



Lecture 9

(Anticoagulant)

- Is a substance that prevents blood from coagulation or clotting.
- The most common anticoagulants used in hematology are:
 1. EDTA: Ethylene Diamine Tetra acetic acid
 2. Sodium citrate
 3. Heparin
 - EDTA and sodium citrate prevent coagulation by removing calcium
 - Heparin acts by forming complex with plasma anti- thrombin, which inhibits thrombin and other stages of clotting factor activation.

1)EDTA:

- Its used in a concentration of 1 to 2 mg/ml of blood
- It may be used for both hematology and chemistry tests, and is the preferred anticoagulant for blood cell counts (CBC), ABO Blood grouping.

2) Sodium citrate:

- The ratio is one part of 3.8% aqueous solution to nine parts of whole blood.
- Its used for blood coagulation and platelet function studies (PT &PTT) and can be used for Erythrocyte sedimentation rate (ESR).



3) Heparin

- Its concentration is 0.1 to 0.2 mg/ml of blood.
- Its good for prevention of hemolysis but it is not satisfactory for leukocyte or platelet counts because of cell clumping.

Stopper color	Additive	Notes
 Lavender tube (purple)	EDTA	<ul style="list-style-type: none"> • Collection of whole blood (binds calcium)
 Green	Sodium or lithium heparin	<ul style="list-style-type: none"> • Inhibits thrombin activation. •chemistry studies
 Gray	<ul style="list-style-type: none"> •fluoride & potassium oxalate: inhibits enolase (phosphopyrovate dehydrogenase) •Sodium iodoacetate: inhibits glucose-3-phosphate dehydrogenase 	<ul style="list-style-type: none"> • For glucose determination in chemistry (stabilize glucose in plasma)



 light blue	Sodium citrate	<ul style="list-style-type: none"> •Coagulation studies (bind calcium) (PT &PTT) (ESR).
 Yellow	Acid citrate dextrose (ACD)	<ul style="list-style-type: none"> •For use in blood bank studies, HLA phenotyping, DNA and paternity testing (preserves red cells)
Red	No additive	<ul style="list-style-type: none"> •Used for blood bank, some chemistries. •Collection of serum

Blood Bag





Blood Containers

- Blood must be collected into an FDA-approved container that is pyrogen-free and sterile
- and contains sufficient anticoagulant for the quantity of blood to be collected.
- The container label must state the type and amount of anticoagulant and the approximate amount of blood collected.
- Blood bags may be supplied in packages containing more than one bag. The manufacturer's directions should be followed for the length of time unused bags may be stored in packages
 - that have been opened.

Blood Collection

- Whole blood is collected in clear plastic bags that contain different mixtures of anticoagulants:
 1. Citrate: chelate calcium, preventing coagulation
 2. Phosphate: prevents pH from dropping
 3. Dextrose: provides nutrients to RBCs during storage