**LIPASE**

**Principle of the Method**

The pancreatic lipase in presence of calcium, deoxycholate and calcium ions, hydrolyses the substrate 1,2-O-dilauryl-rac-glycero-3-glutaric acid-(6' -methylresorufin)-ester. The sequence of reactions involved in the enzymatic direct lipase determination is the following: 1,2-O-dilauryl-rac-glycero-3-glutaric acid-(6' -methylresorufin)-ester → 1,2-O-dilauryl-rac-glycerol + Glutaric-6'-methylresorufin-ester

The rate of methylresorufin formation, measured photometrically, is proportional to the catalytic concentration of lipase present in the sample.

**CLINICAL SIGNIFICANCE**

Lipase (LPS) is a pancreatic enzyme necessary for the absorption and digestion of nutrients that catalyzes the hydrolysis of glycerol esters of fatty acids. Determination of LPS is used for diagnosis of diseases of pancreas such as acute and chronic pancreatitis and obstruction of the pancreatic duct. LPS is a useful tool in the differential diagnosis of acute and chronic pancreatitis, the obstruction of the pancreatic duct, and acute cholecystitis.

**REAGENTS**

<table>
<thead>
<tr>
<th>R 1</th>
<th>TRIS pH 8.3</th>
<th>40 mmol/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffer</td>
<td>Deoxycholate</td>
<td>1.8 mmol/L</td>
</tr>
<tr>
<td>R 2</td>
<td>Substrate 7.2 mmol/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sodium taurodeoxycholate</td>
<td>1.8 mmol/L</td>
</tr>
<tr>
<td></td>
<td>Calcium chloride (CaCl₂)</td>
<td>0.1 mmol/L</td>
</tr>
</tbody>
</table>

**LIPASE CAL**

Standard, Lysophilised human serum. The LPS activity (U/L methylresorufin at 37°C) is indicated on the label of the vial.

**PRECAUTIONS**

LIPASE CAL Components from human origin have been tested and found to be negative for the presence of HBsAg, HCV, and antibody to HIV (1/2). However handle cautiously as potentially infectious.

**STORAGE AND STABILITY**

Components from human origin have been tested and found to be negative for the presence of HBsAg, HCV, and antibody to HIV (1/2). However handle cautiously as potentially infectious.

**SAMPLES**

Serum or plasma with sodium citrate, EDTA or heparin. Avoid repeated frozen and unfrozen. Stability: 2 days at 2-8°C.

**PROCEDURE**

1. **Assay conditions:**
   - Wavelength: 580 nm
   - Blank absorbance at 580 nm ≥ 1.00
   - Standard / Sample
   - R 1: 40 mmol/L
   - R 2: 200 mL
   - Distilled water: 10 mL
   - Standard / Sample
   - R 1: 40 mmol/L
   - R 2: 200 mL
   - Distilled water: 10 mL
   - Standard / Sample
   - R 1: 40 mmol/L
   - R 2: 200 mL
   - Distilled water: 10 mL

2. **Mix, incubate at 37°C for 1 minute.**

3. **Read initial absorbance (A) of the sample, start the stopwatch and read absorbance at 1 minute intervals thereafter for 2 minutes.**

4. **Calculate the difference between absorbances and the average absorbance differences per minute ([ΔA/Δt]).**

**CALCULATIONS**

- **LPS activity (U/L methylresorufin at 37°C):**
  
  \[
  \text{LPS activity} = \frac{\Delta A}{\Delta t} \times \text{Calibrator activity} = \text{U/L of lipase in the sample}
  \]

- **Units:** One international unit (U) is the amount of enzyme that transforms 1 μmol of substrate per minute, in standard conditions. The concentration is expressed in units per litre of sample (U/L).

- **Quality Control**
  - Control sera recommended to monitor the performance of assay procedures.
  - If control values are found outside the defined range, check the instrument, reagents and technique for problems.
  - Each laboratory should establish its own Quality Control Scheme and corrective actions if controls do not meet the acceptable tolerances.

**REFERENCE VALUES**

LPS: 0.1 U/L (U/L methylresorufin at 37°C).

**PERFORMANCE CHARACTERISTICS**

Measuring range: From detection limit of 5 U/L to linearity limit of 250 U/L.

**REFERENCES**