

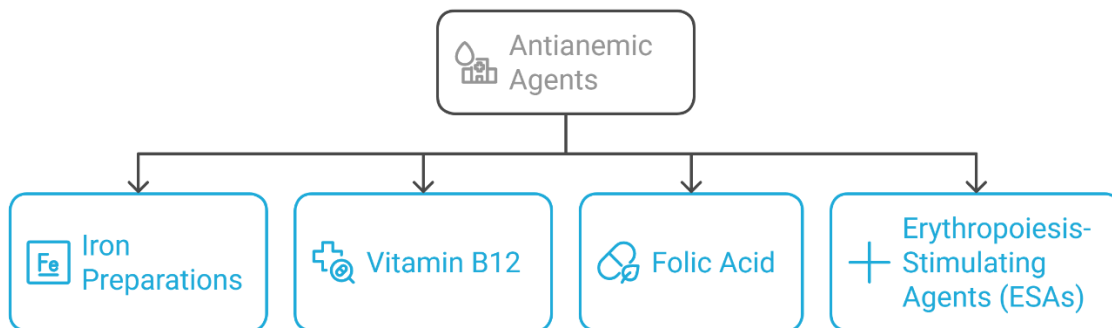
Drugs Acting on Blood and Blood Forming Organs

Hematinic Agents

Definition

- Hematinics are substances used to **improve the quality or quantity of blood**, specifically by **increasing hemoglobin levels** or **stimulating red blood cell production**.
- They are commonly used to treat **anemias** of various etiologies.

Classification



1. Iron Preparations

- **Oral:** Ferrous sulfate, Ferrous gluconate, Ferrous fumarate
- **Parenteral (IV/IM):** Iron sucrose, Ferric carboxymaltose, Iron dextran

2. Vitamin B12 (Cyanocobalamin, Hydroxocobalamin)

- Oral or IM

3. Folic Acid

- Oral or IV

4. Erythropoiesis-Stimulating Agents (ESAs)

- Erythropoietin (Epoetin alfa, Darbepoetin alfa)

Pharmacological Actions

1. Iron preparations:

- Iron is required for hemoglobin synthesis.
- Oral iron is absorbed in the duodenum and jejunum.
- Parenteral iron is used when oral iron is not tolerated or ineffective.

2. Vitamin B12:

- Necessary for DNA synthesis, especially in rapidly dividing cells such as erythroid precursors.
- Deficiency causes megaloblastic anemia and neurological symptoms.

3. Folic Acid:

- Required for purine and pyrimidine synthesis.
- Deficiency leads to megaloblastic anemia.

4. ESAs:

- Stimulate bone marrow to increase production of red blood cells.
- Especially useful in anemia of chronic kidney disease.

Dose (Typical ranges)

Drug	Typical Dose
Ferrous sulfate	200 mg (65 mg elemental iron) 1–3 times/day
Iron sucrose (IV)	100–200 mg per dose weekly
Vitamin B12 (IM)	1000 mcg/day for 1 week, then weekly/monthly
Folic acid (oral)	1–5 mg/day
Epoetin alfa (SC/IV)	50–150 IU/kg 3 times/week

Indications

- Iron deficiency anemia
- **Megaloblastic anemia** (B12 or folate deficiency)
- Anemia of chronic disease
- **Anemia in chronic kidney disease** (CKD)
- **Anemia in chemotherapy** patients (ESA support)
- Pregnancy-related anemia

Contraindications

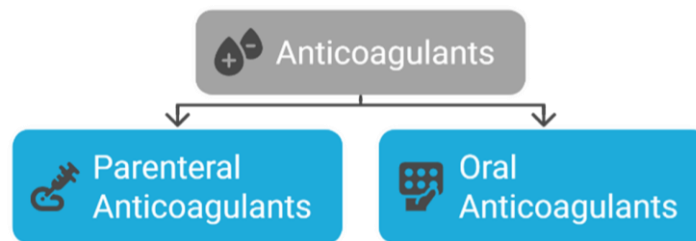
- **Oral iron:** Hemochromatosis, peptic ulcer, inflammatory bowel disease
- **Parenteral iron:** Active infection, hypersensitivity (especially with iron dextran)
- **Vitamin B12:** Leber's disease (may cause optic neuropathy)
- **Folic acid:** Untreated vitamin B12 deficiency (may mask symptoms)
- **ESAs (Erythropoiesis-Stimulating Agents):** Uncontrolled hypertension, risk of tumor progression in cancer

Anti-Coagulants

Definition

- Anticoagulants are drugs that **inhibit clot formation** by acting on **various steps of the coagulation cascade**.
- They prevent **venous thromboembolism, stroke, and clot propagation**, without breaking down existing clots.

Classification



1. Parenteral Anticoagulants

- Heparin (unfractionated)
- **Low Molecular Weight Heparins (LMWH):** Enoxaparin, Dalteparin
- Fondaparinux (Factor Xa inhibitor)
- **Direct thrombin inhibitors:** Argatroban, Bivalirudin

2. Oral Anticoagulants

- **Vitamin K antagonists:** Warfarin, Acenocoumarol
- Direct Oral Anticoagulants (DOACs):
 - **Direct thrombin inhibitor:** Dabigatran
 - **Factor Xa inhibitors:** Rivaroxaban, Apixaban, Edoxaban

Pharmacological Actions

1. Heparin (UFH):

- Binds to antithrombin III → inactivates thrombin (IIa) and factor Xa → prevents clot formation.
- Rapid onset, short half-life.

2. LMWHs:

- Inhibit mainly factor Xa.
- Longer half-life, more predictable response, no need for frequent monitoring.

3. Warfarin:

- Inhibits vitamin K-dependent synthesis of factors II, VII, IX, and X in the liver.
- Delayed onset (3–5 days); requires INR monitoring.

4. DOACs:

- Directly inhibit thrombin (Dabigatran) or Factor Xa (Rivaroxaban, Apixaban).
- Rapid onset, fixed doses, no routine monitoring need

Dose (examples only)

Drug	Typical Dose
Heparin (IV)	Bolus: 5000 U → infusion 1000 U/hr (titrated to aPTT)
Enoxaparin (SC)	1 mg/kg every 12 hours
Warfarin (oral)	2–10 mg/day (titrated to INR 2–3)
Rivaroxaban	10–20 mg/day (depending on indication)
Dabigatran	150 mg twice/day

Indications

- Deep vein thrombosis (DVT)
- Pulmonary embolism (PE)
- Atrial fibrillation (stroke prevention)
- Mechanical heart valves (Warfarin)
- Post-surgical thromboprophylaxis
- Acute coronary syndrome (in combination with antiplatelets)

Contraindications

- **Heparin / LMWH (Low Molecular Weight Heparin):** Active bleeding, severe thrombocytopenia (Heparin-Induced Thrombocytopenia - HIT), recent brain or spinal surgery
- **Warfarin:** Pregnancy, liver failure, uncontrolled bleeding
- **DOACs (Direct Oral Anticoagulants):** Severe renal impairment (especially Dabigatran), active bleeding
- **All (anticoagulants):** Intracranial hemorrhage, peptic ulcer, recent major surgery (relative contraindication)

Anti-Platelet Agents

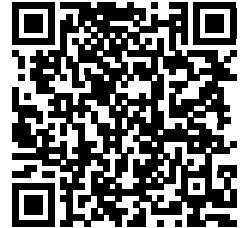


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