

### PACKAGING

Ref.: 101-0487	Cont.: 1 x 40 / 1 x 10 mL
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Store 2 - 8° C.

### INTENDED USE

The  $\alpha_1$ -antritrypsin is a quantitative turbidimetric test for the measurement of  $\alpha_1$ -antritrypsin in human serum or plasma.

### CLINICAL SIGNIFICANCE

$\alpha_1$ -antritrypsin is a glycoprotein synthesized by the hepatic parenchyma cells. It is the most abundant proteinase inhibitor in plasma after  $\alpha_2$ -macroglobulin.  $\alpha_1$ -antritrypsin has a strong action on elastase, skin collagenase, chemotrypsin, plasmin, and thrombin. It also shows inhibitory activity against fungal and leukocytic proteases.

The  $\alpha_1$ -antritrypsin deficiency is an inherited disorder caused by an abnormal gene (PiZ) aberration. This character is recessive and must be on both parents' genome to be expressed. Even if any of both develops the disorder. This deficiency is associated with an increased risk of pulmonary emphysema and hepatic diseases. Neonatal cholestasis, hepatitis and cirrhosis may be also related.

$\alpha_1$ -antritrypsin increases its concentration due to inflammation or necrosis process. Serum levels begin to rise after approximately 24 hours and peak at 3 or 4 days.

### PRINCIPLE OF THE METHOD

Anti-  $\alpha_1$ -antritrypsin antibodies when mixed with samples containing  $\alpha_1$ -antritrypsin, form insoluble complexes. These complexes cause an absorbance change, dependent upon the  $\alpha_1$ -antritrypsin concentration of the patient sample, that can be quantified by comparison from a calibrator of know  $\alpha_1$ -antritrypsin concentration.

### REAGENTS

<b>Diluent (R1)</b>	Tris buffer 20 mmol/L, PEG 8000, pH 8.3. Sodium azide 0.95 g/L.
<b>Antibody (R2)</b>	Goat serum, anti-human $\alpha_1$ -antitrypsin, pH 7.5. Sodium azida 0.95 g/L.
<b>Optional</b>	Ref: 101-0485 General Proteins Calibrator

### CALIBRATION

The assay has been standardized against the Reference Material CRM 470/RPPHS (Institute for Reference Materials and Measurements, IRMM). It must be used the General Proteins Calibrator to calibrate the reagent. The reagent (both monoreagent and bireagent) should be recalibrated every month, when the controls are out of specifications, and when changing the reagent lot or the instrument settings.

### PREPARATION

**Reagents:** Ready to use.

**Calibration Curve:** Prepare the following General Proteins Calibrator dilutions in NaCl (9 g/L) as diluent. Multiply the concentration of the  $\alpha_1$ -antritrypsin calibrator by the corresponding factor stated in table bellow to obtain the  $\alpha_1$ -antritrypsin concentration of each dilution.

Calibrator dilution	1	2	3	4	5	6
Calibrator ( $\mu$ L)	--	10	25	50	75	100
NaCl 9 g/L ( $\mu$ L)	100	90	75	50	25	-
Factor	0	0.1	0.25	0.5	0.75	1.0

### STORAGE AND STABILITY

All the components of the kit are stable until the expiration date on the label when stored tightly closed at 2 - 8° C and contaminations are prevented during their use. Do not use reagents over the expiration date.

**Reagent deterioration:** The presence of particles and turbidity.

Do not freeze; frozen Antibody or Diluent could change the functionality of the test.

### ADDITIONAL EQUIPMENT

- Thermostatic bath at 37° C.
- Spectrophotometer or photometer thermostatable at 37° C with a 340 nm filter (320 – 360 nm).

### SAMPLES

Fresh serum or plasma. EDTA or heparin should be used as anticoagulant. Stable 7 days at 2 - 8° C or 3 months at -20° C. The samples with presence of fibrin should be centrifuged before testing. Do not use highly hemolyzed or lipemic samples.

### PROCEDURE

**Note:** Chronolab has instruction sheets for several automatic analyzers. Instructions for many of them are available on request.

Clinical diagnosis should not be made on findings of a single test result, but should integrate both clinical and laboratory data.

1. Bring the reagents and the photometer (cuvette holder) to 37° C.
2. Assay conditions:

Wavelength : 340 nm

Temperature : 37° C

Cuvette lighth path : 1cm

3. Adjust the instrument to zero with distilled water.
4. Pipette into a cuvette:

Reagent R1 ( $\mu$ L)	800
Sample or Calibrator ( $\mu$ L)	10

5. Mix and read the absorbance ( $A_1$ ) after the sample addition.
6. Immediately, pipette into de cuvette:

Reagent R2 ( $\mu$ L)	200
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7. Mix and read the absorbance ( $A_2$ ) of calibrators and sample exactly 2 minutes after the R2 addition.

### CALCULATIONS

Calculate the absorbance difference ( $A_2-A_1$ ) of each point of the calibration curve and plot the values obtained against the  $\alpha_1$ -antritrypsin concentration of each calibrator dilution.  $\alpha_1$ -antritrypsin concentration in the sample is calculated by interpolation of its ( $A_2-A_1$ ) in the calibration curve.

### QUALITY CONTROL

Control sera are recommended to monitor the performance of manual and automated assay procedures. Chronolab General Proteins Control (Ref.:101-0509) is available. Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

### REFERENCE VALUES<sup>2</sup>

Newborn: Between 124 - 348 mg/dL.

Adults: 90 – 200 mg/dL.

Each laboratory should establish its own reference range.

### PERFORMANCE CHARACTERISTICS

**Measurement range:** Up to 400 mg/dL under the described assay conditions. Samples with higher concentrations, should be diluted 1/5 in NaCl (9 g/L) and retested again. The linearity limit depends on the sample / reagent ratio. It will be higher by decreasing the sample volume, although the sensitivity of the test will be proportionally decreased.

**Detection Limit:** Values less than 16 mg/dL give non-reproducible results.

**Prozone effect:** No prozone effect was detected upon 750 mg/dL

**Sensitivity:**  $\Delta$  3.4 mA / mg/dL.

**Precision:** The reagent has been tested for 20 days, using three levels of serum in a EP5-based study.

EP5	CV (%)		
	34.39 mg/dL	92.7 mg/dL	181.8 mg/dL
Total	4.2 %	2.6 %	2.8 %
Within Run	0.8 %	1.1 %	1.6 %
Between Run	3.8 %	2.4 %	2.3 %
Between Day	1.6 %	0 %	0 %

**Accuracy:** Results obtained using this reagent (y) were compared to those obtained using the Beckman Array 360 CE. 35 samples ranging from 100 to 300 mg/dL of  $\alpha_1$ antitrypsin were assayed. The correlation coefficient (r) was 0.92 and the regression equation  $y = 0.84 x + 26.5$ .

The results of the performance characteristics depend on the used analyzer.

### INTERFERENCES

Hemoglobin (up to 8 g/L), bilirubin (up to 40 mg/dL), rheumatoid factors (up to 790 IU/mL) and lipemia (up to 16 g/L), do not interfere. Other substances may interfere<sup>6,7</sup>.

### BIBLIOGRAPHY

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6. Young DS. Effects of drugs on clinical laboratory tests, 4th ed. AACC Pres, 1995.
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