**K-ASSAY**®

**Apo Al**

**For the Quantitative Determination of Human Apolipoprotein Al in Serum**

**Cat. No. KAI-002**

**INTENDED USE**

For the quantitative determination of human Apolipoprotein Al (Apo Al) in serum by immunoturbidimetric assay. FOR IN VITRO DIAGNOSTIC USE.

**INTRODUCTION AND SUMMARY**

Lipoproteins are present in the plasma in a complex form, low density lipoproteins (LDL), very low density lipoproteins (VLDL), high density lipoproteins (HDL), and intermediate lipoproteins. These complexes are composed of lipid and carrier proteins, the apolipoproteins. There are several apolipoproteins: Apo Al, AlII, B, C1, CII, CIII, and E.

Apolipoprotein Al is present in the highest concentration of any of the apolipoproteins. Apo Al makes up approximately 60% of the high density lipoprotein. It provides the structural component for HDL formation.** A** Apo A activates lecithin cholesterol acyltransferase (LCAT) which catalyzes the esterification of cholesterol. The cholesterol esters can then be transported to the liver where they are removed from the blood stream, catabolized, and excreted.**

Numerous studies have indicated that Apolipoprotein Al may be a useful tool in the assessment of coronary heart disease risk. Patients with coronary disease consistently have lower levels of Apo Al.

Apo Al has been measured using a variety of methods, including radioimmunoassay (RIA), radial diffusion, nephelometric, and enzyme-linked immunosorbent assay.** The K-ASSAY® Apo Al assay uses an immunoturbidimetric format.

**PRINCIPLE OF TEST**

The K-ASSAY® Apo Al assay quantifies Apolipoprotein Al based on immunoturbidimetric assay. The reagent uses a goat polyclonal antibody specific for human Apolipoprotein Al.

The antibody binds to the Apo Al in the serum forming light scattering immune complexes, which increase the turbidity of the sample. Since the increase in turbidity is proportional to the amount of Apo Al in the sample, the Apolipoprotein Al concentration can be determined by measuring this increase in turbidity. The increase in turbidity is measured at 800 nm. Apolipoprotein Al in the sample is quantitatively determined. The K-ASSAY® Apo Al assay can be run using a two-reagent clinical chemistry analyzer. Six calibrators are prepared using the K-ASSAY® Apo Al/Bl Calibrator. These calibrators are used for quantifying the levels of Apo Al present in the patient's serum sample.

**ASSAY PROCEDURE**

Discard reagents if they become contaminated. Evidence of cloudiness or particulate matter in solution is cause to discard. If the absorbance of the isotonic saline is greater than 0.05 or if the absorbance of the calibrator with 133 mg/dL of Apo Al after allowing for the reagent blank is not between 0.25 to 0.50 on the Hitachi 717, the reagents should not be used.

**INSTRUMENT**

Measurement of absorbance is to be made with an instrument able to accurately read absorbance at 800 nm. Refer to the instrument manual from the manufacturer for the following:

- Use or function
- Installation procedures and requirements
- Principles of operation
- Performance characteristics, operating instructions
- Calibration procedures including materials and / or equipment to be used
- Operational precautions, limitations, and hazards
- Service and maintenance information

**SPECIMEN COLLECTION AND PREPARATION**

It is recommended that specimen collection be carried out in accordance with NCCLS document M29-T2. No method can offer complete assurance that human blood samples will not transmit infection. Therefore, all blood samples should be considered potentially infectious.

Serum is required for this assay. Blood should be collected into a fasting patient and the serum collected as soon as possible. Soon after the blood is drawn, it should be allowed to clot, centrifuged, and the serum separated from the clot to a plastic tube (not glass). Samples not tested within 72 hours should be frozen at -20°C. Avoid multiple freeze-thaws.

Use plastic tubes for storing the sample, do not use glass.

**AUTOMATED ANALYZER APPLICATION**

Suitable for two-reagent clinical chemistry analyzers that use a multi-point calibration method.

**PROCEDURE**

**Materials Supplied**

<table>
<thead>
<tr>
<th>Reagent 1 (R-1) Buffer Reagent</th>
<th>3 x 20 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reagent 2 (R-2) Antiserum Reagent</td>
<td>1 x 20 mL</td>
</tr>
</tbody>
</table>

**Materials Required But Not Supplied**

Calibrators: K-ASSAY® Apo Al/Bl Calibrator, Cat. No. KAI-008C (Containing human serum with known levels of Apo Al).

Two-Reagent Clinical Chemistry Analyzer:

- Capable of accurately absorbing readings at 800 nm
- Capable of accurately dispensing the required volumes
- Capable of maintaining 37°C

Quality Control Materials

**ASSAY STABILITY**

Note: Allow all reagents and specimens to warm to room temperature. Mix all reagents gently before using.

An example of automated application (Hitachi 717):

**Sample**

<table>
<thead>
<tr>
<th>3 µL</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 (Buffer Reagent)</td>
</tr>
<tr>
<td>R2 (Antiserum Reagent)</td>
</tr>
</tbody>
</table>

**2-point endpoint, 800 nm**

**Automated Method (Example)**

**Chemistry Parameters for Automatic Analyzer**

- **INSTRUMENT**: Hitachi 717
- **TEMPERATURE**: 37°C
- **TEST**: (Apo Al)
- **ASSAY CODE**: (2 POINT) : (24) : (50)
- **SAMPLE VOLUME**: (3) / (100) / (100)
- **WAVELENGTH**: (800)
- **CALIB. METHOD**: (NONLINEAR) (4) (6)
- **STD.(1) Conc.-POS.**: *(1) - (1)*
- **STD.(2) Conc.-POS.**: *(2) - (2)*
- **STD.(3) Conc.-POS.**: *(3) - (3)*
- **STD.(4) Conc.-POS.**: *(4) - (4)*
- **STD.(5) Conc.-POS.**: *(5) - (5)*
- **STD.(6) Conc.-POS.**: *(6) - (6)*
- **SD LIMIT**: (999)
- **DUPLICATE LIMIT**: (10000)
- **SENSITIVITY LIMIT**: (0)
- **ABS. LIMIT (SLOPE)**: *(32000) INCREASE*
- **PROZONE LIMIT**: *(50000) LOWER*
- **EXPECTED VALUE**: *(99999) 999999*
- **PANIC VALUE**: *(99999) 999999*
- **INSTRUMENT FACTOR**: *(1.00)*

Parameters for other automated analyzers are available.

**CALIBRATION**

It is recommended that Apo Al levels be determined using a multi-point calibration curve prepared using the K-ASSAY® Apo Al/Bl Calibrator. It is recommended that the user determine calibration curve frequency as this depends on the instrument and type/number of other assays being performed. Initially, calibration should be performed each day. Normal and abnormal controls of known concentration should be included in each assay performed. These controls should fall within the stated values assigned to the controls. The validity of the assay is in question if the value for the controls generated by the assay’s calibration curve does not fall within the stated range. Recalibrate if the value determined for the controls falls outside the stated recovery range.
LIMITATIONS OF PROCEDURE

The measurable range for Apo AI is between 20 to 300 mg/dL. Grossly lipemic samples and samples with very high triglyceride concentrations (> 1,000 mg/dL) should be diluted 1 part sample with 1 part isotonic saline or filtered to decrease nonspecific light scattering. Multiply results by 2 to compensate for the dilution.

If the Apo AI concentration of a patient sample is greater than the highest calibrator value, dilute 1 part sample with 4 parts isotonic saline and reassay. Multiply results by 5 to compensate for the dilution.

PERFORMANCE

Precision

The precision for the K-ASSAY® Apo AI assay was determined using packaged reagents, pooled human serum, and a Hitachi 704 analyzer.

<table>
<thead>
<tr>
<th>Precision Assay: Within Run</th>
<th>Sample I</th>
<th>Sample II</th>
<th>Sample III</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 20</td>
<td>Mean = 83.1</td>
<td>Mean = 142.6</td>
<td>Mean = 189.0</td>
</tr>
<tr>
<td>SD = 1.6</td>
<td>SD = 2.3</td>
<td>SD = 2.9</td>
<td></td>
</tr>
<tr>
<td>CV = 1.87%</td>
<td>CV = 1.60%</td>
<td>CV = 1.51%</td>
<td></td>
</tr>
</tbody>
</table>

Concentration in mg/dL

<table>
<thead>
<tr>
<th>Precision Assay: Between Runs</th>
<th>Sample I</th>
<th>Sample II</th>
<th>Sample III</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 10</td>
<td>Mean = 85.9</td>
<td>Mean = 136.5</td>
<td>Mean = 185.9</td>
</tr>
<tr>
<td>SD = 1.1</td>
<td>SD = 1.437</td>
<td>SD = 2.9</td>
<td></td>
</tr>
<tr>
<td>CV = 1.28%</td>
<td>CV = 1.05%</td>
<td>CV = 1.57%</td>
<td></td>
</tr>
</tbody>
</table>

Concentration in mg/dL

Accuracy / Correlation

A comparison of the K-ASSAY® Apo AI assay and a Sigma Apo AI Test Kit was performed using a Hitachi 704. The test results provided the following data:

\[
\begin{align*}
y &= 0.980x + 4.776 \\
r &= 0.970 \\
n &= 55 \\
x &= \text{Sigma Apo AI Test Kit} \\
y &= \text{K-ASSAY® Apo AI assay} \\
x_{\text{min}} &= 91 \quad x_{\text{max}} = 200 \quad \text{mean} = 146 \\
\text{max} &= 213 \quad \text{mean} = 147
\end{align*}
\]

Linearity

Linearity tests were performed with normal human serum spiked with high concentration fractions of Apo AI. Testing was linear from 20 to 300 mg/dL of Apo AI.

INTERFERENCE

- Bilirubin F and C: No interference up to 20 mg/dL
- Hemoglobin: No interference up to 500 mg/dL
- Lipemia: No interference up to 20% volume of Intralipid® 10%

EXPECTED VALUES

The expected value as reported is between 115 to 224 mg/dL. Each laboratory should establish its own expected values using this kit.

This test system has been evaluated through a WHO/IFCC/CDC collaborative effort and assay values are traceable to the WHO International Reference Material for Apo AI, SP1-01. The evaluation was performed on a Hitachi 717 analyzer using the K-ASSAY® Apo AI/B Calibrator, Cat. No. KAI-008C.

REFERENCES


LABELING SYMBOLS