Anaemia

Definition and Etiology

Anaemia is defined as an absolute decrease in the red cell mass as measured by RBC count,hemoglobinconcentration, and PCV.

It can develop from loss, destruction, or lack of production of RBC

Anaemia- Classification

- **Anemia is classified as**
- **Regenerative**
- **Non regenerative**

Regenerative anaemia

- In a regenerative anemia, the bone marrow responds appropriately to the decreased red cell mass by increasing RBC production and releasing reticulocytes.

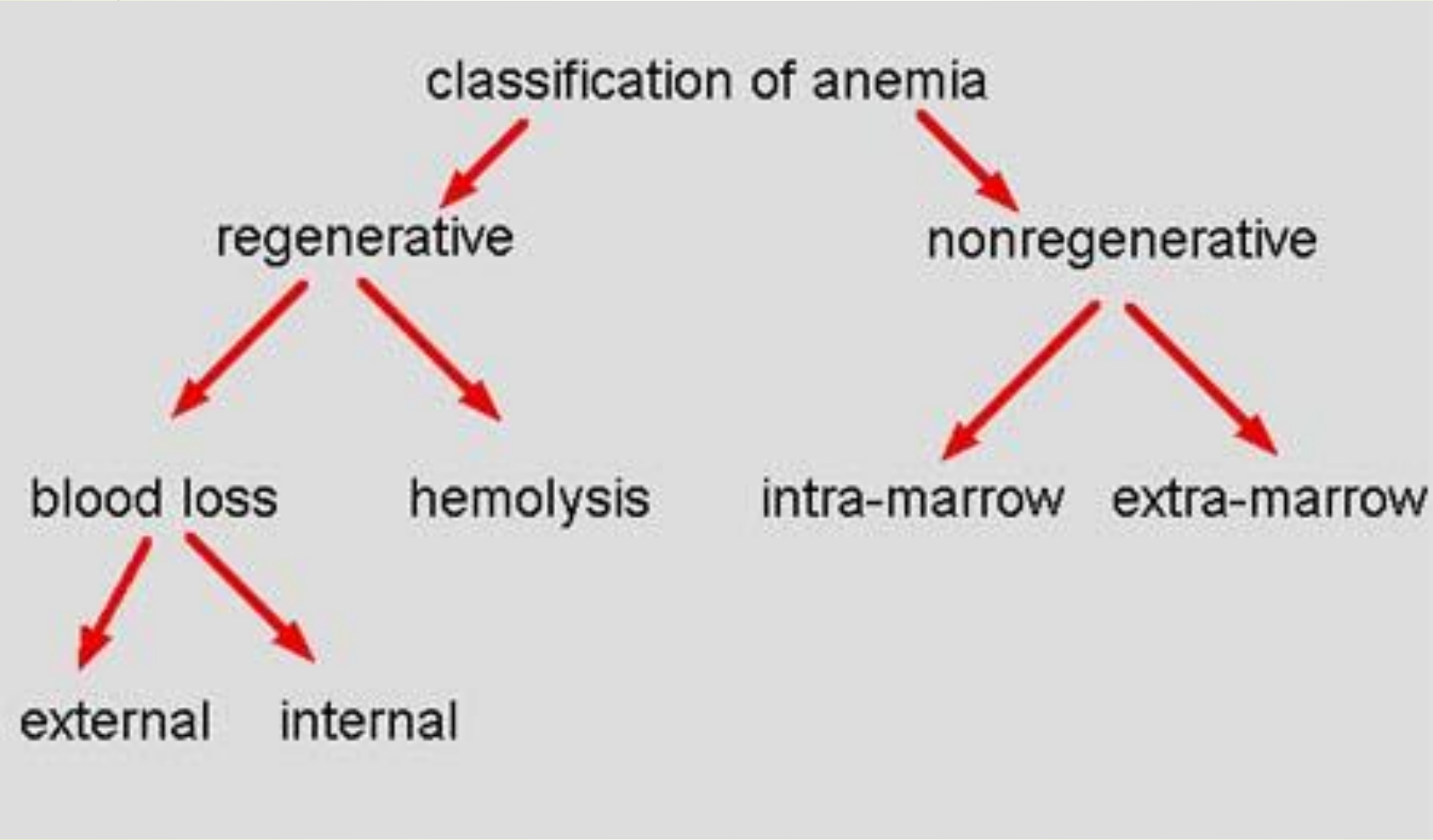
- Anaemias due to hemorrhage or hemolysis are usually regenerative.

Non – regenerative anaemia

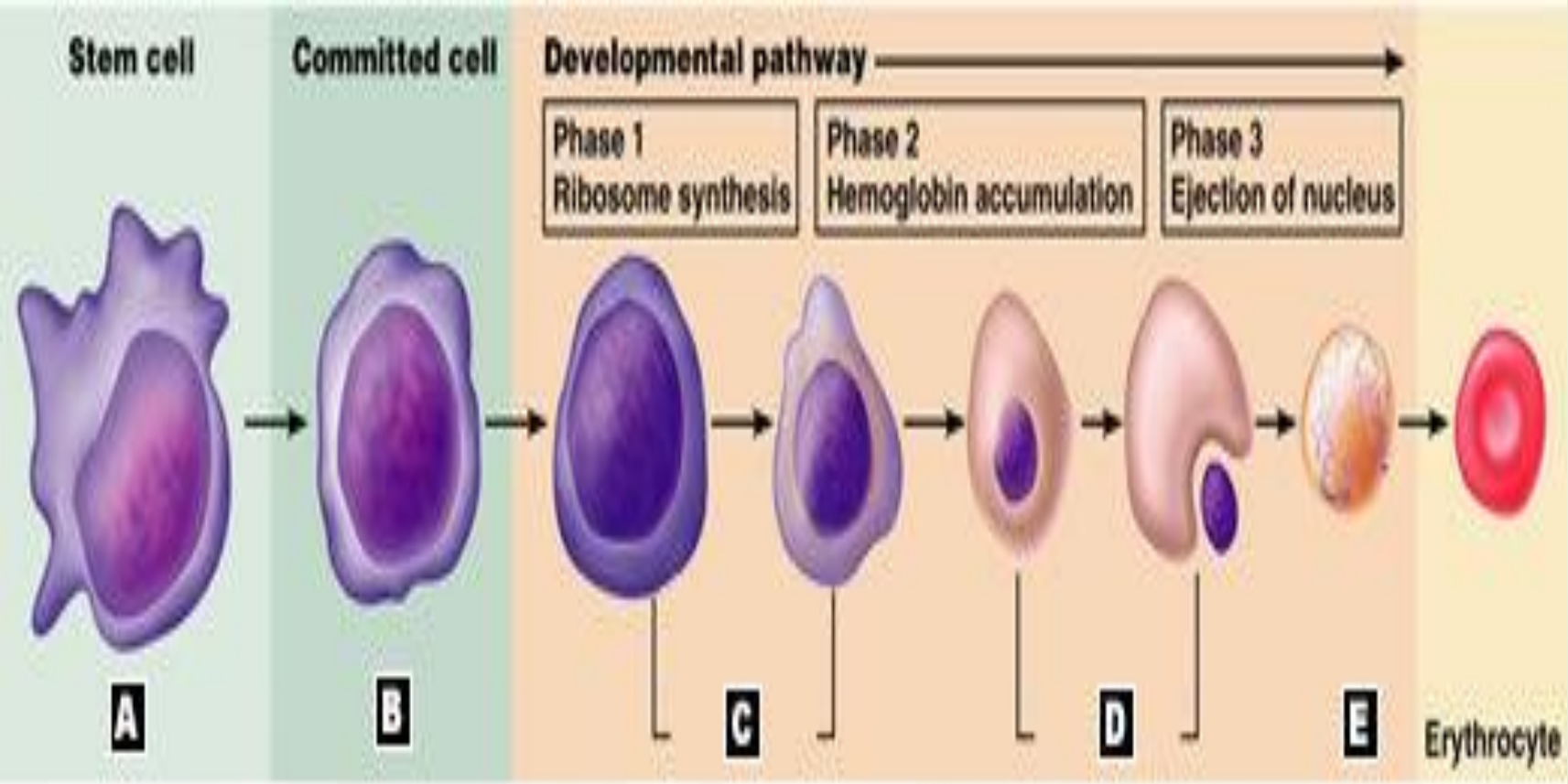
- In a non regenerative anaemia, the bone marrow responds inadequately to the increased need for RBC.

- Anaemias that are caused by decreased erythropoietin or an abnormality in the bone marrow are non regenerative

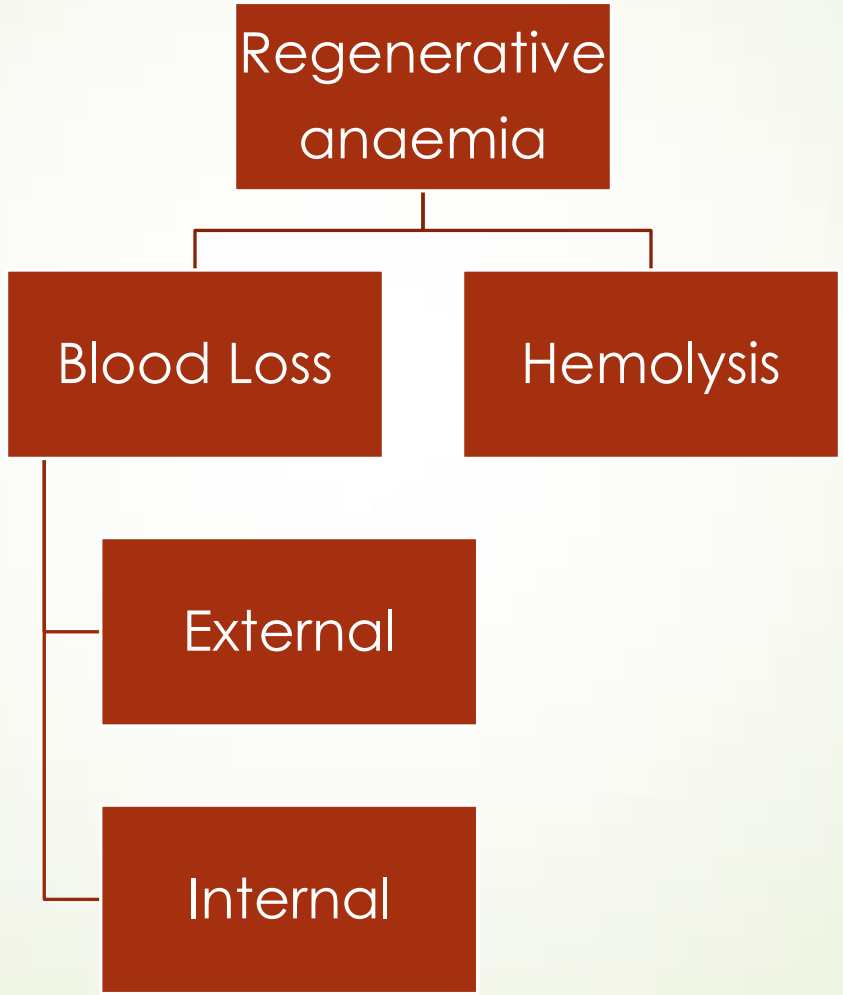
Classification



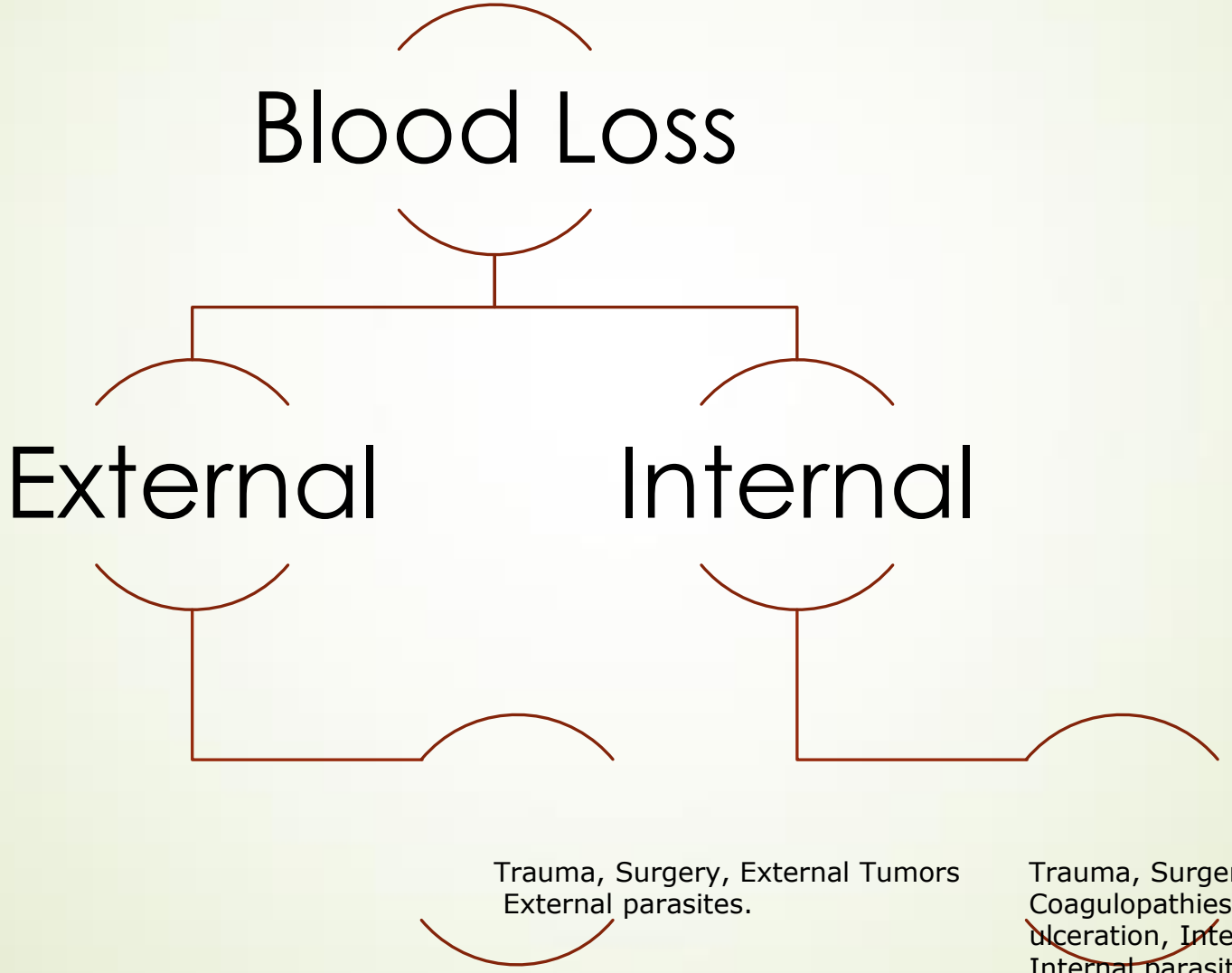
Developmental process of RBC



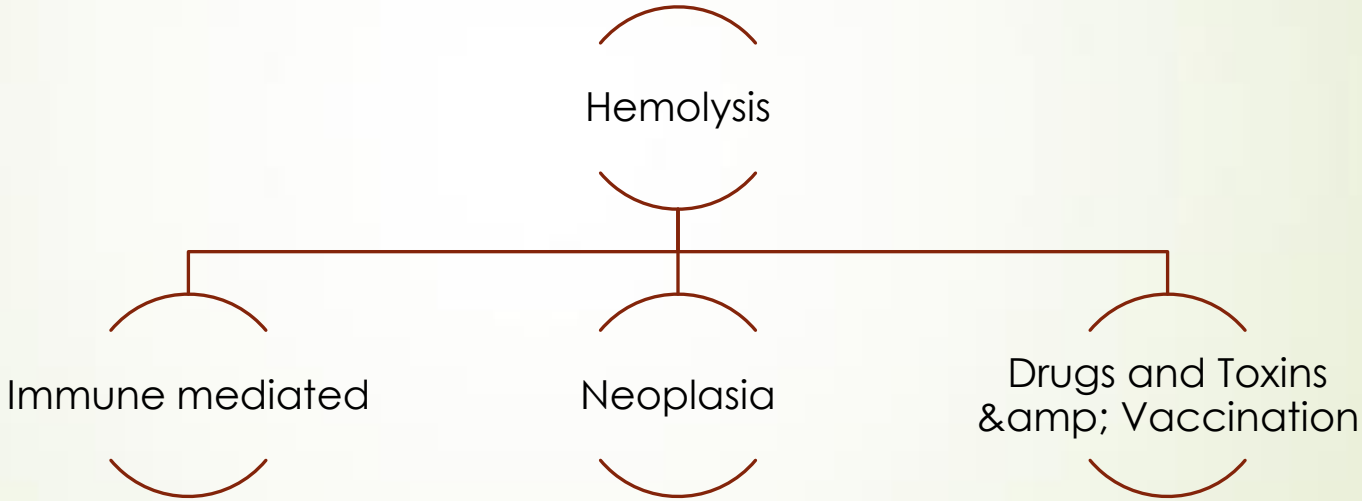
Regenerative anaemia



Blood Loss


Blood Loss
External
Internal
Trauma, Surgery, External Tumors
External parasites.
Trauma, Surgery,
Coagulopathies, Gastric
ulceration, Internal tumors
Internal parasites

Hemolysis


Hemolysis
Immune mediated
Neoplasia
Drugs and Toxins & Vaccination

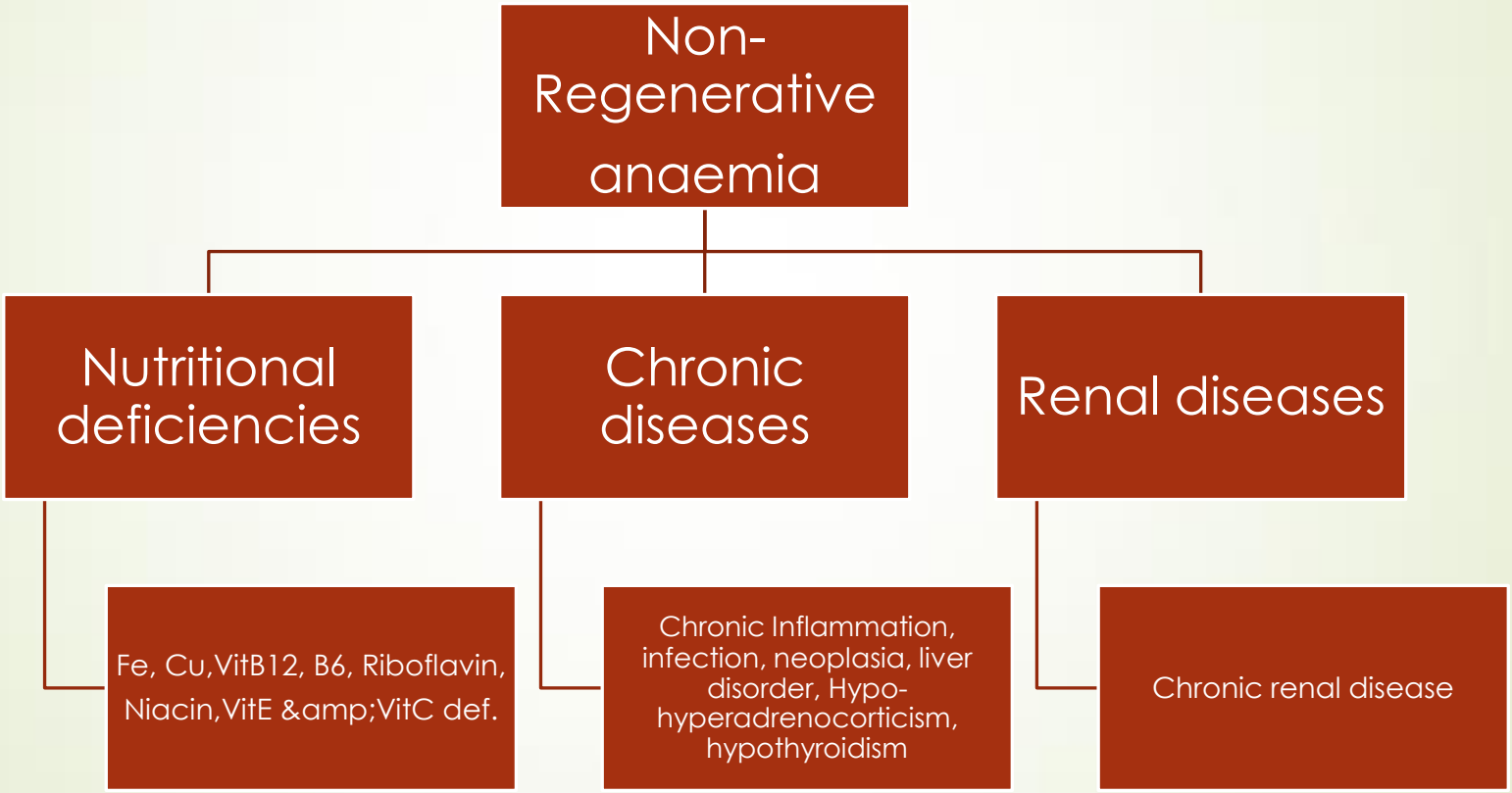
Toxic Cause of hemolysis

Drugs	Plant products	Chemicals
Acetaminophen, benzocaine, dapsone, nitrofurans, primaquine, propofol, quinacrine	Bracken fern sweet clover	Lead
Aspirin, naproxen	onions,	Selenium
Amphotericin, cephalosporins, chloramphenicol, estrogen, fenbendazole, griseofulvin, meclofenamic acid, phenobarbital, phenothiazine, phenylbutazone, , quinidine, sulfonamides, thiacetarsamide		Copper Zinc

Infectious cause

Bacterial	**Viral**	**Rickettsial**	**Protozoal**
Clostridium Leptospira	Equine infectious anaemia. Feline leukemia virus	Mycoplasma Anaplasma Ehrlichia	Babaesia Theileria Trypanosoma

Non-regenerative anaemia



Clinical signs :

- Lethargy and exercise intolerance
- Mucous membrane pallor
- Tachycardia
- Low grade haemic murmur
- Prominent femoral pulse
- Tachypnoea
- Episodic collapse (excitement or stress-induced)
- Jaundice (in haemolytic anemia)

Pathogenesis of anemia

- Reduced oxygen carrying capacity of the blood.
- Inadequate tissue oxygenation
- Development of clinical signs
- Compensatory mechanism

Diagnosis:

- Hb and PCV value measurement
- Complete Blood Count
  - **Red Blood Cell morphology**
  - **Reticulocyte count**
  - **Erythrocytic Indices**
  - **Platelet count**

Packed Cell Volume

- ➢ PCV - 30 to 37 – mild anemia,
- ➢ PCV - 20-29- moderate anemia
- ➢ PCV - < 20 – severe anemia

PCV - < 12 poor prognosis

Red cell morphology

Type of anemia	Red cell morphology
Acute blood loss	Normocytic , normochromic No evidence of regeneration for 3-4 days.
Chronic blood loss	Hypochromasia, microcytic if iron deficiency present
Hemolytic	Spherocytosis
Non-regenerative	Normocytic, normochromic

Reticulocyte count

Indicates degree of regeneration

Erythrocytic Indices

- *Mean Corpuscular Volume (MCV)*
- *Mean Corpuscular Hemoglobin Concentration (MCHC)*

Platelet count < 20,000/ µl

- **Thrombocytopenia**
- **DIC**
- **Intramedullary or extramedullary suppression of platelet production.**

Faecal examination/ faecal occult blood test

Severe upper gastrointestinal bleeding - black, tarry feces

Bone marrow Evaluation

Nonregenerative anemia

Leukopenia

Unexplained thrombocytopenia

Pancytopenia

Treatment of anemia

- Emergency stabilization
- Blood transfusion
- Specific treatment of underlying cause

Blood transfusion

- **PCV < 15%**
- **Selection of donor animals**
- **Major and minor cross**
- **Blood collection**
- **Blood transfusion**

Other treatments-

Anabolic Steroids

- Nandrolone decanoate (1 to 2 mg/kg/week, im
- Oxymetholone – 1-5 mg/kg, PO, every 18-24 hr
- Stanozolol (dogs: 1-4 mg, PO, bid)

Hemostatics

- **Astringents**
- **Epinephrine** and **norepinephrine**
- **Vitamin K**
- **Calcium therapy**
- **Desmopressin**

- , **Component therapy**:

  Fresh Frozen Plasma and Platelet therapy