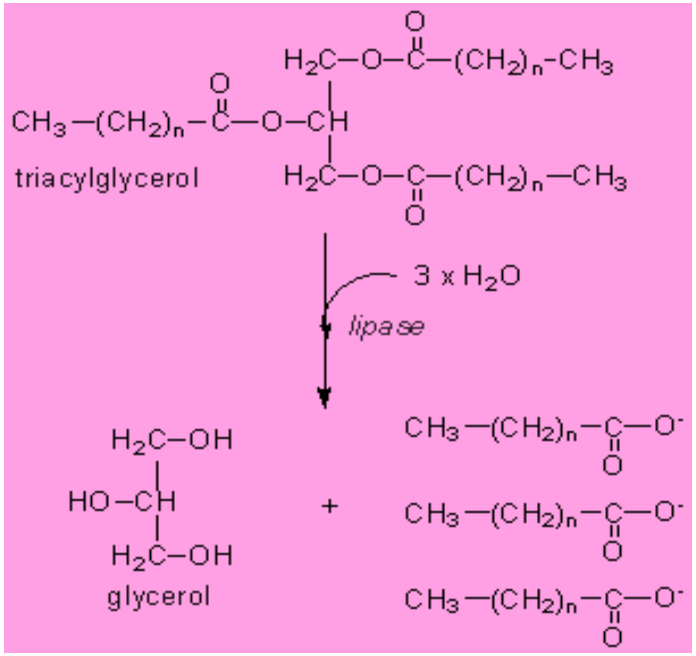
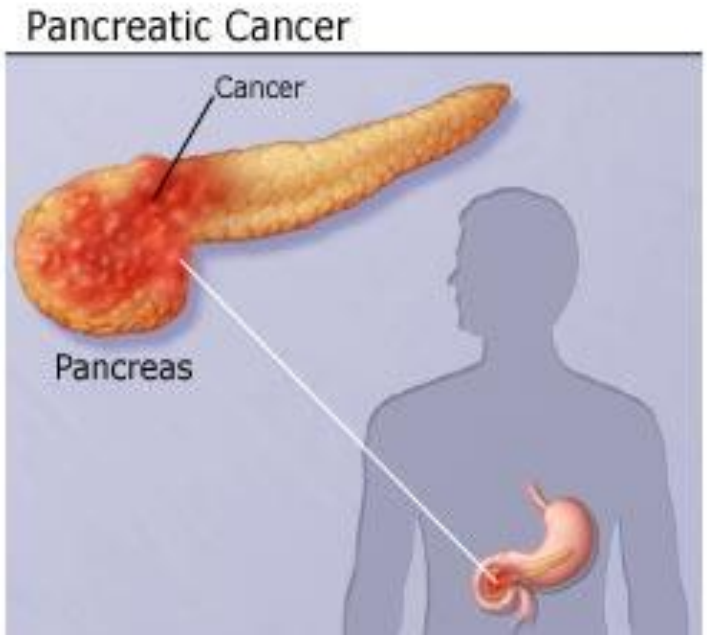
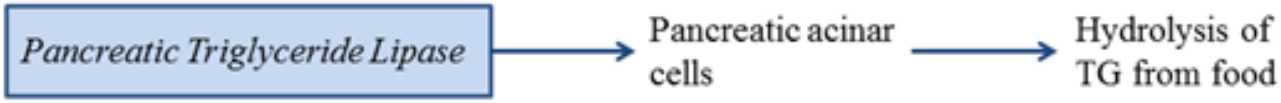
Determination of Lipase in serum





Lipase

- **Pancreatic lipase**, also known as **pancreatic triacylglycerol lipase**, is the primary lipase enzyme that hydrolyzes dietary fat molecules in the human digestive system, converting triglyceride substrates found in ingested oils to monoglycerides and free fatty acids.
- Lipase helps the body absorb fat. This test is used to measure the amount of the lipase in the blood



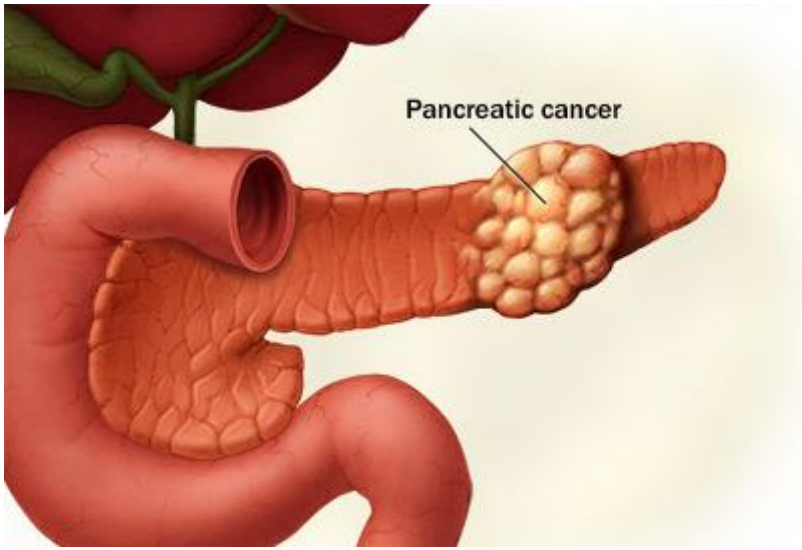
DIAGNOSTIC SIGNIFICANCE

- The measurement of lipase activity in serum and other body fluids to evaluate conditions associated with pancreas

- Pancreatic lipase is secreted into the duodenum through the duct system of the pancreas.
- Its concentration in serum is normally very low. Under extreme disruption of pancreatic function, such as pancreatitis or pancreatic adenocarcinoma, the pancreas may begin to autolyse and release pancreatic enzymes including pancreatic lipase into serum. Thus, through measurement of serum concentration of pancreatic lipase, acute pancreatitis can be diagnosed.

Why the Test is Performed

- This test is done to check for disease of the pancreas, most often acute pancreatitis.
- A high serum lipase is also increase in cirrhosis of liver , hepatitis .



Normal Results

Adults → 10-150 U/L

Old individuals → 18-180 U/L

(more than 60 years)

What Abnormal Results Mean?

Higher-than-normal levels may be due to:

- Blockage of the bowel (bowel obstruction)
- Celiac disease
- Duodenal ulcer
- Cancer of the pancreas
- Infection of swelling of the pancreas
- This test may also be done for familial lipoprotein lipase deficiency

METHOD PRINCIPLE

- Serum is incubated at 37 °C with an olive oil substrate buffered at pH 9.0. Hydrolysis of triglycerides present in the olive oil by pancreatic lipase causes a decrease in the turbidity of the reaction mixture. The decrease in absorbed light at 400 nm is measured over a period of 5 minutes and reflects the activity of lipase in the sample.

- The UDI Lipase procedure is a **turbidimetric method.**
- Triglycerides $+H_2O \xrightarrow{Lipase}$ mono + di-Glycerides +Fatty acids

MATERIALS

CHEMICALS:

- ***LIPA-ZYME SUBSTRATE:*** 0.8% w/v Olive Oil in Ethanol. Must be kept tightly capped and protected from evaporation.
- ***LIPA-ZYME BUFFER*** **:**(Concentration based upon reconstitution) 70 mmol/L Tris (hydroxymethyl) aminomethane, 8.7 mmol/L Sodium deoxycholate and Preservative; pH 9.3 $\pm$ 0.05 at 25 °C. Protect from contamination
- ***2 Serum Sample***

MATERIALS

- **PREPARATION OF WORKING REAGENT**
- add 1.0 ml of lipa-zyme substrate to 30 ml of reconstituted lipa-zyme buffer.

GLASSWARE:

- pipettes,
- test vials or cuvettes
- timer
- 37 °C heating bath
- spectrophotometer

PROCEDURE

- Pipette into clean dry test tubes

CHEMICAL	SAMPLE 1	SAMPLE 2	REAGENT	B L A N K
Working Reagent	3.0 ml	3.0 ml	3.0 ml	D i s . H 2 O
Pre-incubate for 5 minutes at 37 °C. Add (using timed intervals)				
Sample1	0.1 ml	--	--	
SAMPLE 2	--	0.1 ml	--	

•Read the absorbance (A°) immediately at 400 nm against distilled water.

•Then transfer to water bath at 37 °C.
•Read absorbance (A1) after exactly 5 minutes at 400 nm against dis.H2O

RESULTS

ABSORBANCE AT 400 nm	REAGENT	SAMPLE 2	SAMPLE 1

CALCULATION OF RESULTS

LIPASE ACTIVITY IN SAMPL1 =

$$\frac{\text{SAMPL1(Ao - A1)- REAGENT(Ao - A1)}}{\text{REAGENT(Ao)}} \times 3000 = \ldots\ldots. \text{ U/L}$$

LIPASE ACTIVITY IN SAMPL2 =

$$\frac{\text{SAMPL2(Ao - A1)- REAGENT(Ao - A1)}}{\text{REAGENT(Ao)}} \times 3000 = \ldots\ldots. \text{ U/L}$$

EXAMPLE

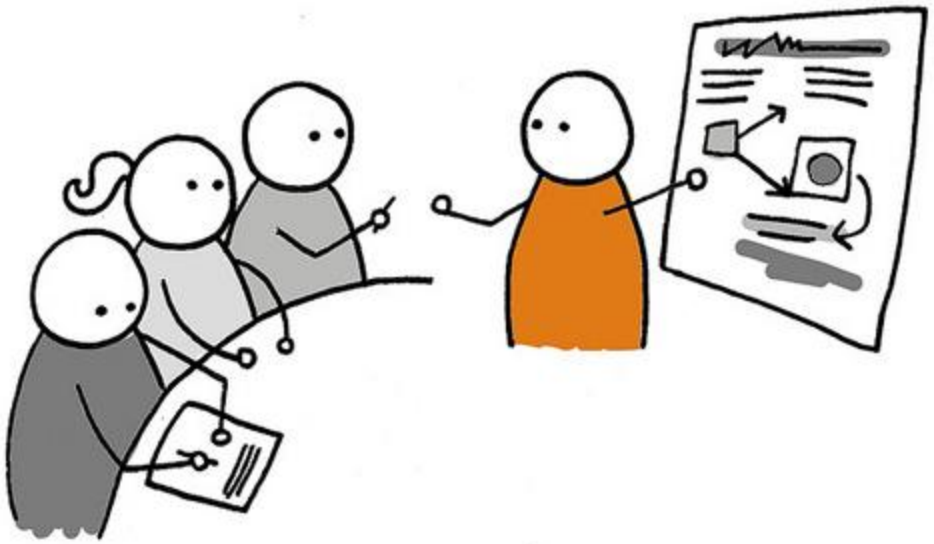
$$\frac{(0.784 - 0.770) - (0.706 - 0.705)}{0.706} \times 3000 = 55 \text{ U/L}$$

PROCEDURE NOTES

Reagent If (A^o - A^1) is a negative value, it should be considered as zero. However, it should normally be between 0.000 and 0.005.

DISCUSSION

Comment on the concentration of amylase in sample 1 and sample 2 .



REFERENCES

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC33354/

- **UDI LIPASE REAGENT SET(TURBIDIMETRIC)**