MYO2

Tina-quant Myoglobin Gen.2

cobas®

Specific proteins

Order information

REF	CONTENT		Analyzer(s) on which **cobas c** pack(s) can be used
04580010 190	Tina-quant Myoglobin Gen.2 (100 Tests)	System-ID 07 6923 1	COBAS INTEGRA 400 plus COBAS INTEGRA 800
04580044 190	C.f.a.s. Myoglobin (3 × 1 mL)	System-ID 07 6875 8	
11730835 216	Myoglobin Control Set (2 × 3 mL)	System-ID 07 6876 6 System-ID 07 6877 4	
20756350 322	NaCl Diluent 9 % (6 × 22 mL)	System-ID 07 5635 0	

English

System information

Test MYO2, test ID 0-023.

Intended use

In vitro test for the quantitative immunological determination of human myoglobin in human serum and plasma on COBAS INTEGRA systems.

Summary[1,2,3,4]

Myocardial infarction is one of the major causes of death. The early diagnosis, preferably within the first six hours after onset of the infarction, allows the treatment with thrombolytic agents like streptokinase, urokinase, or tissue plasminogen activator. Two of the key clinical markers for the diagnosis of acute myocardial infarction are myoglobin and creatine kinase isoforms (CKMB) of which the former provides higher clinical sensitivity. Myoglobin is an oxygen-binding heme protein found in cardiac and skeletal muscle. During an acute myocardial infarction, the associated tissue injury leads to release of myoglobin into the bloodstream. The upper limit of normal myoglobin serum levels is 72 µg/L. During infarction, myoglobin levels can increase more than tenfold. Elevated levels of serum myoglobin are usually detectable two hours after infarction. CKMB levels, on the other hand, become abnormal after approximately six hours which explains the sensitivity difference. This may be due to the four times smaller molecular weight of myoglobin compared with CKMB. Due to this small size, myoglobin is directly released into the blood stream whereas CKMB needs to be transported through the lymphatics before it appears in the systemic blood circulation.

Because of its presence in skeletal muscle, people performing exhaustive exercise or genetic carriers of progressive muscular dystrophy may show increased myoglobin serum levels. Myoglobin in serum is rapidly cleared by the kidneys. Thus, renal failure could also elevate serum myoglobin levels. All these latter limitations can, however, be overcome by carefully examining the history, clinical presentation (e.g. chest pain), and kidney function (e.g. by the measurement of creatinine and blood urine nitrogen) of a patient suspected of having a myocardial infarction. The efficiency of early diagnosis is further improved when clinical history and electrocardiography are taken into account along with the myoglobin values.

Test principle[5]

Latex enhanced immunoturbidimetric assay.

Human myoglobin agglutinates with latex particles coated with anti-myoglobin antibodies. The precipitate is determined turbidimetrically at 583 nm.

Reagents - working solutions

R1 Glycine buffer: 170 mmol/L, pH 8.3; NaCl 100 mmol/L; EDTA 50 mmol/L; preservative

SR Latex particles coated with anti-human myoglobin antibodies (rabbit): 0.1 %; glycine buffer 170 mmol/L, pH 7.3; NaCl 100 mmol/L; 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

Ready for use

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-, Na-heparin, K_2-, K_3-EDTA 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.

Blood collected in capillary blood collection tubes is unsuitable.

Stability:[6]	2 days at 15-25 °C
	1 week at 2-8 °C
	3 months 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.

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	Endpoint
Reaction mode	R1-S-SR
Reaction direction	Increase
Wavelength A	583 nm
Calc. first/last	35/58
Typical prozone effect	> 1400 µg/L (> 79.9 nmol/L or > 1400 ng/mL)
Antigen excess check	Yes[a)]
Predilution factor	No

Postconcentration factor	No
Unit	µg/L

Pipetting parameters

		Diluent (H_2O)
R1	80 µL	
Sample	5.5 µL	10 µL
SR	40 µL	20 µL
Total volume	155.5 µL	

COBAS INTEGRA 800 test definition

Measuring mode	Absorbance
Abs. calculation mode	Endpoint
Reaction mode	R1-S-SR
Reaction direction	Increase
Wavelength A	583 nm
Calc. first/last	46/87
Typical prozone effect	> 1700 µg/L (> 97.1 nmol/L or > 1700 ng/mL)
Antigen excess check	Yes[a)]
Predilution factor	No
Postconcentration factor	No
Unit	µg/L

Pipetting parameters

		Diluent (H_2O)
R1	80 µL	
Sample	5.5 µL	10 µL
SR	40 µL	20 µL
Total volume	155.5 µL	

a) Samples with concentrations > 1400 µg/L (> 79.9 nmol/L) up to > 10000 µg/L (> 571 nmol/L) on COBAS INTEGRA 400 plus systems or > 1700 µg/L (> 97.1 nmol/L) up to > 10000 µg/L (> 571 nmol/L) on COBAS INTEGRA 800 systems are flagged either ">TEST RNG" or "HIGH ACT". Rerun the sample with postdilution or, if the sample has already been postdiluted, rerun the sample with a higher postdilution factor.

Calibration

Calibrator	C.f.a.s. Myoglobin
Calibration dilution ratio	1:1, 1:2, 1:4, 1:8, 1:16, and 0 µg/L performed automatically by the instrument.
Calibration mode	Logit/log 4
Calibration replicate	Duplicate recommended
Calibration interval	Each lot and as required following quality control procedures.

Enter the assigned lot-specific myoglobin value of the undiluted calibrator (µg/L) indicated in the package insert of C.f.a.s. Myoglobin.

Traceability: This method has been standardized against a selected manufacturer's reference procedure (immunological method).

Results must be corrected by + 10 µg/L. An additive factor has been introduced in the application (lab correlation - offset) in order to keep traceability. The performance has only been validated using this factor.

Quality control

Reference range	Myoglobin Control Set
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:[7]	µg/L x 0.0571 = nmol/L µg/L = ng/mL
Molecular weight:	17500

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 500 (approximate hemoglobin concentration: 311 µmol/L or 500 mg/dL).

Lipemia (Intralipid):[8] No significant interference up to an L index of 500. There is poor correlation between the L index (corresponds to turbidity) and triglycerides concentration.

Rheumatoid factors: No significant interference up to a rheumatoid factor level of 100 IU/mL.

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

High-dose hook effect: Does not occur at myoglobin concentrations below 1400 µg/L (79.9 nmol/L) on COBAS INTEGRA 400 plus analyzers or 1700 µg/L (97.1 nmol/L) on COBAS INTEGRA 800 analyzers. Samples with concentrations > 1400 µg/L (79.9 nmol/L) or > 1700 µg/L (97.1 nmol/L) up to > 10000 µg/L (571 nmol/L) are flagged either ">TEST RNG" or "HIGH ACT".

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

18-580 µg/L (1.03-33.1 nmol/L or 18-580 ng/mL)

The technical limit of the high end of measuring range in the instrument setting is defined as 570 µg/L due to the instrument factor for MYO2 (b = 10 µg/L; see above chapter calibration).

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

≤ 18 µg/L (≤ 1.03 nmol/L or ≤ 18 ng/mL)

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 = 21).

Expected values[12]

Females	19-51 µg/L	(1.08-2.91 nmol/L or 19-51 ng/mL)
Males	23-72 µg/L	(1.31-4.11 nmol/L or 23-72 ng/mL)

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 COBAS INTEGRA 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 (1 aliquot per run, 1 run per day, 21 days). The following results were obtained:

	Mean	CV repeatability
Level 1	61.9 µg/L (3.53 nmol/L or 61.9 ng/mL)	2.3 %
Level 2	267.6 µg/L (15.3 nmol/L or 267.6 ng/mL)	1.4 %

	Mean	CV intermediate precision
Level 1	60.9 µg/L (3.48 nmol/L or 60.9 ng/mL)	1.8 %
Level 2	270.2 µg/L (15.4 nmol/L or 270.2 ng/mL)	1.8 %

Method comparison

Myoglobin values for human serum samples obtained on a COBAS INTEGRA 400 analyzer with the COBAS INTEGRA Myoglobin Gen.2 (y) test were compared to those determined with the Myoglobin Gen.2 test on a Roche/Hitachi 917 analyzer (x). Samples were measured in duplicate. Sample size (n) represents all replicates.

Roche/Hitachi 917 analyzer

Sample size (n) = 60

Passing/Bablok[13]	Linear regression
y = 0.99x - 4.3 µg/L	y = 0.99x - 4.2 µg/L
τ = 0.973	r = 0.999
SD (md 95) = 26.7	Sy.x = 9.85

Values ranged from 31 to 613 µg/L (1.77-35.0 nmol/L or 31-613 ng/mL).

A comparison of the myoglobin determination using the COBAS INTEGRA Myoglobin Gen.2 test (y) with an immunological method (x) [selected manufacturer's procedure] gave the following correlation with human sera.

Immunological method

Sample size (n) = 58

Passing/Bablok[13]	Linear regression
y = 1.00x + 1.7 µg/L	y = 0.97x + 5.6 µg/L
τ = 0.911	r = 0.989
SD (md 95) = 10.6	Sy.x = 5.02

Values ranged from 26 to 381 µg/L (1.48-21.8 nmol/L or 26-381 ng/mL).

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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MYO2

Tina-quant Myoglobin Gen.2

cobas®

Specific proteins

CE

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