

# **LIPASE ASSAY**

## **(USING TURBIDIMETRIC METHOD)**

# LIPASE ACTIVITY

## ❖ Objective:

-To determine Lipase activity.



## ❖ INTRODUCTION:

- Lipase is defined as a group of enzymes which hydrolyze the glycerol; esters of long chain fatty acids so it can be easily absorbed.
- Lipase is produced by the pancreas, liver, intestine, tongue, stomach, and many other cells.
- Lipase is produced by the pancreas in large quantity and secrete them into the small intestine.
- Lipase testing is indicated in **acute pancreatitis and pancreatic cyst.**
- The measurement of lipase activity in serum and other fluids evaluate the conditions associated with **pancreas.**

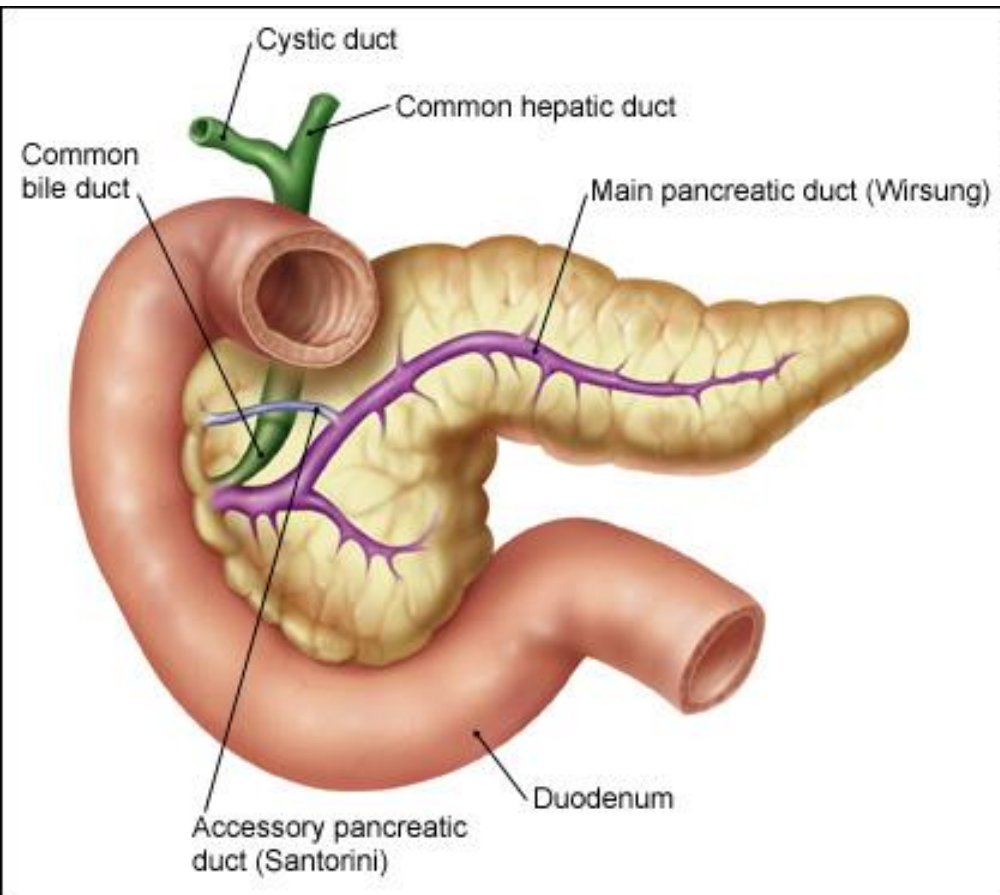


## - Serum lipase concentration:

- Lipase concentrations is increased with pancreatic duct obstruction, pancreatic cancer, and other pancreatic disease as well as with gallbladder inflammation.
- Lipase concentrations are increased in **pancreatitis up to 3 times normal**.
- The common bile duct and the pancreatic duct join together to transport digestive enzymes and bile to the small intestine .
- A **gallstone** in the common bile duct can cause back pressure in the pancreatic duct leading to pancreatitis.
- Therefore, acute pancreatitis elevates blood lipase levels.

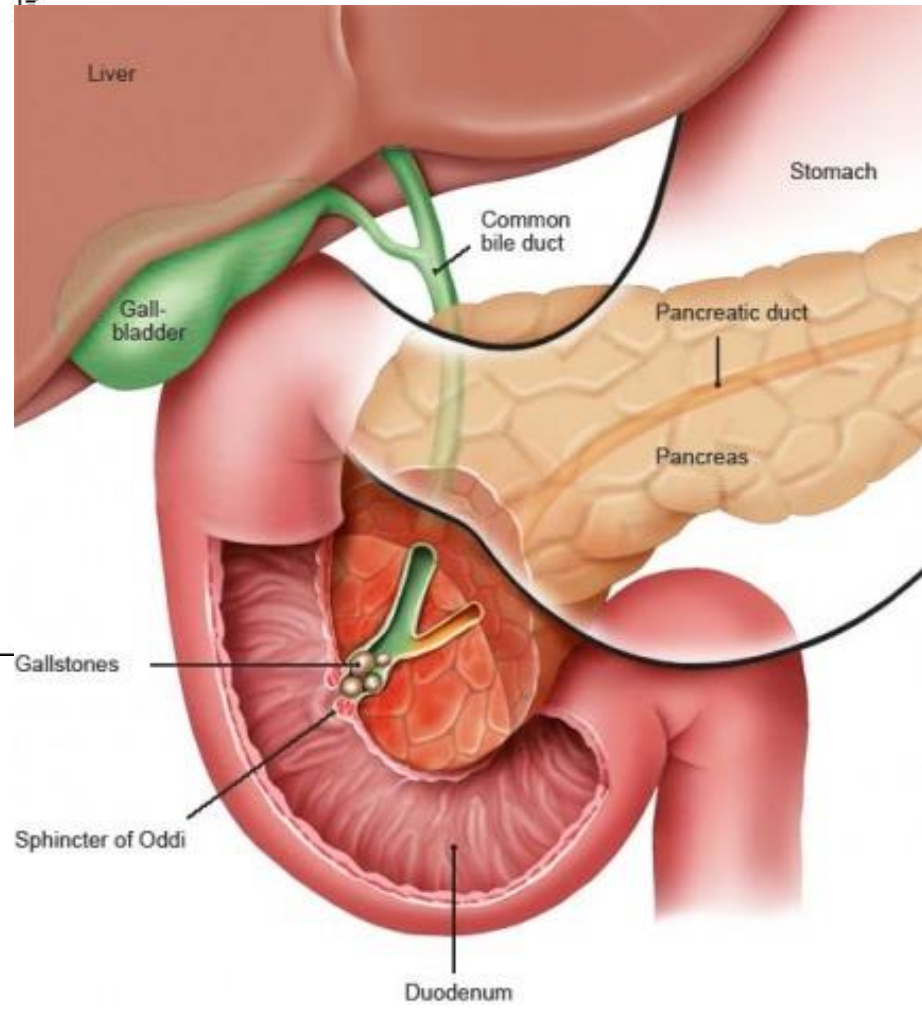


# Normal



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# Pancreatitis



- **A low level of lipase** in the blood may indicate **permanent damage to the lipase-producing cells in the pancreas** and this can occur in **chronic diseases** that affect the **pancreas** such as **cystic fibrosis**.

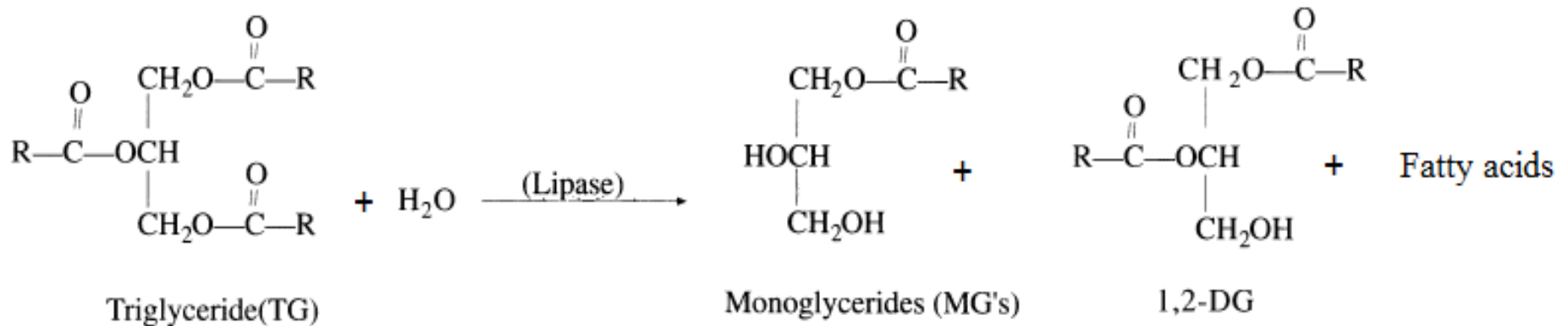
- **Symptoms of pancreatitis may include:**

- Severe abdominal pain
- Back pain
- Fever
- Nausea
- Vomiting
- Loss of appetite



## - Principle:

- **Serum lipase** hydrolyzes the olive oil emulsion.



- The decrease in turbidity at 400 nm ( after incubation ) is proportional to lipase activity in the specimen.

## SPECIMEN COLLECTION STORAGE

- Use **fresh serum** specimens.
- **Hemolyzed specimens should not be used.**
- **Lipase activity in serum** is stable at room temperature for one week and may be stored for three weeks in the refrigerator (4-8°C) and for several months if frozen.
- **Caution!**
- **Bacterial contamination** of the specimens may result in an **increase in lipase activity.**





- **Normal range:**

- **In adults: 10-150 U/L**

- **In old individuals (more than 60 years): 18-180 U/L**



## - METHOD:

### - Two test tubes:

	Test	Blank
Lipzyme reagent buffer	3 ml	3 ml
Pre-incubate for 5 min. at 37 ° C		
Serum	0.1 ml	---

- Read the absorbance ( $A_0$ ) immediately at 400 nm.
- Then transfer to water bath pre-incubate for 5 min. at 37 ° C .
- Then read the absorbance ( $A_1$ ) at 400 nm against distilled water.



## - CALCULATIONS:

$$\frac{\text{Test } (A_0 - A_1) - \text{Blank } (A_0 - A_1)}{\text{Blank } (A_0)} \times 3000 = \text{Lipase activity in U/L}$$

### - Example:

$$A_1 \text{ TEST} = 0.454$$

$$A_0 \text{ TEST} = 0.464$$

$$A_1 \text{ Blank} = 0.334$$

$$A_0 \text{ Blank} = 0.332$$

$$\text{LIPASE ACTIVITY} = \frac{(0.464 - 0.454) - (0.332 - 0.334)}{(0.332)} \times 3000 = 71.85 \text{ U/L}$$

**Normal**

### - Note:

- Reagent blank: if  $(A_0 - A_1)$  is a negative value, it should be considered as zero. However, it should normally be between 0.000 and 0.005.