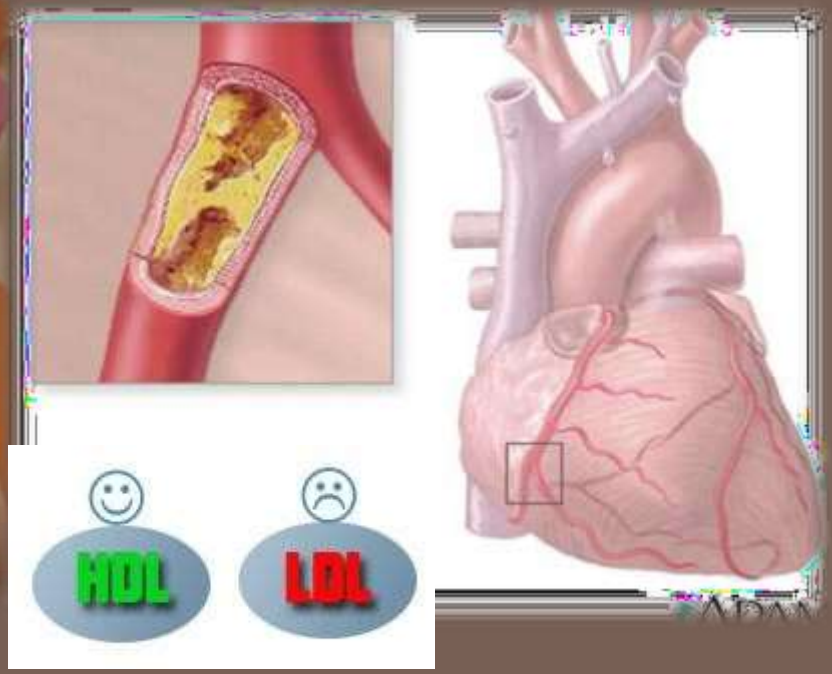
LIPIDS PROFILE



Lipids profile:

Lipid profile test: is a test that measures the amount of certain fat molecules called lipids in your blood..

A lipid profile usually includes the levels of:

- Total cholesterol
- High-density lipoprotein (HDL) cholesterol
- Triglycerides

And Using these values, a laboratory may also calculate:

- ✓ Very low-density lipoprotein (VLDL)
- ✓ low-density lipoprotein (LDL)
- ✓ Cholesterol :HDL ratio

it Ordered to determine the risk of heart disease .

Lipids profile :

- The results of this test can identify certain genetic diseases and can determine approximate risks for cardiovascular disease, certain forms of pancreatitis, and other diseases.

Cholesterol:

- Is steroid
- Cholesterol is a type of fat, found in your blood. It is produced by your body and also comes from the foods you eat (animal products). Cholesterol is needed by your body to maintain the health of your cells. Too much cholesterol leads to coronary artery disease. Your blood cholesterol level is related to the foods you eat or to genetic conditions (passed down from other generations of family members).
- Has important function in body:
  - important part in membrane of cells, organs and tissues in the body
  - is used to make hormones,
  - forms acids that are needed to absorb nutrients from food.

Therefore, cholesterol deficiency is not good.

- Source: 70% synthesized in body,
  30% from food (animal source as meat, eggs and dairy products)

Cholesterol levels:

- High level associated with heart disease
- Good level: below 200 mg/dl (low risk of heart disease).
- Border line: 240mg/dl (if higher at high risk)
- **Notes:**
- Measuring blood cholesterol level not need fasting?

Cholesterol level is not affected by single meal but affected by long term pattern of eating

- This test may be measured any time of the day without fasting. However, if the test is drawn as part of a total lipid profile, it requires a 12-hour fast (no food or drink, except water). For the most accurate results, wait at least two months after a heart attack, surgery, infection, injury or pregnancy to check cholesterol levels.

- Cholesterol level is elevated during pregnancy (till 6 weeks after delivery)
- Some drugs are known to increase cholesterol levels as anabolic steroids, beta blockers, epinephrine, oral contraceptives and vitamin D.

Blood lipoprotein:

- They are lipids carrier particles .
- **Composed of:**

  cholesterol, cholesterol ester, TG, phospholipids and protein

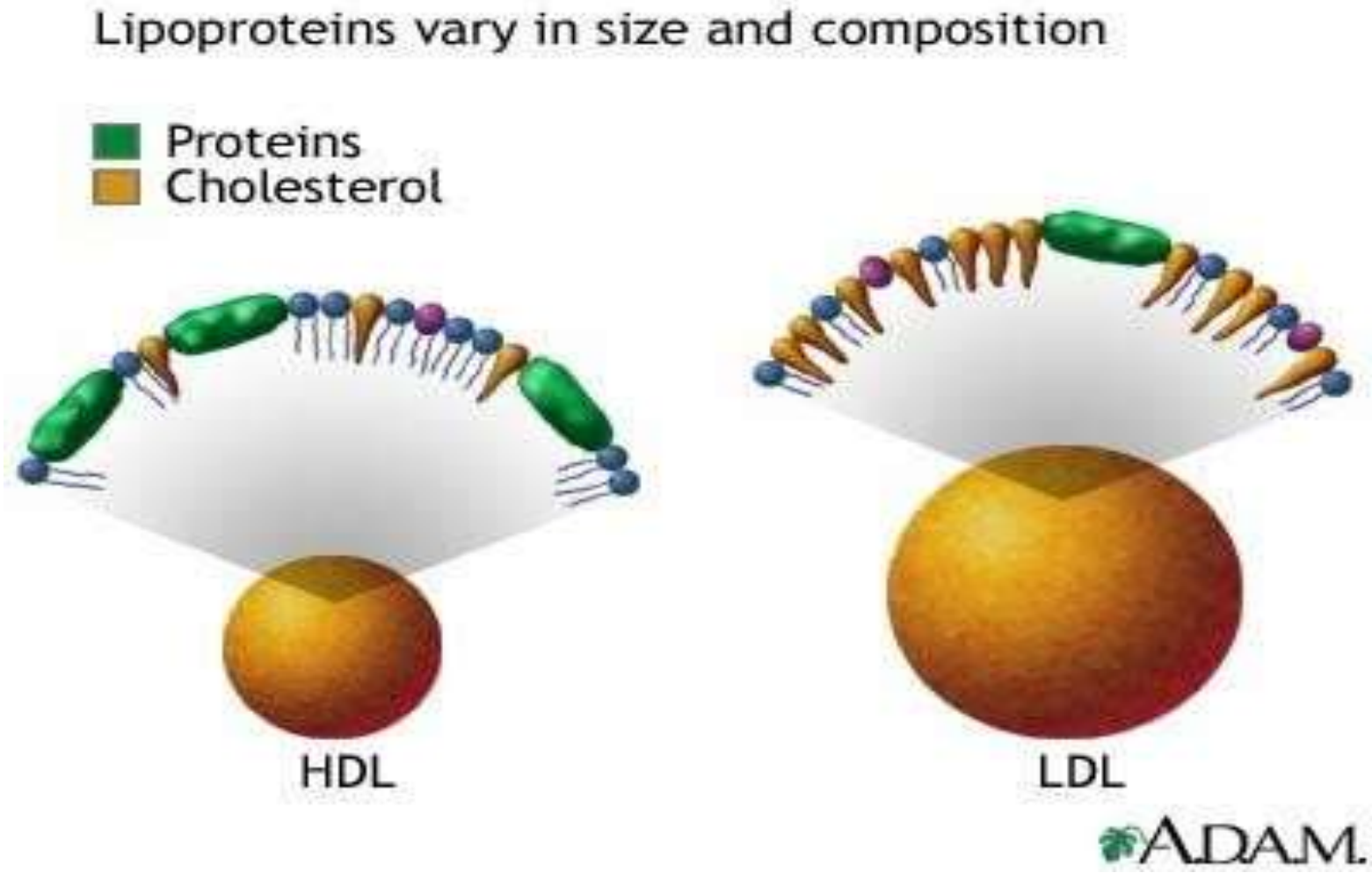
- Four major types: VLDL, LDL, HDL and chylomicron
- They differ in the contents of each composition.

- Function: transport lipids in blood to organs

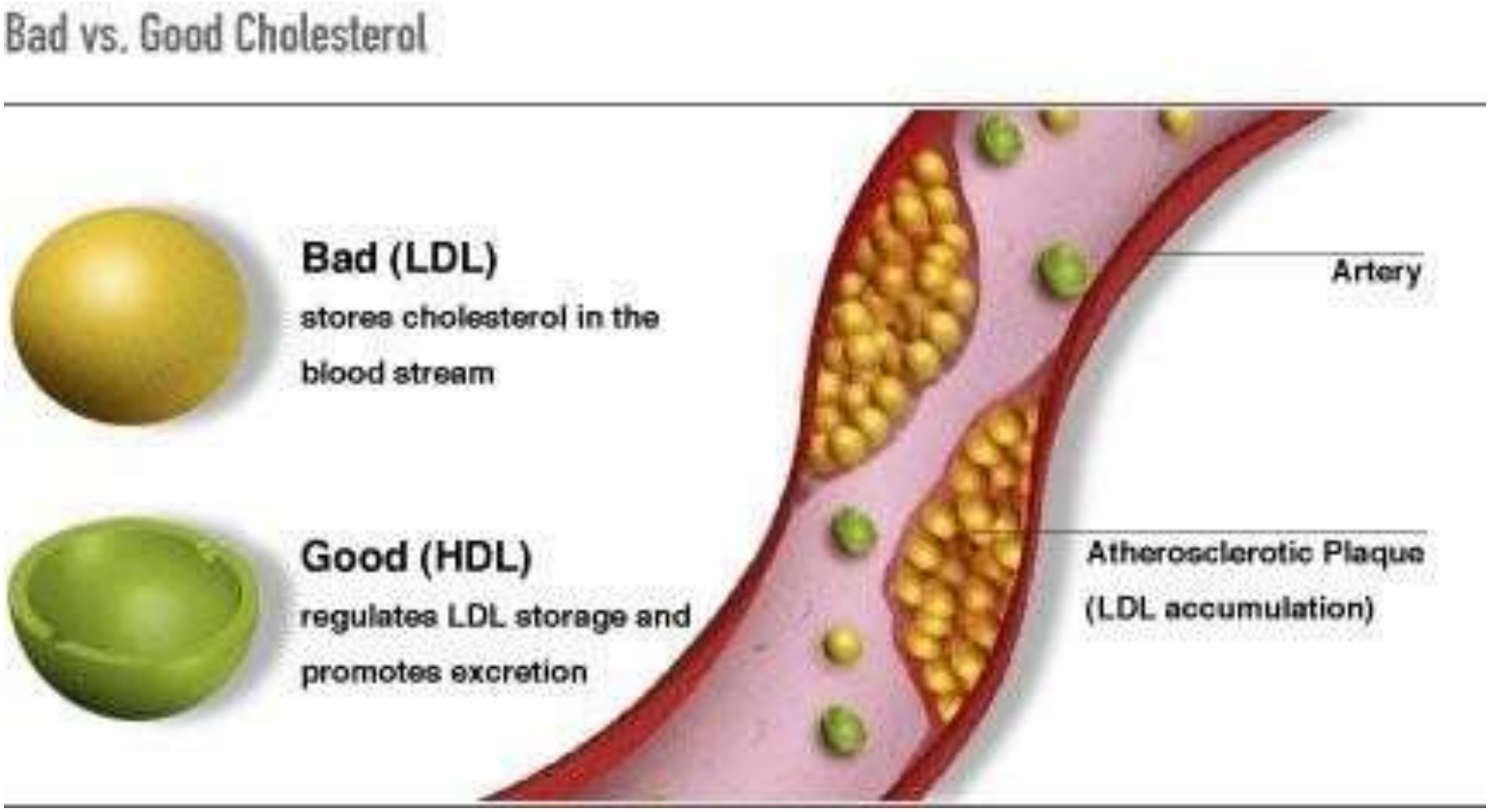
  (lipids are hydrophobic and can't transport in blood without carrier)

- Then these lipids are either: stored in adipose tissue or oxidized to give energy.

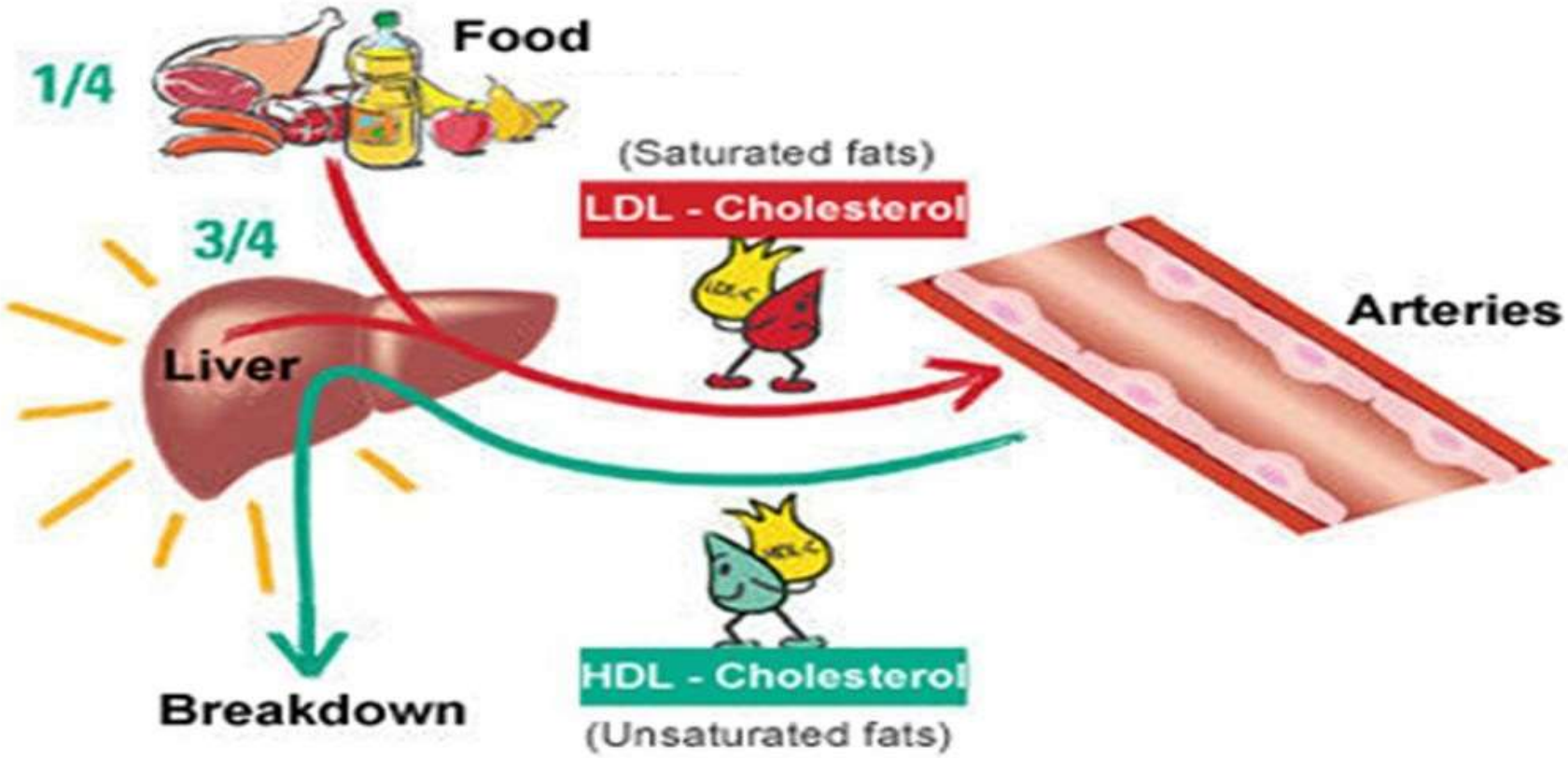
Blood lipoprotein:



Blood lipoprotein:

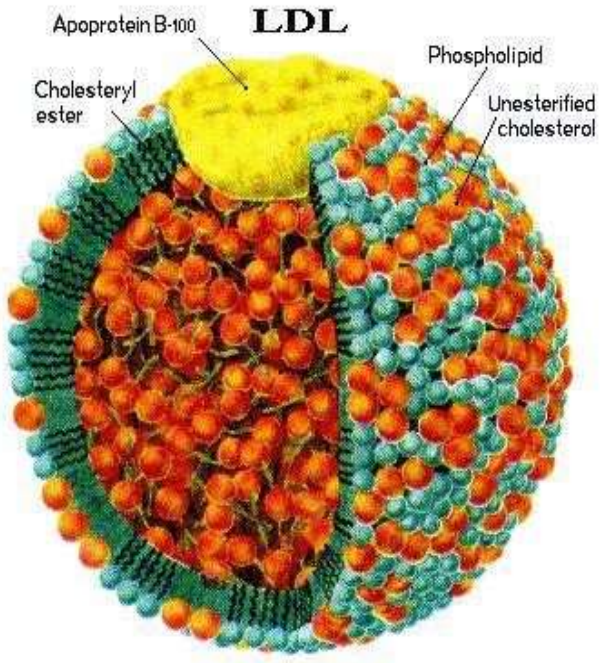


Blood lipoprotein:



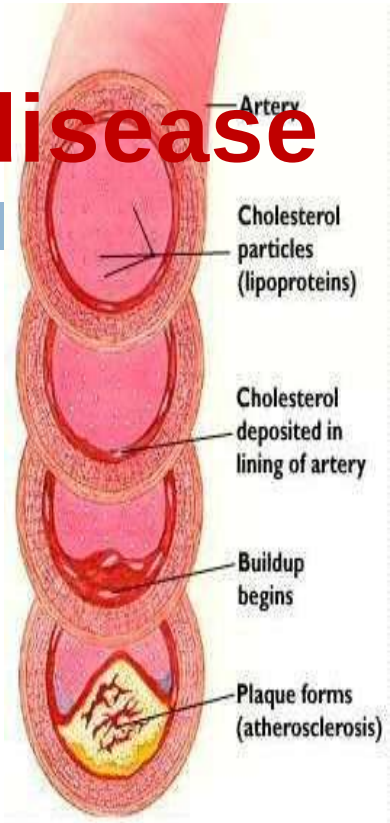
LDL (low density lipoprotein):

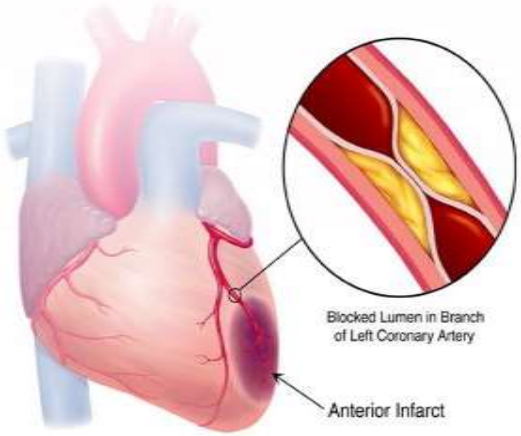
- LDL: bad cholesterol " carry cholesterol from liver to blood then to organs
- It has less protein content and contains more cholesterol.
- LDL cholesterol is easy to stick to the walls of blood vessels.
- High LDL in blood associated with atherosclerosis, heart disease and myocardial infraction
- Reducing LDL levels is a major treatment target for cholesterol-lowering medications.
- Because high LDL in blood will deposited in blood artery and trigger clot formation



Risk of high LDL and heart disease

- High blood LDL will deposit cholesterol in the inner walls of the arteries that feed the heart and brain.
- It can form plaque (thick, hard deposit) that can narrow the arteries and make them less flexible.
- This condition is known as atherosclerosis.
- If a clot forms and blocks a narrowed artery, heart attack or stroke can result.





LDL-Cholesterol levels:

Blood should be collected after a 12-hour fast (no food or drink, except water). For the most accurate results, wait at least 2 months after a heart attack, surgery, infection, injury or pregnancy to check LDL levels.

Goal values:

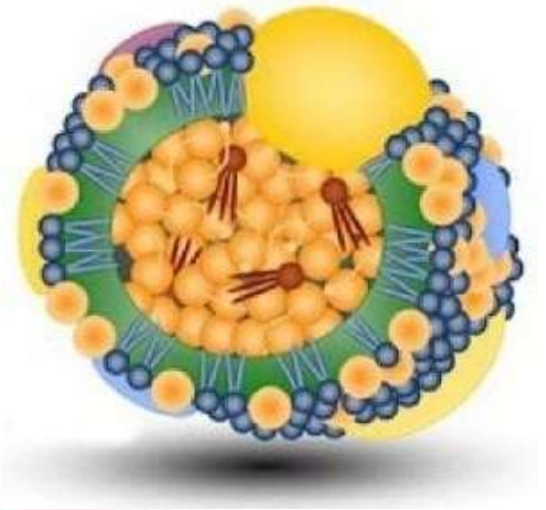
- Good level: below 100 mg/dl (low risk of heart disease).
- Border line: 100- 120mg/dl
- High risk : < 120mg/dl

Measuring LDL-C level:

- LDL level calculated either : directly or by equation
- LDL= Total cholesterol -(HDL+TG/5)

HDL (high density lipoprotein) :

- HDL: good cholesterol, carry cholesterol from organs and blood to liver to get rid of it
- It removes excess cholesterol from tissues (it cleans blood).
- High levels linked to a reduced risk of heart and blood vessel disease. The higher your HDL level, the better.



HDL levels:

Goal value:

- Greater than 40 mg/dL
- A good level of HDL is 60 mg/dl or more.

Preparation:

- This test may be measured any time of the day without fasting. However, if the test is drawn as part of a total lipid profile, it requires a 12-hour fast (no food or drink, except water). For the most accurate results, wait at least two months after a heart attack, surgery, infection, injury or pregnancy to check HDL levels.

Triglycerides TG:

- Triglyceride is body storage form of fat and energy
- Most TG found in adipose tissue
- Give energy in case of absence of carbohydrates
- Some triglycerides circulate in the blood to provide fuel for muscles to work.
- Extra triglycerides are found in the blood after

  meal TG "gut" >>>> blood>>>> adipose
- Elevated in obese or diabetic patients.
- It increases after eating sugars or drinking alcohol.
- Associated with heart and blood vessel disease.

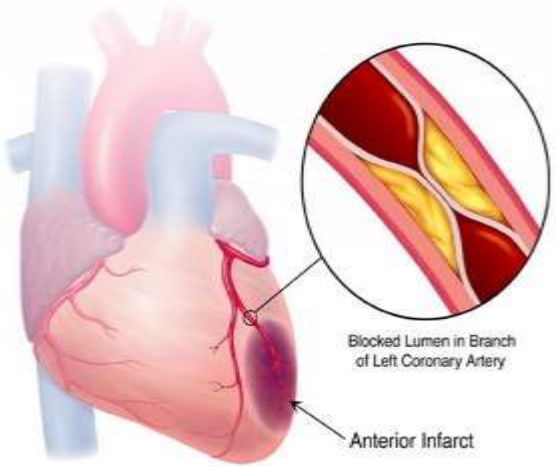
TG levels:

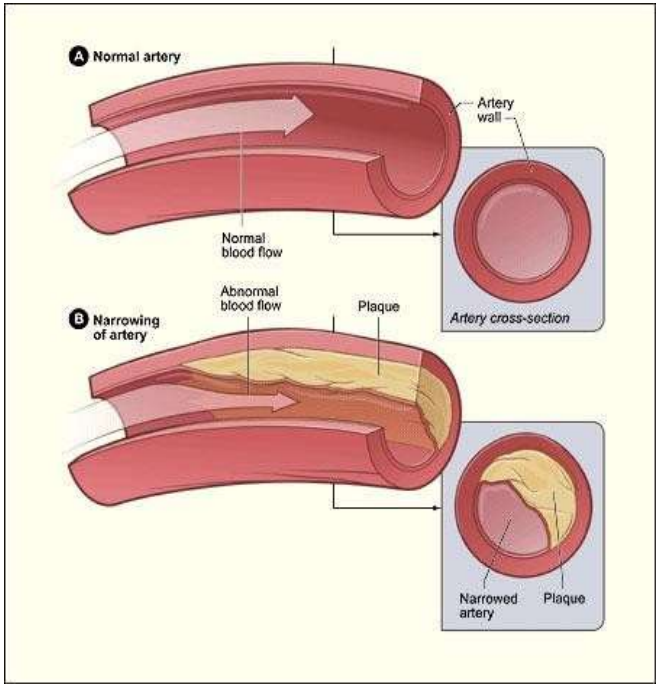
- TG test needs 12 hrs fasting because its level is effected by meal (fatty meal, high carbohydrates meal)
- Level should be: Less than 150 mg/dl
- High TG leads to fatty liver

HYPERLIPIDEMIA

- Is the condition of abnormally elevated levels of any or all lipids and/or lipoproteins in the blood. It consider a heterogeneous group of disorders.

blood (left for 4h)
LDL >120 mg/dl
markedly abnormal





HYPERLIPIDEMIA

- **Hyperlipidemia** is a major, modifiable risk factor for atherosclerosis and cardiovascular disease, including coronary heart disease; this is true both of disorders involving hypercholesterolemia and hypertriglyceridemia

TYPES OF HYPERLIPIDEMIA

- Primary hyperlipidemias are probably genetically based, but the genetic defects are known for only a minority of patients
- Secondary hyperlipidemia may result from diseases such as diabetes, thyroid disease, renal disorders, liver disorders, and Cushing's syndrome, as well as obesity, alcohol consumption, estrogen administration, and other drug-associated changes in lipid metabolism

Procedure for cholesterol and TG

-Follow the table:

	Blank	Standard	Test
Reconstituted Reagent	1 ml	1 ml	1 ml
Pre-worm at 37◦C for 2 min and add:			
Standard	---	0.01 ml (10 µl)	---
Sample	---	---	0.01 ml (10 µl)
Mix and incubate at 37ºC for 10 min ↓ Read the absorbance of standard and sample at 505 nm against blank			

CALCULATIONS

Total cholesterol = HDL + LDL + VLDL

VLDL = Triglyceride / 5

LDL = Total cholesterol – (HDL + Triglyceride / 5)