

Anticoagulants: blood coagulates when withdrawn from the vessel & anticoagulants are used to prevent blood from clotting

Anticoagulant	Mechanism
Antithrombin III	it inhibits the activity of thrombin & other factors like XIIa, XIa, Xa, IXa; it is activated by binding to heparin-like molecules
Proteins C & S	these proteins are vitamin-K dependent proteins which inactivate Va & VIIIa
Endothelial prostacyclin (PGI ₂) & NO	these are potent vasodilators & inhibitors of platelet aggregation
Tissue factor pathway inhibitor	This is derived from the endothelium & inhibits tissue factor VIIa & Xa molecules
Thrombomodulin	It is produced by all endothelial cells except those in the cerebral microcirculation; it binds to thrombin, & this complex activates protein C (in the presence of protein S), which finally inactivates factor V & VIII.

Classification of Anticoagulants:

Vitamin K Antagonists	Warfarin
Direct Thrombin Inhibitors (DTI)	Parenteral - Monovalent: DTI - argatroban Bivalent: DTI - lepirudin, desirudin, Oral: Dabigatran bivalirudin
Indirect thrombin inhibitors	- Unfractionated heparin - Low mol. wt. heparins: enoxaparin, dalteparin, tinzaparin, nadroparin
Indirect factor Xa inhibitors	Fondaparinux
Oral Direct factor <u>Xa</u> inhibitors	- Rivaroxaban - Apixaban - Edoxaban - Betrixaban

Specific Reversal Agents for Anticoagulants:

Heparin $\Rightarrow$ protamine sulfate

Warfarin $\Rightarrow$ vitamin K

Rivaroxaban & other oral Xa inhibitors $\Rightarrow$ andexanet α

Dabigatran $\Rightarrow$ idarucizumab.

Vacutainer Tubes:

Colour	Anticoagulant	Use
Red	No anticoagulant	Serological examination in biochemistry
White	Sodium fluoride	Glucose estimation
Purple	EDTA	Haematological examination like complete hemogram, ESR
Blue	3.2% sodium citrate	Coagulation studies like PT, APTT
Green	Heparin	Bone marrow studies
Yellow	Citrate	Blood culture
Pink	(K ₂) EDTA	Blood bank tests, Blood typing, ABO grouping, etc.