PREA

cobas®

Prealbumin

Order information

REF	CONTENT		Analyzer(s) on which **cobas c** pack(s) can be used
20764655 322	Prealbumin 100 tests	System-ID 07 6465 5	Roche/Hitachi **cobas c** 311, **cobas c** 501/502
03555941 190	Calibrator f.a.s. PAC (3 x 1 mL)	Code 589	
04567021 190	Prealbumin/Ceruloplasmin Control Set*		
	Precinorm PC (3 x 1 mL)	Code 102	
	Precipath PC (3 x 1 mL)	Code 103	
05117003 190	PreciControl ClinChem Multi 1 (20 x 5 mL)	Code 391	
05947626 190	PreciControl ClinChem Multi 1 (4 x 5 mL)	Code 391	
05947626 160	PreciControl ClinChem Multi 1 (4 x 5 mL, for USA)	Code 391	
05117216 190	PreciControl ClinChem Multi 2 (20 x 5 mL)	Code 392	
05947774 190	PreciControl ClinChem Multi 2 (4 x 5 mL)	Code 392	
05947774 160	PreciControl ClinChem Multi 2 (4 x 5 mL, for USA)	Code 392	
04489357 190	Diluent NaCl 9 % (50 mL)	System-ID 07 6869 3	

*Not for use in the US; US customers should use a suitable commercially available control.

English

System information

For **cobas c** 311/501 analyzers:

PREA: ACN 710

For **cobas c** 502 analyzer:

PREA: ACN 8710

Intended use

In vitro test for the quantitative determination of prealbumin in human serum and plasma on Roche/Hitachi **cobas c** systems.

Summary[1,2,3,4]

Prealbumin is a tryptophan-rich protein which is synthesized in hepatocytes and has a molar mass of 55000 daltons. At a pH of 8.6, an electrophoretic band appears prior to albumin in a relative amount of < 2.5 % due to its greater rate of diffusion to the anode. Its function is to bind and transport low molecular weight retinol-binding proteins (molar mass of less than 21000 daltons), preventing their glomerular filtration. 30-50 % of circulating prealbumin is complexed by retinol-binding protein. Furthermore, it binds and transports thyroxine (T4), nevertheless its affinity to this hormone is less than that of thyroxine-binding globulin.

Prealbumin has a short half-life of approximately 2 days. Accordingly, decreased hepatocellular synthesis caused by acute liver damage or dietary protein deficiency elicits a very rapid decrease in serum prealbumin levels. According to the literature, prealbumin can act as a negative acute phase reactant, with its concentration decreasing rapidly during inflammatory processes.

Various methods are available for the determination of prealbumin, such as radial immunodiffusion (RID), nephelometry and turbidimetry.

Test principle

Immunoturbidimetric assay.

Human prealbumin forms a precipitate with a specific antiserum which is determined turbidimetrically.

Reagents - working solutions

R1 Accelerator

Polyethylene glycol (PEG): 50 g/L; phosphate buffer; preservative

R2 Anti-prealbumin T antiserum (rabbit) specific for human prealbumin: > 0.25 g/L; phosphate buffer; preservative

R1 is in position B and R2 is in position C.

Precautions and warnings

For in vitro diagnostic use.
Exercise the normal precautions required for handling all laboratory reagents.
Disposal of all waste material should be in accordance with local guidelines.
Safety data sheet available for professional user on request.

Reagent handling

Ready for use

Storage and stability

PREA

Shelf life at 2-8 °C:	See expiration date on **cobas c** pack label.
On-board in use and refrigerated on the analyzer:	8 weeks

Diluent NaCl 9 %

Shelf life at 2-8 °C:	See expiration date on **cobas c** pack label.
On-board in use and refrigerated on the analyzer:	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 and K_2-EDTA plasma.
The use of Li-heparin plasma may lead to approximately 6 % lower values.
The use of K_2-EDTA plasma may lead to approximately 5 % lower values.

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:[5]	3 days at 2-8 °C
	6 months at (-15)-(-25) °C

Materials provided

See “Reagents – working solutions” section for reagents.

Materials required (but not provided)

See “Order information” section

General laboratory equipment

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.

The performance of applications not validated by Roche is not warranted and must be defined by the user.

PREA

Prealbumin

cobas®

Application for serum

cobas c 311 **test definition**

Assay type	2-Point End		
Reaction time/Assay points	10 / 6-25		
Wavelength (sub/main)	700/340 nm		
Reaction direction	Increase		
Units	g/L (µmol/L, mg/dL)		
Reagent pipetting		Diluent (H_2O)	
R1	90 µL	–	
R2	10 µL	20 µL	
Sample volumes	*Sample*	*Sample dilution*	
		Sample	*Diluent (NaCl)*
Normal	12 µL	15 µL	135 µL
Decreased	12 µL	5 µL	145 µL
Increased	12 µL	15 µL	135 µL

cobas c 501 **test definition**

Assay type	2-Point End		
Reaction time/Assay points	10 / 10-36		
Wavelength (sub/main)	700/340 nm		
Reaction direction	Increase		
Units	g/L (µmol/L, mg/dL)		
Reagent pipetting		Diluent (H_2O)	
R1	90 µL	–	
R2	10 µL	20 µL	
Sample volumes	*Sample*	*Sample dilution*	
		Sample	*Diluent (NaCl)*
Normal	12 µL	15 µL	135 µL
Decreased	12 µL	5 µL	145 µL
Increased	12 µL	15 µL	135 µL

cobas c 502 **test definition**

Assay type	2-Point End		
Reaction time/Assay points	10 / 10-36		
Wavelength (sub/main)	700/340 nm		
Reaction direction	Increase		
Units	g/L (µmol/L, mg/dL)		
Reagent pipetting		Diluent (H_2O)	
R1	90 µL	–	
R2	10 µL	20 µL	
Sample volumes	*Sample*	*Sample dilution*	
		Sample	*Diluent (NaCl)*
Normal	12 µL	15 µL	135 µL
Decreased	12 µL	5 µL	145 µL
Increased	12 µL	20 µL	80 µL

Calibration

Calibrators	S1: H_2O
	S2-S6: C.f.a.s. PAC
	Multiply the lot-specific C.f.a.s. PAC calibrator value by the factors below to determine the standard concentrations for the 6-point calibration curve:
	S2: 0.200 S5: 1.75
	S3: 0.400 S6: 2.75
	S4: 0.800
Calibration mode	RCM2
Calibration frequency	Full calibration
	• after reagent lot change
	• as required following quality control procedures

Traceability: This method has been standardized against the certified reference material in human serum of the IRMM (Institute for Reference Materials and Measurements) ERM-DA470k/IFCC.

Quality control

For quality control, use control materials as listed in the "Order information" section.

In addition, other suitable control material can be used.

Drug concentrations of the controls have been verified by GC/MS.

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

Roche/Hitachi **cobas c** systems automatically calculate the analyte concentration of each sample.

Conversion factors:	mg/dL x 0.01 = g/L	g/L x 18.2 = µmol/L
	g/L x 100 = mg/dL	mg/dL x 0.182 = µmol/L

Limitations - interference

Criterion: Recovery within ± 10 % of the initial value at a prealbumin concentration of 0.4 g/L (7.28 µmol/L, 40 mg/dL).

Icterus:[6] 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:[6] No significant interference up to an H index of 1000 (approximate hemoglobin concentration: 621 µmol/L or 1000 mg/dL).

Lipemia (Intralipid):[6] No significant interference up to an L index of 100. There is poor correlation between the L index (corresponds to turbidity) and triglycerides concentration.

Rheumatoid factors up to 400 IU/mL do not interfere.

High dose hook-effect: No false result occurs up to a prealbumin concentration of 2.5 g/L (45.5 µmol/L, 250 mg/dL).

Drugs: No interference was found at therapeutic concentrations using common drug panels.[7, 8]

Exception: Intralipid causes artificially high prealbumin results.

In very rare cases, gammopathy, in particular type IgM (Waldenström's macroglobulinemia), may cause unreliable results.[9]

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 Roche/Hitachi **cobas c** systems. The latest version of the carry-over evasion list can be found with the NaOHD/SMS/Multiclean/SCCS or the NaOHD/SMS/SmpCln1+2/SCCS Method Sheets. For further instructions refer to the operator's manual. **cobas c** 502 analyzer: All special wash programming necessary for avoiding carry-over is available via the **cobas** link, manual input is not required.

PREA

cobas®

Prealbumin

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

Limits and ranges

Measuring range

0.03-0.8 g/L (0.55-14.6 µmol/L, 3-80 mg/dL)

Determine samples having higher concentrations via the rerun function. Dilution of samples via the rerun function is a 1:3 dilution. Results from samples diluted using the rerun function are automatically multiplied by a factor of 3.

Lower limits of measurement

Lower detection limit of the test

0.03 g/L (0.55 µmol/L, 3 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 the lowest standard (standard 1 + 3 SD, repeatability, n = 21).

Expected values[10,11]

0.2-0.4 g/L (3.64-7.28 µmol/L or 20.0-40.0 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 (n = 21) and intermediate precision (3 aliquots per run, 1 run per day, 21 days). The following results were obtained:

Repeatability	*Mean*	*SD*	*CV*
	g/L (µmol/L, mg/dL)	*g/L (µmol/L, mg/dL)*	*%*
Precinorm Protein	0.201 (3.66, 20.1)	0.003 (0.05, 0.3)	1.2
Precipath Protein	0.207 (3.78, 20.7)	0.003 (0.05, 0.3)	1.4
Human serum 1	0.189 (3.44, 18.9)	0.004 (0.07, 0.4)	2.2
Human serum 2	0.216 (3.93, 21.6)	0.002 (0.04, 0.2)	1.1

Intermediate precision	*Mean*	*SD*	*CV*
	g/L (µmol/L, mg/dL)	*g/L (µmol/L, mg/dL)*	*%*
Precinorm Protein	0.198 (3.60, 19.8)	0.004 (0.07, 0.4)	1.9
Precipath Protein	0.203 (3.69, 20.3)	0.004 (0.07, 0.4)	1.9
Human serum 3	0.194 (3.53, 19.4)	0.004 (0.07, 0.4)	2.2
Human serum 4	0.252 (4.59, 25.2)	0.005 (0.09, 0.5)	2.1

Method comparison

Prealbumin values for human serum samples obtained on a Roche/Hitachi **cobas c** 501 analyzer (y) were compared with those determined using the corresponding reagent on a Roche/Hitachi 917 analyzer (x).

Sample size (n) = 260

Passing/Bablok[12]	Linear regression
y = 0.989x + 0.016 g/L	y = 0.955x + 0.027 g/L
τ = 0.907	r = 0.989

The sample concentrations were between 0.019 and 0.743 g/L (0.346 and 13.5 µmol/L, 1.9 and 74.3 mg/dL).

References

1 Lievens M, Bienvenu J, Buitrago JMG, et al. Evaluation of four new Tina-quant assays for determination of α1-acid glycoprotein, α1-antitrypsin, haptoglobin and prealbumin. Clin Lab 1996;42:515-520.

2 Greiling H, Gressner AM, eds. Lehrbuch der Klinischen Chemie und Pathobiochemie, 3rd ed. Stuttgart/New York: Schattauer Verlag 1995:224-225.

3 Hutchinson DR, Halliwell RP, Smith MG, et al. Serum "prealbumin" as an index of liver function in human hepatobiliary disease. Clin Chim Acta 1981;114:69-74.

4 Bourry J, Milano G, Caldani C, et al. Assessment of nutritional proteins during the parenteral nutrition of cancer patients. Ann Clin Lab Sci 1982;12:158-162.

5 Tietz NW, ed. Clinical Guide to Laboratory Tests, 3rd ed. Philadelphia, PA: WB Saunders Company 1995;608.

6 Glick MR, Ryder KW, Jackson SA. Graphical Comparisons of Interferences in Clinical Chemistry Instrumentation. Clin Chem 1986;32:470-475.

7 Breuer J. Report on the Symposium "Drug effects in Clinical Chemistry Methods". Eur J Clin Chem Clin Biochem 1996;34:385-386.

8 Sonntag O, Scholer A. Drug interference in clinical chemistry: recommendation of drugs and their concentrations to be used in drug interference studies. Ann Clin Biochem 2001;38:376-385.

9 Bakker AJ, Mücke M. Gammopathy interference in clinical chemistry assays: mechanisms, detection and prevention. Clin Chem Lab Med 2007;45(9):1240-1243.

10 Dati F, Schumann G, Thomas L, et al. Consensus of a group of professional societies and diagnostic companies on guidelines for interim reference ranges for 14 proteins in serum based on the standardization against the IFCC/BCR/CAP reference material (CRM 470). Eur J Clin Chem Clin Biochem 1996;34:517-520.

11 Burtis CA, Ashwood ER, Bruns DE (eds.). Tietz Fundamentals of Clinical Chemistry, 6th ed., Saunders Elsevier 2008;297.

12 Bablok W, Passing H, Bender R, et al. A general regression procedure for method transformation. Application of linear regression procedures for method comparison studies in clinical chemistry, Part III. J Clin Chem Clin Biochem 1988 Nov;26(11):783-790.

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

FOR US CUSTOMERS ONLY: LIMITED WARRANTY

Roche Diagnostics warrants that this product will meet the specifications stated in the labeling when used in accordance with such labeling and will be free from defects in material and workmanship until the expiration date printed on the label. THIS LIMITED WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. IN NO EVENT SHALL ROCHE DIAGNOSTICS BE LIABLE FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES.

Significant additions or changes are indicated by a change bar in the margin.

CE

Roche Diagnostics GmbH, Sandhofer Strasse 116, D-68305 Mannheim
www.roche.com

Distribution in USA by:
Roche Diagnostics, Indianapolis, IN
US Customer Technical Support 1-800-428-2336

Roche