

# Electrophoresis

# Electrophoresis

- Electrophoresis is derived from the Greek word "ηλεκτροφόρηση" which means "to bear electrons".
- Electrophoresis of positively charged particles (cations) is sometimes called cataphoresis.
- Electrophoresis of negatively charged particles (anions) is sometimes called anaphoresis.
- Electro – charged particle; phoresis – movement.

# Rate of migration of charged molecules depends upon:

1. The strength of electric field, size and shape.
2. Relative hydrophobicity of the sample.
3. Ionic strength and temperature of the buffer.
4. Molecular size of the analysing bio molecule.
5. Net charge and density of the analysing bio molecule.
6. Shape of the analysing bio molecule.

# Types of electrophoresis

Depending upon the presence or absence of supporting media:

- Zone Electrophoresis
  1. Paper Electrophoresis
  2. Gel Electrophoresis
  3. Thin Layer Electrophoresis
  4. Cellulose acetate Electrophoresis
- Moving Boundary Electrophoresis
  1. Capillary Electrophoresis
  2. Isotachopheresis
  3. Isoelectric Focusing
  4. Immuno Electrophoresis

# Serum protein electrophoresis

SPE yields in five fractions:

1. Albumin fraction
2. Alpha 1 globulin fraction
3. Alpha 2 globulin fraction
4. Beta globulin fraction
5. Gamma globulin fraction

# Lipoproteins

- Lipoproteins are a group of particles that are responsible for transporting lipids throughout the body. Each particle contains a combination of protein, cholesterol, triglyceride, and phospholipid molecules.
- There are four major classes of circulating lipoproteins, each with its own characteristic protein and lipid composition. They are chylomicrons, very low-density lipoproteins (VLDL), low-density lipoproteins (LDL), and high-density lipoproteins (HDL).



**Chylomicron**



**VLDL**



**IDL**



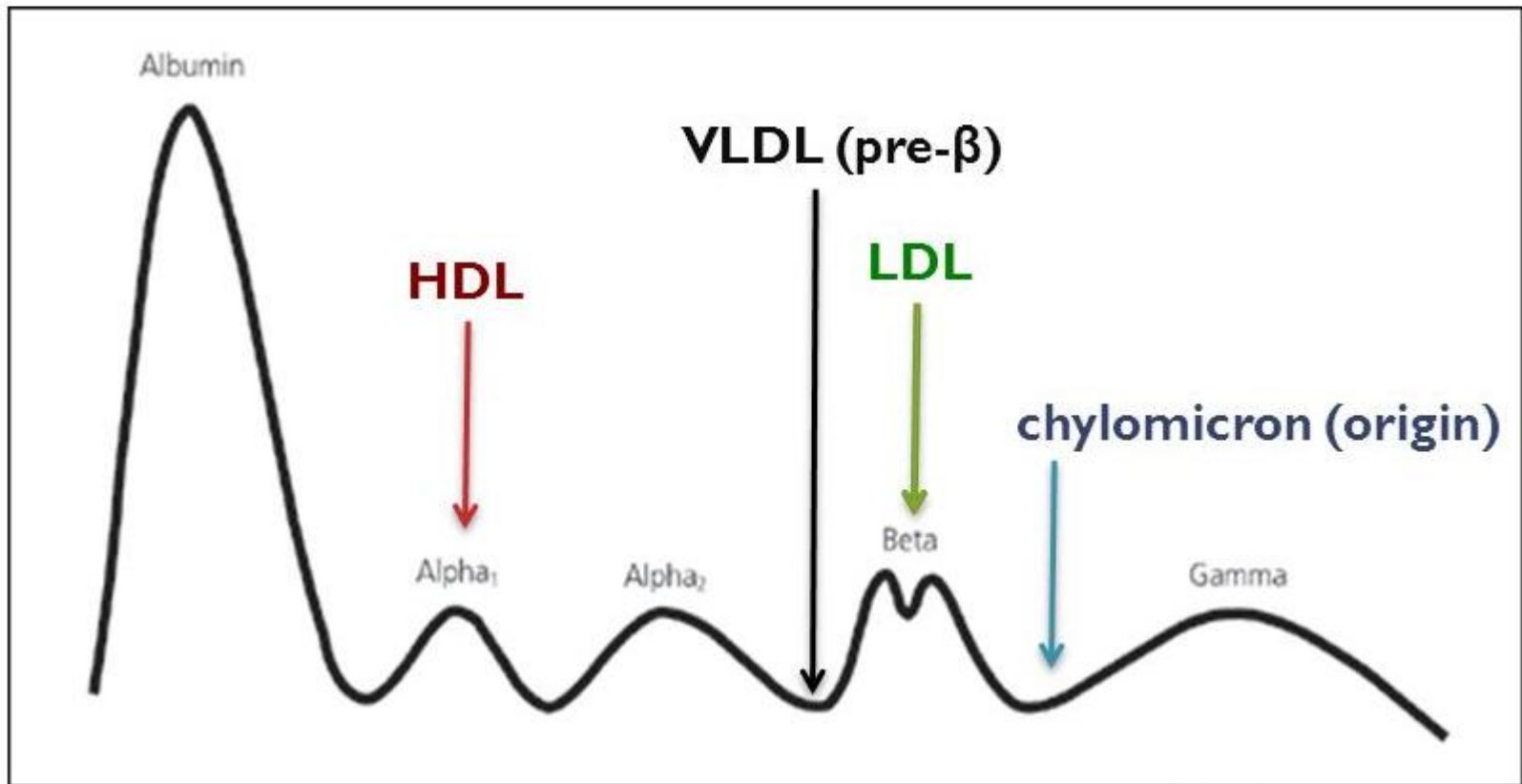
**LDL**



**HDL**

# Classification of lipoproteins

## Agarose gel electrophoresis





# Hemoglobin

- Hemoglobin, the oxygen-carrying protein inside red blood cells, comes in many molecular forms, some normal and some abnormal.
- Abbreviated Hb or Hgb.
- It is a iron containing oxygen transport metalloprotein in the RBC.
- Hemoglobin has an oxygen binding capacity of 1.34 mL O<sub>2</sub> per gram.
- 1 molecule carry 4 molecule of O<sub>2</sub>.
- Normal hemoglobin carries and releases oxygen efficiently, while abnormal hemoglobin doesn't and lead to hemoglobinopathies.