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Lec.5

Anemia

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Introduction to Anemia

Anemia is a condition where blood lacks enough healthy red blood cells or hemoglobin to carry oxygen to body tissues.

Main Types:

- Iron deficiency anemia
- Vitamin deficiency anemia
- Sickle cell anemia
- Aplastic anemia
- Hemolytic anemia

Common Symptoms:

- Fatigue and weakness
- Shortness of breath
- Pale skin
- Irregular heartbeat

Types of Anaemia

Anaemia Type	Description
Iron deficiency anaemia	The most common type of anaemia, caused by low levels of iron in the body.
Folate deficiency anaemia	Caused by the lack of folic acid in your diet or the body's inability to absorb folic acid properly.
Pernicious anaemia	Caused by a diet lacking in vitamin B12 or body's inability to absorb vitamin B12 properly.
Thalassemia or sickle cell anaemia	Inherited blood disorders.
Hemolytic anaemia	Caused by red blood cells breaking down too quickly.
Hyperthyroidism, hypothyroidism, advanced kidney disease and lupus	Chronic condition caused by the body's inability to produce enough hormones to create red blood cells.

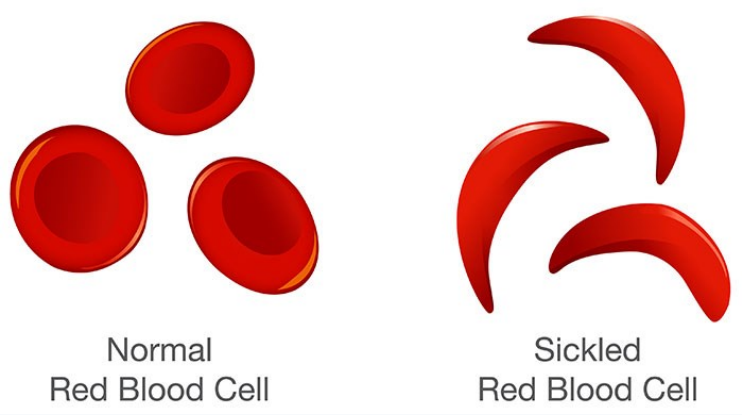
Sickle Cell Anemia: Symptoms and Causes

Key Symptoms:

- **Anemia**: Severe fatigue and weakness
- **Pain crises**: Sharp pain in chest, abdomen, joints
- Swelling of hands and feet
- Frequent infections
- Delayed growth and puberty

Causes:

- Genetic disorder from mutation in hemoglobin gene
- Both parents must carry sickle cell gene



Mechanism:

- Red blood cells change from round to crescent shape
- Cells become rigid and sticky, blocking blood vessels
- Sickle cells have shorter lifespan (10-20 days) vs normal cells (120 days)

Sickle Cell Anemia: Complications and Treatment

Major Complications:

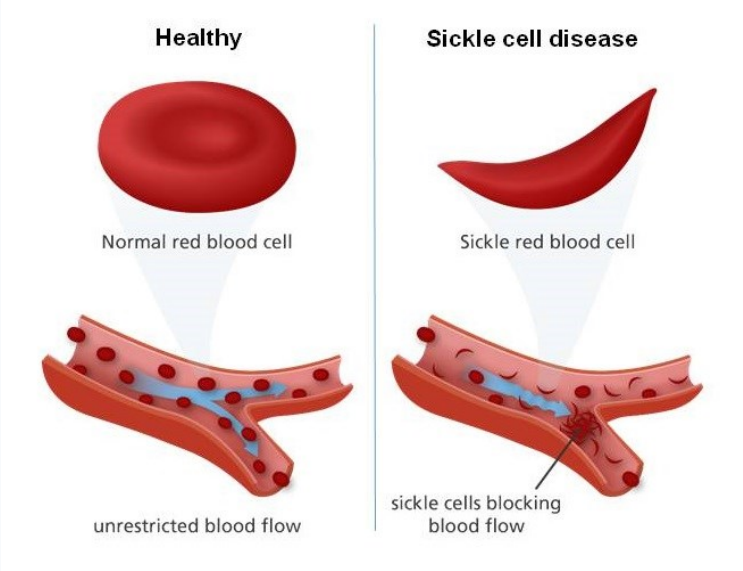
- **Stroke**: Blocked blood vessels in the brain
- **Acute chest syndrome**: Severe lung inflammation
- Organ damage: Kidneys, liver, spleen
- Pulmonary hypertension
- Leg ulcers and blindness

Available Treatments:

- Blood transfusions to increase red blood cells
- Medications to reduce pain crises
- Antibiotics for infection prevention

Advanced Treatments:

- Hydroxyurea therapy to increase fetal hemoglobin
- Bone marrow transplant (potential cure)
- Gene therapy (newest and most effective)



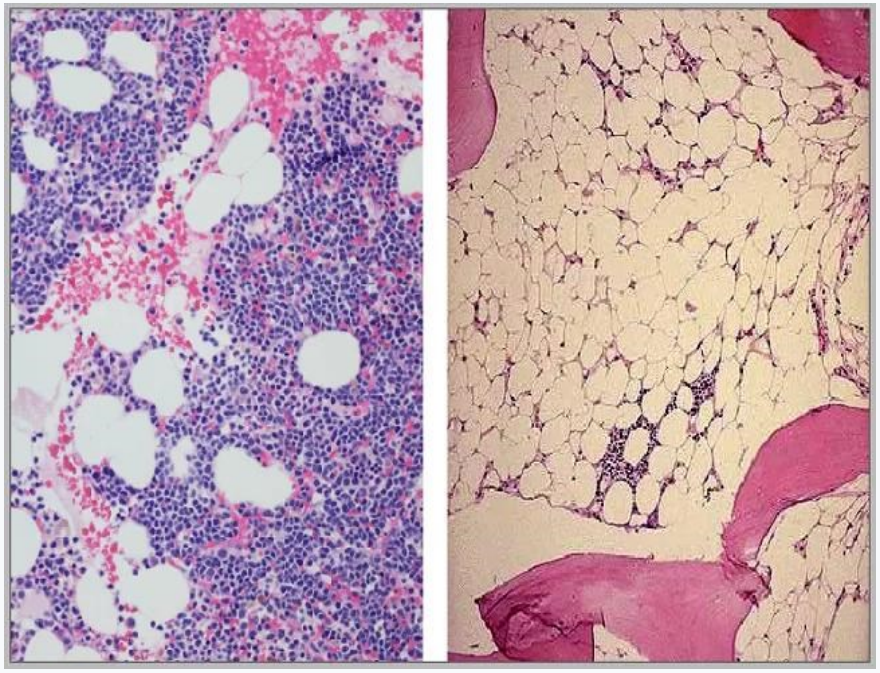
Aplastic Anemia: Symptoms and Causes

Key Symptoms:

- **Severe fatigue** and shortness of breath
- Rapid or irregular heartbeat
- **Frequent infections** or prolonged infections
- Unexplained or easy bruising
- Pale skin and fever

What is Aplastic Anemia?

- Rare condition when bone marrow stops producing new blood cells
- Affects red blood cells, white blood cells, and platelets



Main Causes:

- **Autoimmune attack** on bone marrow stem cells
- Chemotherapy and radiation therapy
- Exposure to toxic chemicals

Aplastic Anemia: Complications and Treatment

Major Complications:

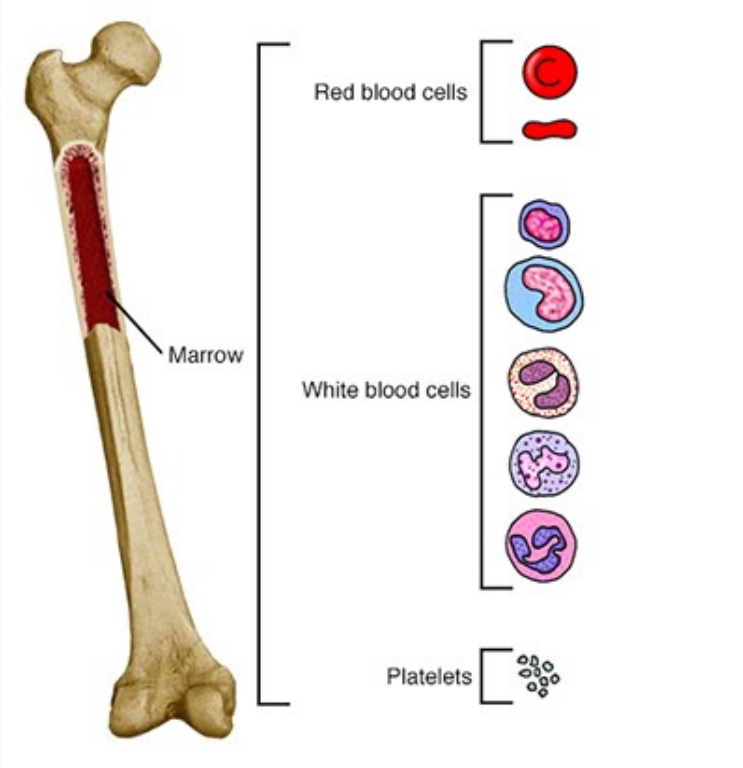
- **Severe infections**: Due to low white blood cell count
- **Serious bleeding**: Due to low platelet count
- Chronic bone marrow failure
- Progression to leukemia (rare)

Available Treatments:

- Blood transfusions to increase blood cells
- Immunosuppressive medications
- Growth factors for blood cells

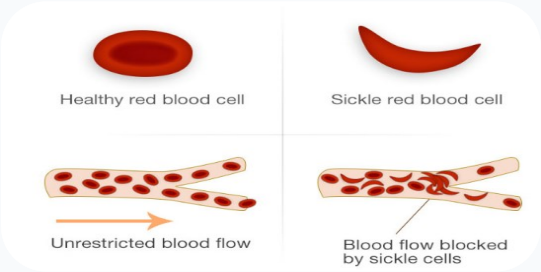
Advanced Treatments:

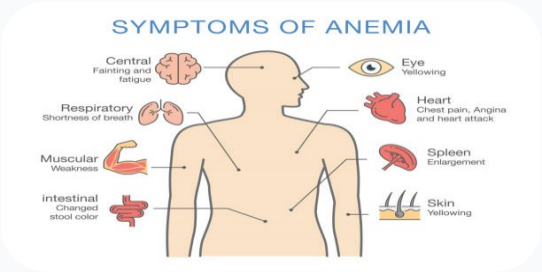
- **Bone marrow transplant**: Most effective for younger patients
- Intensive immunotherapy for non-transplant candidates
- Experimental stem cell therapy

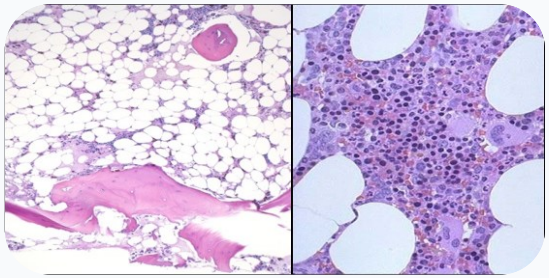


Comparison between the Three Types of Anemia

Comparison	Sickle Cell Anemia	General Anemia	Aplastic Anemia
Key Symptoms	**Severe pain crises** Swelling of hands and feet Frequent infections	**Fatigue and weakness** Shortness of breath Pale skin	**Frequent infections** Bleeding and bruising Severe fatigue
Main Cause	**Genetic mutation** in hemoglobin gene Shape change in red blood cells	**Iron or vitamin deficiency** Blood loss or production issues	**Bone marrow failure** Autoimmune attack
Main Treatment	**Blood transfusions** and pain medications Hydroxyurea Bone marrow transplant	**Iron and vitamin supplements** Blood transfusions in severe cases Treat underlying cause	**Bone marrow transplant** Immunosuppressive medications Blood transfusions







Conclusion and Summary

Key Points

Sickle Cell Anemia

Genetic disorder changing red blood cells to **crescent shape**, causing severe **pain crises**

General Anemia

Deficiency in red blood cells or hemoglobin, most common cause is **iron deficiency**

Aplastic Anemia

Rare condition where bone marrow stops producing blood cells, causing **deficiency in all** cell types