Triglyceride- test

م.م سهاد طه محمد

Triglycerides

- Triglycerides TG are a type of fat in the blood .The body converts excess fat and stores it as triglycerides
- Most TG found in adipose tissue
- Give energy in case of absence of carbohydrates
- Some TGs circulate in the blood to provide fuel for muscles to work
- Extra triglycerides are found in the blood after meal
- Elevated in obese or diabetic patients. Level increases from eating simple sugars or drinking alcohol.
- Associated with heart and blood vessel disease، because high levels of triglycerides in the blood can lead to the buildup of plaque in the arteries.

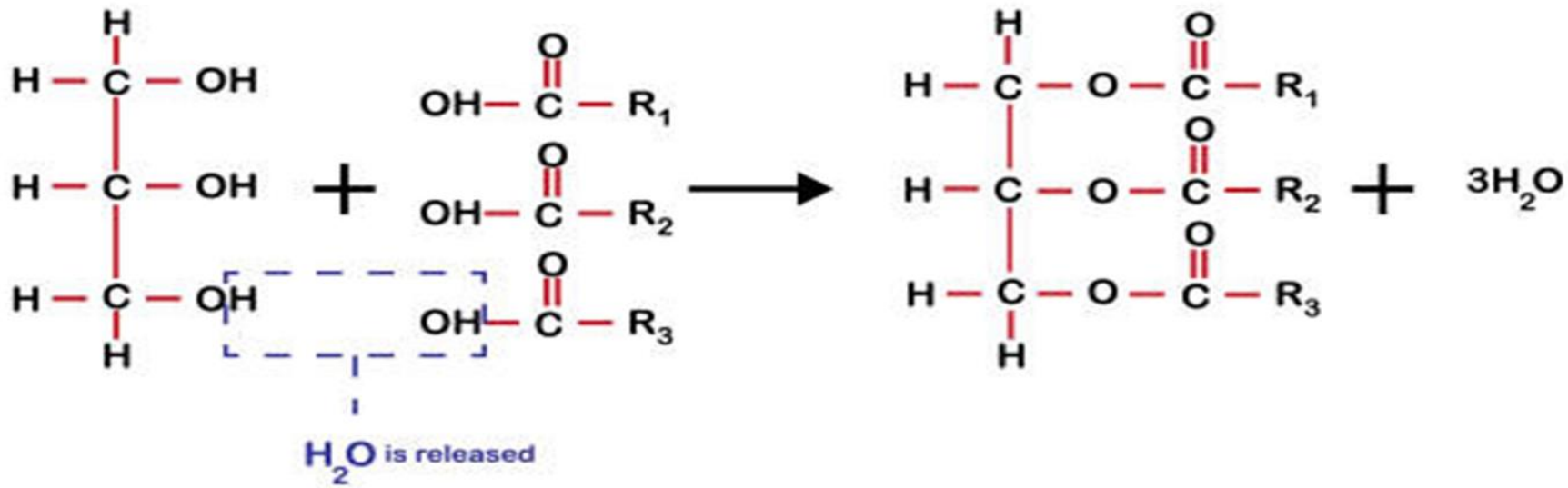
What are Triglycerides

Triglycerides are the esters derived from glycerol and three fatty acids. The two main types of triglycerides are saturated fat and unsaturated fat. Hydrocarbon chains of fatty acids are saturated in saturated fat, while hydrocarbon chains of fatty acids contain double bonds in unsaturated fat.

Chemical reaction

TRIGLYCERIDEs

glycerol + 3 fatty acids → triglycerides



Sources of triglyceride

- These are fatty acid esters of glycerol, and are the main lipids in the diet. They are broken down in the small intestine to a mixture of monoglycerides, fatty acids and glycerol. These products are absorbed, and triglycerides are resynthesized from them in the mucosal cell. Most of these exogenous triglycerides pass into plasma as chylomicrons.
- (Chylomicrons are the principal form in which dietary triglycerides are carried to the tissues).

- Endogenous triglyceride synthesis occurs in the liver from fatty acids and glycerol. The triglycerides synthesized in this way are transported as VLDL.

(VLDLs are triglyceride-rich particles that form the major route whereby endogenous triglycerides are carried to the tissues from the liver).

Lipid profile

- **Lipid profile**: A pattern of lipids in the blood. A lipid profile usually includes the levels of
- **triglycerides**
- total cholesterol
- high-density lipoprotein (HDL) cholesterol.
- low-density lipoprotein (LDL) cholesterol.
- very low-density lipoprotein(VLDL) cholesterol.

$$\textbf{LDL-C} = \textbf{Total Cholesterol} - (\textbf{HDL-C} + \textbf{TG}/5)$$

- Ideally, The above equation : the total cholesterol level should be below 200 milligrams per deciliter (mg/dL).

The difference between triglycerides and cholesterol.

Triglycerides and cholesterol are different types of lipids that circulate in the blood:

- Cholesterol is used to build cells and certain hormones.
- Triglycerides store unused calories and provide the body with energy

Preparing for a Triglyceride Test

To prepare for a triglyceride test, the patient should be asked to **fast for 10-14 hours** before the test. because its level is affected by meal This means no food

(fatty meal, high carbohydrate meal)،or drink

except water.

- the patient also **avoid alcohol** and certain **medications** that can affect on triglyceride levels for several days before the test.

the doctor will give the patient specific instructions based on the individual situation.

What's considered normal?

A simple blood test can reveal whether the triglycerides fall into a healthy range:

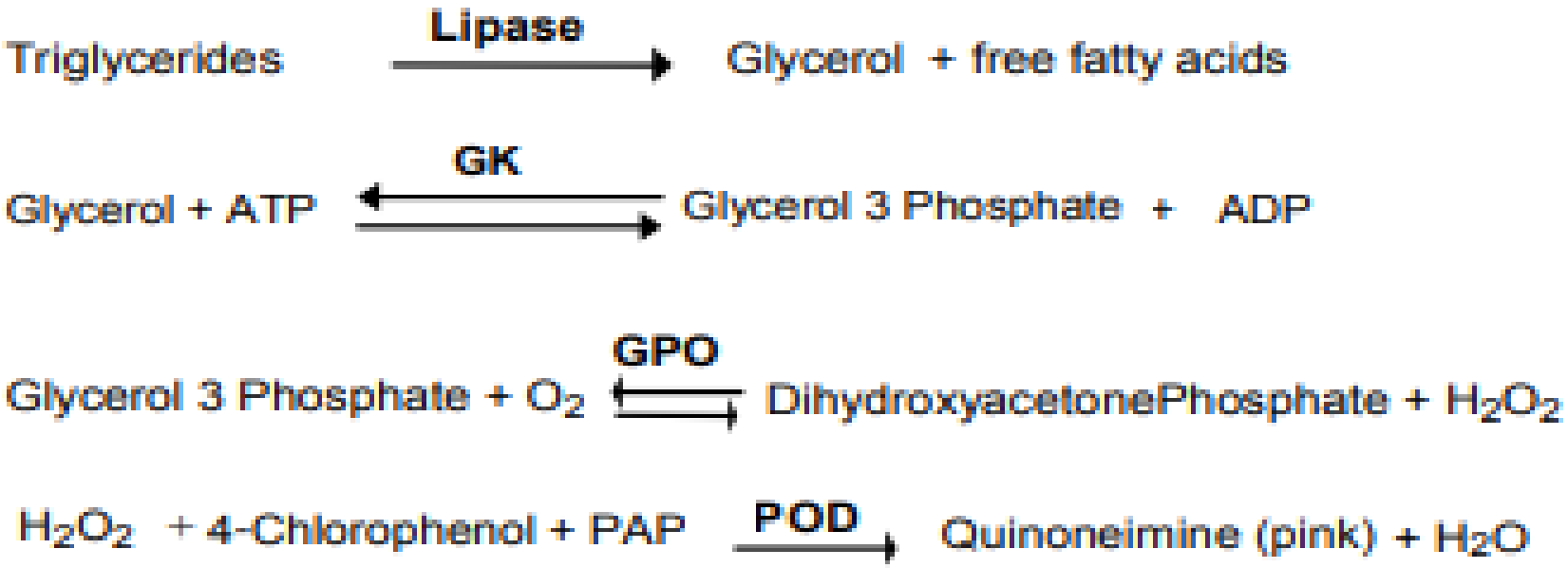
- Normal — Less than 150 milligrams per deciliter (mg/dL),
- **Mild:** 150-199 mg/dL.
- **Moderate:** 200-499 mg/dL.
- **Severe:** Greater than 500 mg/dL.

Factors that may raise triglyceride levels include:

- Excessive alcohol use.
- Family history of high cholesterol.
- Liver disease or kidney disease.
- Medications, including birth control pills, estrogen, immunosuppressive medications.
- Obesity.
- Smoking.
- Hypothyroidism
- Uncontrolled diabetes.
- A diet high in sugar and simple carbohydrates.

Principle:

Reaction scheme is as follows



The absorbance of the colored complex (quinoneimine), proportional to the amount of triglycerides in the specimen, is measured at 505 nm.

Abbreviation:

- Lipase
- Peroxidase (POD)
- Glycerol 3 phosphate oxidase (GPO)
- Glycerol Kinase (GK)
- 4 - Amino – antipyrine (PAP)
- Adenosine triphosphate (ATP)
- Adenosine-diphosphate (ADP)

Quantitative determination of triglycerides

- Temperature (20-25 c˚)
- Wavelength 505nm

	Blank	Standard	Sample
Reagent	1000 µl	1000 µl	1000 µl
Standard(µl)	-----	10µl	-----
Sample(µl)	-----	------	10 µl

*mix and incubate10 min at room temperature

*read the absorbance (A) of the samples and standard against the blank

*the sample color is stable for at least 30 min

Calculation:

- Triglyceride in mg/dl= $\frac{Asample-Ablank}{Astandard-Ablank}$ x 200

- Triglyceride in mMol/L =mg/dl x 0.0113


Thank
you!