MAGNESIUM

MG 0200 CH	10 x 20 ml
MG 0500 CH	4 x 125 ml

INTENDED USE

Reagent for quantitative in vitro determination of magnesium in biological fluids.

SUMMARY OF TEST

Magnesium is not a true trace element. It is the fourth most abundant cation in the body and within the cell is second only to potassium. The adult human body (70 kg) contains 21 to 28 g of magnesium (approximately 1 mol). Magnesium catalyzes or activates more than 300 enzymes in the body. Magnesium acts as an essential cofactor for enzymes concerned with cell respiration, glycolysis, and transmembrane transport of other cations such as calcium and sodium. The permeability characteristics and electric properties of membranes are affected by magnesium.

PRINCIPLE OF THE METHOD

Calmagite combines with magnesium at alkaline pH to form a red complex, the absorbance of which is measured at 510 nm. Interference from other cations are avoided by specific chelating agents.

KIT COMPONENTS

For in vitro diagnostic use only.
The components of the kit are stable until expiration date on the label.
Keep away from direct light sources.

MG R1 **0200: 5 x 20 ml (liquid) blue cap**
0500: 2 x 125 ml (liquid) blue cap

Composition: EGTA 0.80 mM, triethanolamine 0.7 mM, KCl 1.34 M, Good's buffer pH 12.5.

MG R2 **0200: 5 x 20 ml (liquid) red cap**
0500: 2 x 125 ml (liquid) red cap

Composition: calmagite 0.33 mM, KCl 1.34 M, surfactant.

Standard: **magnesium solution 2 meq/l - 5 ml**

Store all components at 15-25°C.

MATERIALS REQUIRED BUT NOT SUPPLIED

Current laboratory instrumentation. Spectrophotometer UV/VIS with thermostatic cuvette holder. Automatic micropipettes. Glass or high quality polystyrene cuvettes. Saline solution.

REAGENT PREPARATION

Mix equal quantities of both reagents R1 and R2.
Stability of working reagent: 90 days at 2-8°C and 30 days at room temperature, well closed.
Stability of unopened vials: up to expiration date on labels at 15-25°C.
Stability since first opening of vials: preferably within 60 days at 15-25°C.

PRECAUTIONS

MG R1: Warning. Causes serious eye irritation (H319). Causes skin irritation (H315). Wear protective gloves. Eye protection (P280). IF ON SKIN: Wash with plenty of water (P302+P352). IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing (P305+P351+P338). If eye irritation persists: get medical advice (P337+P313).

MG R2: It is not classified as hazardous.

Standard: It is not classified as hazardous.

SPECIMEN

Serum (preferred), plasma heparinate. Do not use citrate, oxalate and EDTA as anticoagulant. The specimen should be drawn without venous stasis if possible. Do not use samples from patients in therapy with EDTA. Remove serum from clot without delay.
Serum or plasma samples are stable at 2-8°C for one week.
Urine samples have to be acidified in order to avoid precipitation (add 15 ml of concentrated HCl to 24/hours urine).
Acidified urine are unsuitable for creatinine determination.
Dilute sample urine 1:2 with redistilled water and multiply results by two.

TEST PROCEDURE

Wavelenght: 510 nm (allowed 490 ÷ 540 nm)
Lightpath: 1 cm
Temperature: 25, 30 or 37°C

dispense:	blank	standard	sample
reagent	1 ml	1 ml	1 ml
water	10 µl	-	-
standard	-	10 µl	-
sample	-	-	10 µl

Mix, incubate at 25, 30 or 37°C for 2 minutes.
Read absorbances of standard (As) and samples (Ax) against reagent blank.

RESULTS CALCULATION

serum/plasma sample:

magnesium meq/l = Ax/As x 2 (standard value)

urine sample:

magnesium meq/l = Ax/As x 2 x 2 (standard value and dilution factor)

24 hours urine sample:

magnesium meq/24h = Ax/As x 2 x 2 x urine volume (standard value, dilution factor and diuresis in decilitres)

EXPECTED VALUES

newborn 2-4 d:	1.20 - 1.80 meq/l	(0.60 - 0.90 mmol/l)
5 mo - 6 yrs:	1.42 - 1.88 meq/l	(0.71 - 0.94 mmol/l)
6 - 12 yrs:	1.38 - 1.74 meq/l	(0.69 - 0.87 mmol/l)
12 - 20 yrs:	1.35 - 1.77 meq/l	(0.67 - 0.88 mmol/l)
Adult:	1.30 - 2.10 meq/l	(0.65 - 1.05 mmol/l)
Urine:	6.0 - 10.0 meq/24h	(3.0 - 5.0 mmol/24h)

Each laboratory should establish appropriate reference intervals related to its population.

QUALITY CONTROL AND CALIBRATION

It is suggested to perform an internal quality control. For this purpose the following human based control sera are available:
QUANTINORM CHEMA
with normal or close to normal control values
QUANTIPATH CHEMA
with pathological control values.
If required, a multiparametric, human based calibrator is available:
AUTOCAL H

Please contact Customer Care for further information.

TEST PERFORMANCE

Linearity
the method is linear up to 8 meq/l.
If the limit value is exceeded, it is suggested to dilute sample 1+9 with distilled water and to repeat the test, multiplying the result by 10.

Sensitivity/limit of detection (LOD)
the limit of detection is 0.14 meq/l.

Interferences
no interference was observed by the presence of:

hemoglobin	≤ 300 mg/dl
bilirubin	≤ 25 mg/dl

Lipids interferences are possible.

Precision

intra-assay (n=10)	mean (meq/l)	SD (meq/l)	CV%
sample 1	2.13	0.04	1.70
sample 2	3.60	0.04	1.20

inter-assay (n=20)	mean (meq/l)	SD (meq/l)	CV%
sample 1	2.10	0.05	2.60
sample 2	3.45	0.08	2.40

Methods comparison
a comparison between Chema and a commercially available product gave the following results:

Magnesium Chema = x
Magnesium competitor = y
n = 88

y = 1.01x - 0.02 meq/l $r^2 = 0.96$

WASTE DISPOSAL

This product is made to be used in professional laboratories.
P501: Dispose of contents according to national/international regulations.

REFERENCES

Maxwell et al. - Clin.Chem. 31/3, 520-522 (1982).
Tietz Textbook of Clinical Chemistry, Second Edition, Burtis-Ashwood (1994).

MANUFACTURER

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SYMBOLS

IVD	*in vitro* diagnostic medical device
LOT	batch code
REF	catalogue number
	temperature limit
	use by date
	caution
	consult instructions for use

CE