turbidity) and triglycerides concentration. Turbid samples exceeding 0.1 Absorbance are recognized by the "High Activity" check. Correct results can be obtained after postdilution.

Rheumatoid factors: No significant interference.

HAMA: Although measures were taken to minimize interference caused by human anti-mouse antibodies, erroneous findings may be obtained from samples taken from patients who have been treated with monoclonal mouse antibodies or have received them for diagnostic purposes.

Drugs: No interference was found at therapeutic concentrations using common drug panels.[9,10]

Exception: Significantly decreased CRP values may be obtained from samples taken from patients who have been treated with carboxypenicillins.

In very rare cases, gammopathy, in particular type IgM (Waldenström's macroglobulinemia), may cause unreliable results.[11]

For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

ACTION REQUIRED

Special Wash Programming: The use of special wash steps is mandatory when certain test combinations are run together on COBAS INTEGRA analyzers. Refer to the CLEAN Method Sheet for further instructions and for the latest version of the Extra wash cycle list.

Where required, special wash/carry-over evasion programming must be implemented prior to reporting results with this test.

Limits and ranges

Measuring range

1.0-200 mg/L (9.52-1904 nmol/L or 0.1-20 mg/dL)

The upper and lower limits of the measuring range depend on the actual calibrator value.

Determine samples having higher concentrations via the rerun function. Dilution of samples via the rerun function is a 1:10 dilution. Results from samples diluted using the rerun function are automatically multiplied by a factor of 10.

Lower limits of measurement

Lower detection limit of the test

1.0 mg/L (9.52 nmol/L or 0.1 mg/dL)

The lower detection limit represents the lowest measurable analyte level that can be distinguished from zero. It is calculated as the value lying 3 standard deviations above that of a zero sample (zero sample + 3 SD, repeatability, n = 30).

Expected values

Adults[12]	< 5 mg/L	(< 47.6 nmol/L or < 0.5 mg/dL)

Each laboratory should investigate the transferability of the expected values to its own patient population and if necessary determine its own reference ranges.

Specific performance data

Representative performance data on the analyzers are given below. Results obtained in individual laboratories may differ.

Precision

Precision was determined using human samples and controls in an internal protocol with repeatability and intermediate precision (2 aliquots per run, 2 runs per day, 20 days). The following results were obtained:

	Level 1	Level 2
Mean	6.2 mg/L	142 mg/L
	(59.0 nmol/L or 0.62 mg/dL)	(1352 nmol/L or 14.2 mg/dL)
CV repeatability	1.8 %	1.5 %
CV intermediate precision	2.9 %	2.7 %

Method comparison

CRP values for human serum and plasma samples obtained on a COBAS INTEGRA 400 analyzer using the COBAS INTEGRA C-Reactive Protein (Latex) reagent (y) were compared with those determined using the same reagent on a COBAS INTEGRA 700 analyzer (x) and with a commercially available alternative automated system (x). Sample size (n) represents all replicates.

		COBAS INTEGRA 700 analyzer
Sample size	(n)	140
Corr. coefficient	(r)	0.999
Lin. regression		y = 0.981x + 0.50 mg/L
Passing/Bablok[13]		y = 0.986x + 0.11 mg/L
		Alternative system
Sample size	(n)	140
Corr. coefficient	(r)	0.998
Lin. regression		y = 1.014x - 0.55 mg/L
Passing/Bablok[13]		y = 1.011x - 0.12 mg/L

The sample concentrations were between 0.56 to 357 mg/L (5.33 to 3399 nmol/L or 0.056 to 35.7 mg/dL).

References

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A point (period/stop) is always used in this Method Sheet as the decimal separator to mark the border between the integral and the fractional parts of a decimal numeral. Separators for thousands are not used.

Symbols

Roche Diagnostics uses the following symbols and signs in addition to those listed in the ISO 15223-1 standard.

CONTENT	Contents of kit
→	Volume after reconstitution or mixing
GTIN	Global Trade Item Number

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