Haematinics

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Overview

- Haematinics are medicines used to treat and prevent anaemia, a condition marked by a deficiency of healthy red blood cells or haemoglobin.
- Hemoglobin is essential for oxygen transport in the body, and its deficiency can result in symptoms such as fatigue, weakness, shortness of breath, and dizziness.
- Haematinics provide the necessary nutrients for the production of red blood cells and hemoglobin.

Key Components of Haematinics

1. **Iron**
   - Vital for hemoglobin synthesis.
   - Deficiency is common in women and children.
   - Supplements are available in oral or intravenous forms.
2. **Vitamin B12 (Cobalamin)**
   - Required for red blood cell production and nervous system health.
   - Deficiency leads to pernicious anemia.
   - Commonly affects older adults and vegetarians due to dietary restrictions or absorption issues.
3. **Folic Acid (Vitamin B9)**
   - Essential for cell production, including red blood cells.
   - Deficiency causes megaloblastic anemia.
   - Crucial during pregnancy to prevent neural tube defects in the developing fetus.

Mechanism of Action

- Haematinics support erythropoiesis, the production of red blood cells in the bone marrow.

They work by:

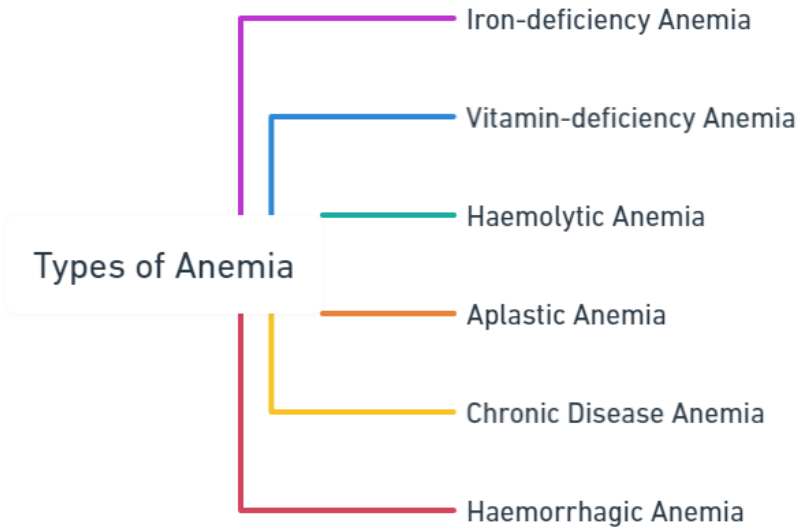
- Increasing the availability of building blocks for hemoglobin synthesis.
- Promoting the proliferation and maturation of red blood cell precursors.
- Correcting nutritional deficiencies that contribute to anemia.

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Uses and Indications:

1. **Iron Deficiency Anemia:** Treatment and prevention, especially in high-risk groups.
2. **Pernicious Anemia and Other B12 Deficiency States:** Due to dietary deficiencies, absorption issues, or certain autoimmune conditions.
3. **Folic Acid Deficiency:** Prevention and treatment, particularly in pregnant women to prevent birth defects.

Some common types of anaemia include:



1. Iron-deficiency Anemia:

- Most common type, due to iron shortage for hemoglobin production.
- Causes include poor diet, bad absorption, or increased demand (e.g., pregnancy).

2. Vitamin-deficiency Anemia:

- Results from a lack of vitamins like B12 or folic acid needed for RBC production.
- Pernicious anemia is a B12 deficiency due to no intrinsic factor for absorption.

3. Haemolytic Anemia:

- RBCs are destroyed faster than made, due to inherited (e.g., sickle cell, thalassemia) or acquired reasons (e.g., autoimmune, infections).

4. Aplastic Anemia:

- Rare, severe type; bone marrow fails to make enough RBCs.
- Causes include radiation, certain drugs, or autoimmune diseases.

5. Chronic Disease Anemia:

- Linked to long-term illnesses (e.g., kidney disease, cancer) affecting RBC production/survival.

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6. Haemorrhagic Anemia:

- From significant blood loss (trauma, surgery, heavy periods), depleting RBCs and iron.

Various Haematinics

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1. Ferrous Sulphate

Synonyms

- Iron(II) sulfate
- Green vitriol
- Copperas

Chemical Formula

- **$FeSO_4 \cdot 7H_2O$** (heptahydrate form is most common in pharmaceuticals)

Physical Properties

- Appearance: Pale green crystalline solid
- Solubility: Soluble in water, insoluble in alcohol
- Odor: Odorless
- Taste: Metallic, astringent
- Melting Point: Decomposes before melting
- Hygroscopic: Absorbs moisture from air

Chemical Properties

- **Oxidation**: Easily oxidized in air to ferric (Fe^{3+}) state.
- **Reaction with bases**: Precipitates iron hydroxide ($Fe(OH)_2$)
- **Acid reaction**: Dissolves in dilute acids to form iron salts
- **Thermal decomposition**: On heating, loses water and eventually decomposes to iron oxide and sulfur dioxide.

Pharmaceutical Formulations

- Tablets (usually enteric-coated to avoid gastric irritation)
- Syrups
- Drops

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- Extended-release capsules

Market Preparations

- Fefol® (Ferrous sulfate + folic acid)
- Orofer-S®
- Ferroglobin®
- Various generics available globally

Storage Conditions

- Store in tightly closed containers
- Protect from moisture and air (oxidation risk)
- Store in a cool, dry place

Uses

- Treatment and prevention of iron-deficiency anemia
- Used in pregnancy-related anemia
- Supplement in chronic blood loss conditions (e.g., ulcers, menstruation)

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2. Ferrous Fumarate

Synonyms

- Iron(II) fumarate

Chemical Formula

- **$C_4H_2FeO_4$**

Physical Properties

- Appearance: Reddish-orange powder
- Solubility: Poorly soluble in water
- Odor: Odorless
- Taste: Slightly metallic
- Stability: More stable and less irritating than ferrous sulfate

Chemical Properties

- **Less oxidizable** compared to ferrous sulfate

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- Reacts with acids to form soluble iron salts
- Decomposes at high temperatures

Pharmaceutical Formulations

- Tablets (film-coated)
- Capsules
- Syrups
- Extended-release forms

Market Preparations

- Ferose®
- Tonoferon®
- Hemfer®
- Often combined with folic acid or vitamin B12

Storage Conditions

- Store in well-closed containers
- Protect from light and moisture
- Cool, dry conditions preferred

Uses

- Management of iron-deficiency anemia
- Preferred in patients with gastric sensitivity
- Used in iron supplementation during pregnancy and lactation

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3. Ferric Ammonium Citrate

Synonyms

- Ammonium iron(III) citrate
- Brown or green ferric citrate (depending on the type)

Chemical Formula

- Variable: Commonly represented as $[NH_4]_5[Fe(C_6H_4O_7)_2]\cdot xH_2O$

Physical Properties

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