CENTRAL NERVOUS SYSTEM

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CEREBROVASCULAR ACCIDENT/STROKE

- 2 types:
  - Ischemic stroke: due to infarction/ischemia of brain tissue.
    - MC cause: **Thrombus/embolus(>80%)**
  - Hemorrhagic stroke: Bleeding into brain tissue or subarachnoid space.
    - MC cause: **Rupture of berry aneurysm**

- Clinical features:
  - Syncope, headache, Loss of consciousness (बेहोस हुनु)
  - Hemiparesis/hemiplegia (आधा शरिर नचल्नु), Deviation of mouth (on opposite side) (मुख बांगिनु)
  - Aphasia (बोलि नआऊनु), dysphagia, visual changes,

Management:

- Risk factor modification
- Bed rest
- NG feeding, Foley's catheterization
- Prevention of bed sore
- O2 therapy
- Anti-hypertensives
- Thrombolysis (only in ischemic stroke)
- Surgery

MENINGITIS

- Inflammation of meningeal layers by virus, bacteria or fungi.
- 3 major types: Pyogenic/Aseptic/Tubercular
- Pyogenic meningitis:
  - **MC cause: Streptococcal>Maningococcus>H. influenzae**
  - Neutrophils seen in CSF

- Aseptic meningitis:
  - **MC cause (Viral): Enterovirus>Mumps>measles**
  - Lymphocytes seen in CSF

- Tubercular meningitis:
  - Lymphocytes seen in CSF

- Fungal meningitis:
  - Candida, cryptococcus, Histoplasma

- Clinical features:
  - **First symptom: Headache**
  - High grade fever, deteriorated बिग्रिनु level of consciousness
  - **Signs of meningeal irritation: Neck rigidity, Kernig sign**
  - **Raised ICP: projectile vomiting, tachycardia, bradypnea (बिस्तारै सास फेर्नु)**
  - Photophobia (प्रकाशमा हेर्न नसक्नु)

- Diagnosis: Lumbar puncture (ढाडबाट CSF निकाल्नु), CT scan, CBC, Blood C/S

- Management:
  - General supportive treatment
  - IV antibiotics: **emperical antibiotics – Inj penicillin/ciprofloxacin/chloramphenicol**
  - Later, antibiotic therapy is based on organisms cultured from CSF.

EPILEPSY

- Abnormal discharge of electrical discharges in the nerve cells of brain leading to LOC, seizures, motor or sensory or behavioral disorders.

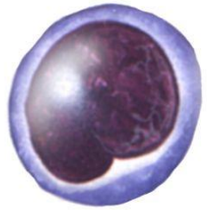
- Types:
  - **Partial**
  - **Generalized**
  - **Status epilepticus:** Prolonged seizures without regain of consciousness in between **for >30 minutes.**

- **Treatment:**
  - Status epilepticus: IV diazepam/lorazepam
  - Sedatives (Midazolam, lorazepam)
  - Anticonvulsant therapy (usually given lifelong) (Phenytoin, Phenobarbitone)
  - Preventive measures

HEMATOLOGY

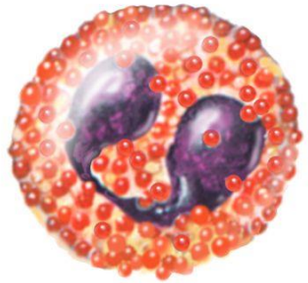
Blood Cells

Monocyte

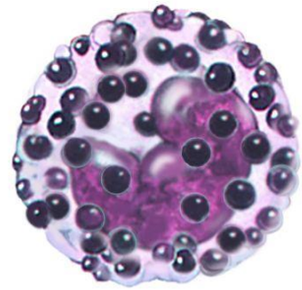


Lymphocyte

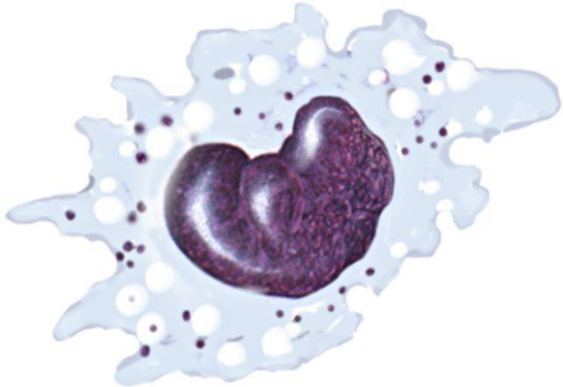
Neutrophil



Eosinophil

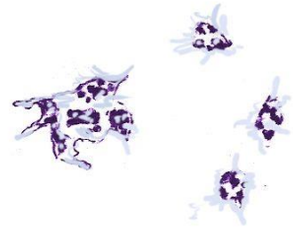


Basophil

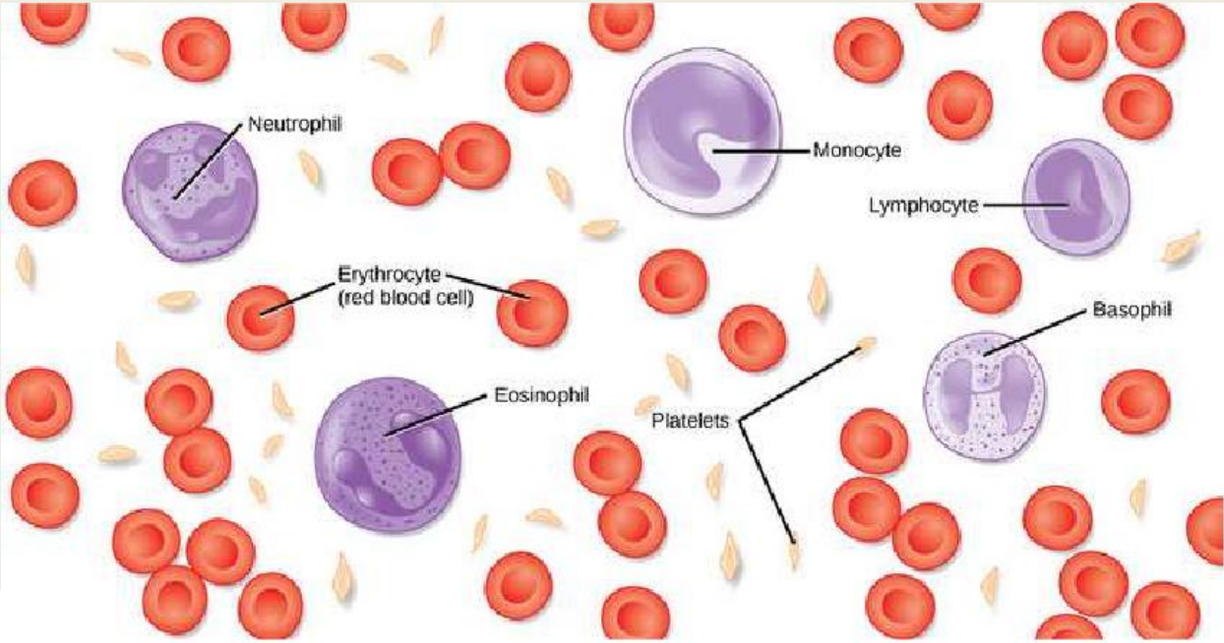


Macrophage

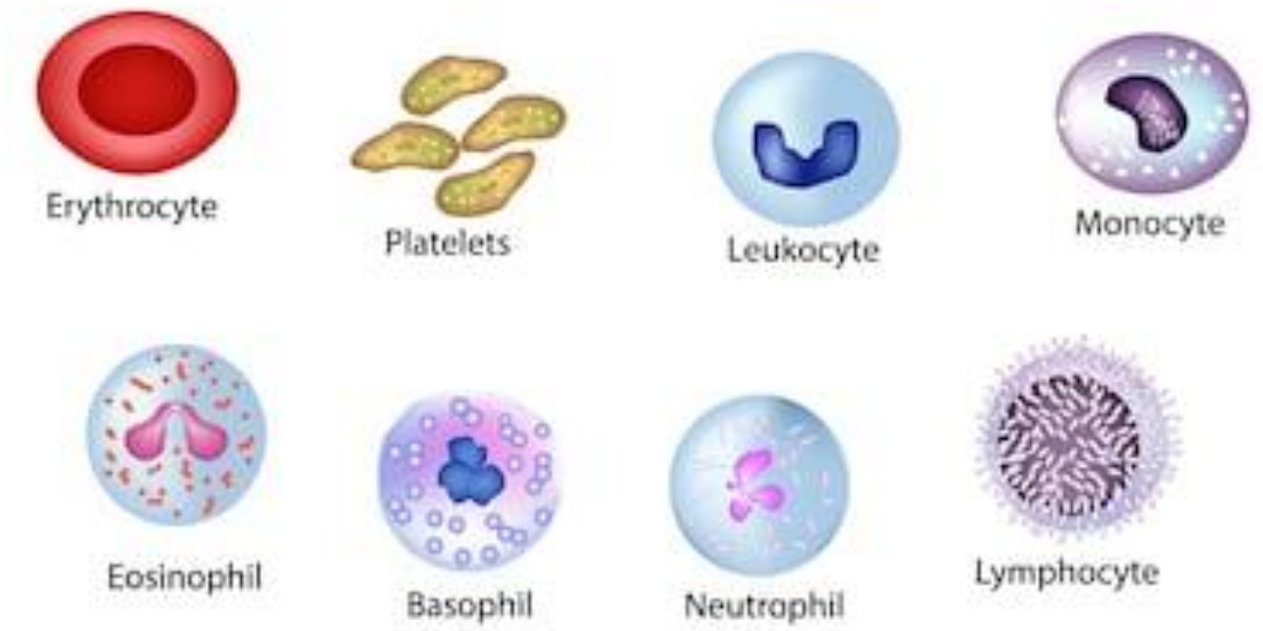
Erythrocyte



Platelets


Neutrophil
Monocyte
Lymphocyte
Erythrocyte
(red blood cell)
Basophil
Eosinophil
Platelets

Blood cells


Erythrocyte
Platelets
Leukocyte
Monocyte
Eosinophil
Basophil
Neutrophil
Lymphocyte

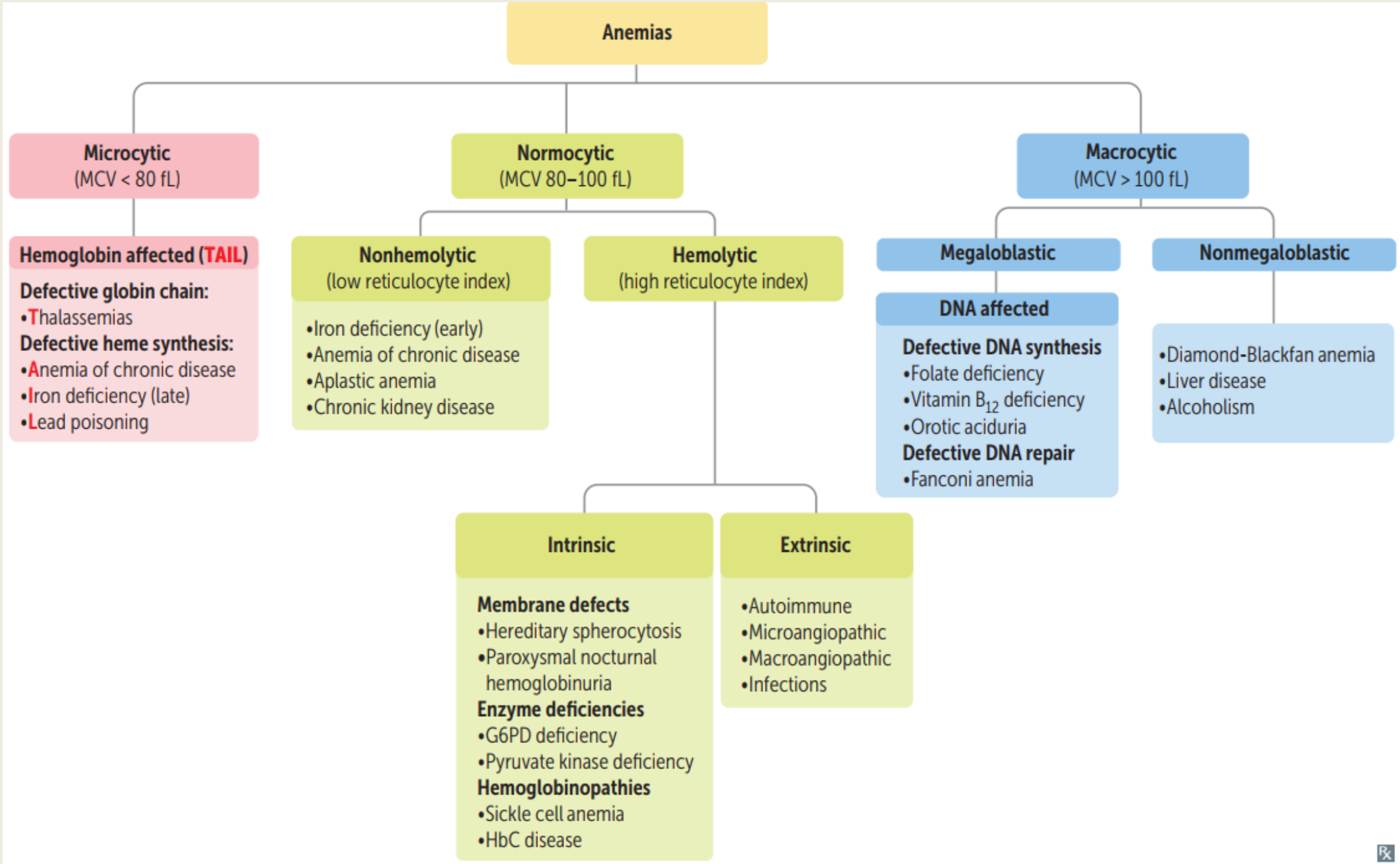
BLOOD CELLS

BLOOD CELLS	DETAILS
Erythrocytes (4.5-6.5 million/cumm-males; 4-5.5million/cumm- females)	Biconcave; non-nucleated; produced in bone marrow; life span-120 days; destroyed in spleen
Leucocytes (4000-11000/cumm) • Granulocytes: Neutrohils, Eosinophils, Basophils • Agranulocytes: Monocytes, Lymphocytes	Life span- 7-8 days; nucleated; main function- phagocytosis, immunity
Thrombocytes (1.5-5 million/cumm)	Life span- 7-10 days; nucleated; function: coagulation
Blood: Volume: 5-6 liters (Male); 4.5-5.5 liters (Female) Plasma (55%), Blood cells (45%) Plasma: Albumin is major plasma protein; Globulin helps in formation of immunoglobulin; Fibrinogen helps in blood clotting	

ANEMIA

- DECREASED level of hemoglobin
- Normal range: **males-13-18 g/dl**

  females- 12-16g/dl
- Types:
  - Microcytic (small RBCs)
    - Iron deficiency anemia (MC)
    - Thalassemia
    - Sideroblastic anemia
  - Macrocytic (large RBCs)
    - Vit. B12 deficiency
    - Folic acid deficiency
  - Normocytic (normal RBCs)
    - Anemia of chronic disease
    - Sickle cell anemia
    - Secondary anemia in malignancy

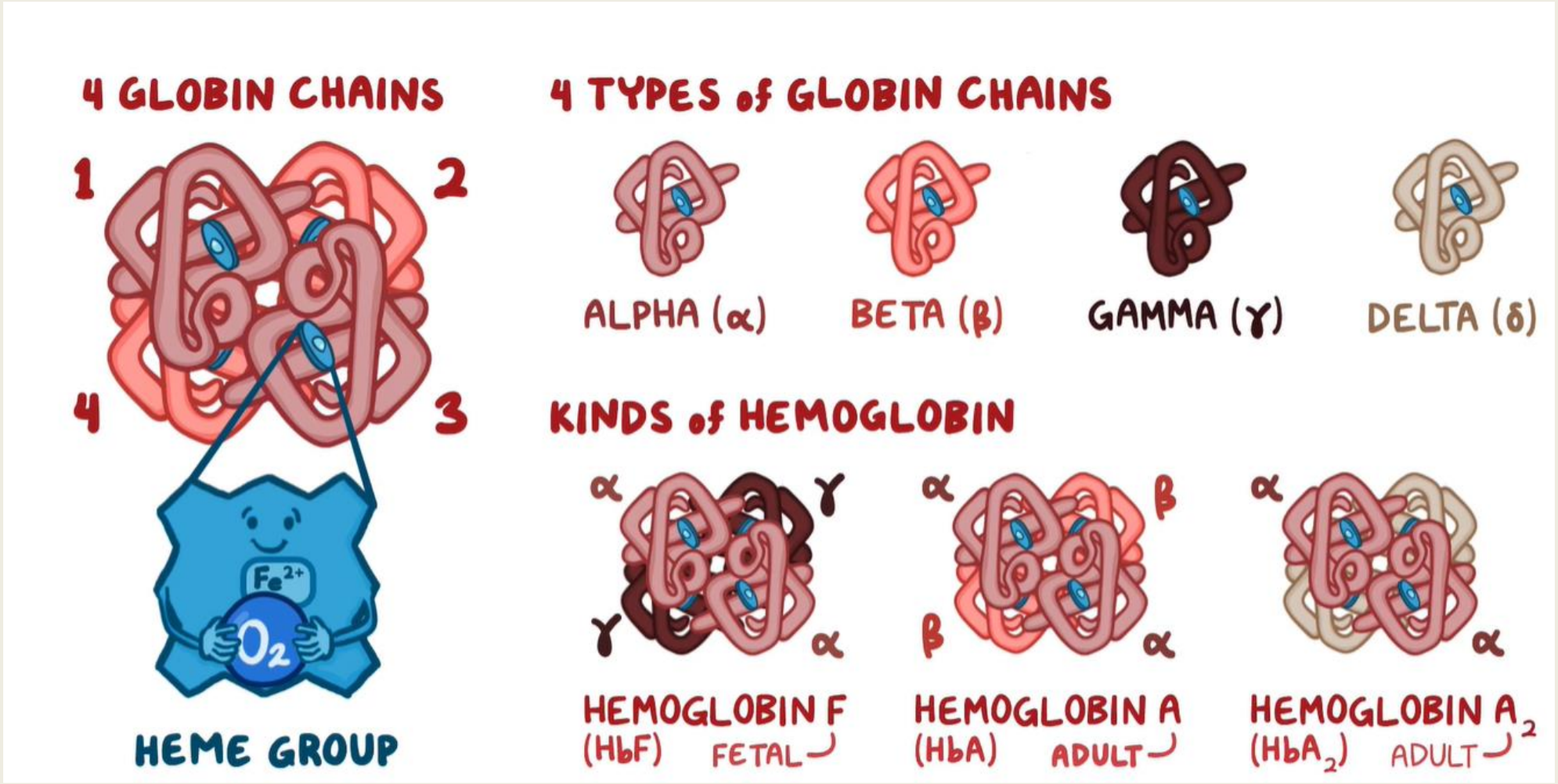

Anemias
Microcytic
(MCV < 80 fL)
Normocytic
(MCV 80–100 fL)
Macrocytic
(MCV > 100 fL)
Hemoglobin affected (TAIL)
Defective globin chain:
•Thalassemias
Defective heme synthesis:
•Anemia of chronic disease
•Iron deficiency (late)
•Lead poisoning
Nonhemolytic
(low reticulocyte index)
•Iron deficiency (early)
•Anemia of chronic disease
•Aplastic anemia
•Chronic kidney disease
Hemolytic
(high reticulocyte index)
Megaloblastic
DNA affected
Defective DNA synthesis
•Folate deficiency
•Vitamin B12 deficiency
•Orotic aciduria
Defective DNA repair
•Fanconi anemia
Nonmegaloblastic
•Diamond-Blackfan anemia
•Liver disease
•Alcoholism
Intrinsic
Membrane defects
•Hereditary spherocytosis
•Paroxysmal nocturnal hemoglobinuria
Enzyme deficiencies
•G6PD deficiency
•Pyruvate kinase deficiency
Hemoglobinopathies
•Sickle cell anemia
•HbC disease
Extrinsic
•Autoimmune
•Microangiopathic
•Macroangiopathic
•Infections

- Clinical features:
  - Symptoms: fatigue, Shortness of breath, palpitation
  - Signs: pallor, palpitations, tachycardia
  - **Koilonychia: spooning of nails (iron deficiency)**
  - **Jaundice(hemolytic anemia)**
  - **Macroglossia ठूलो जिब्रो, beefy red tongue(vit B12 def./folic acid def.)**

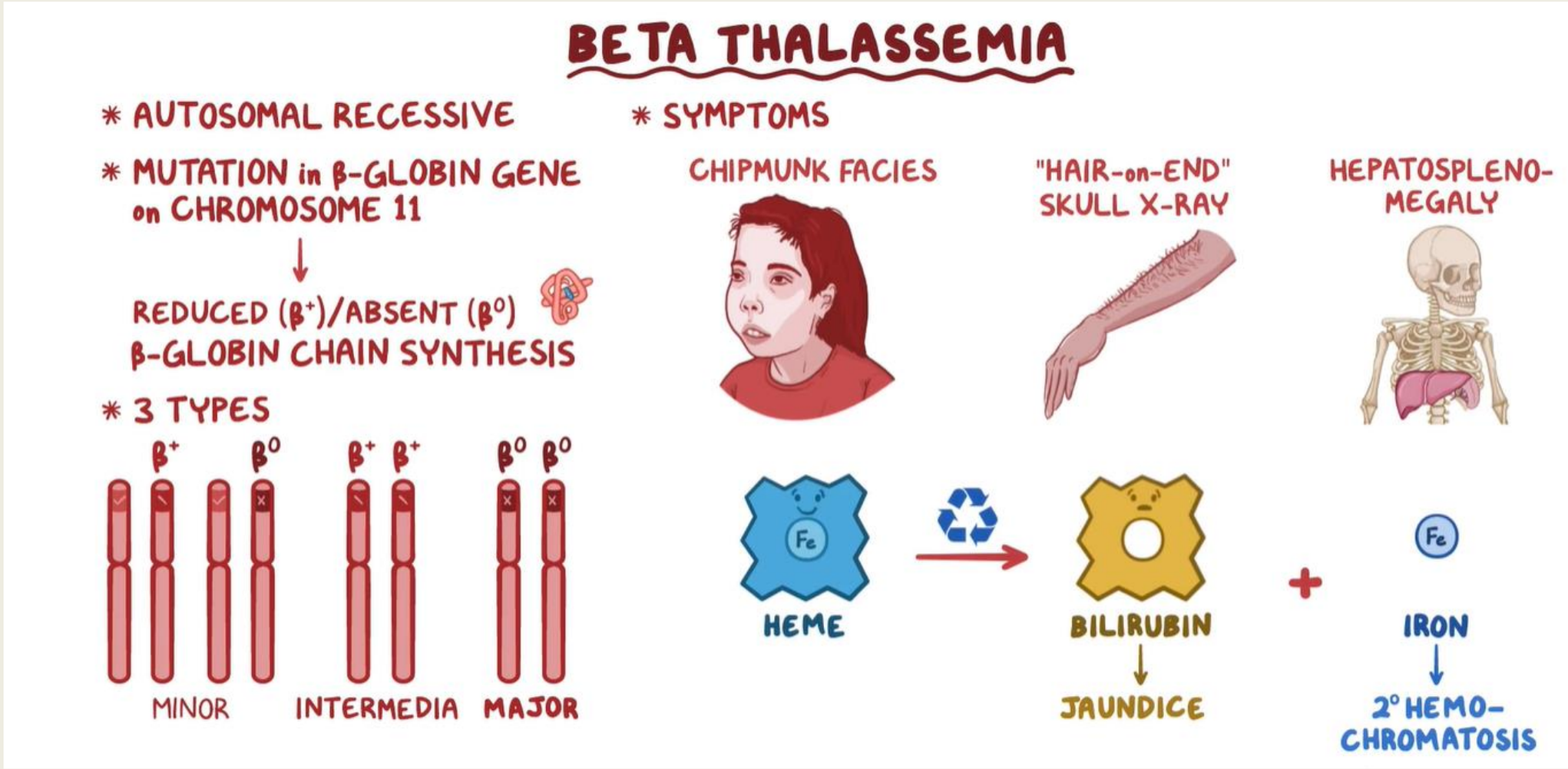
- Management:
  - **Dietary supplementation**
  - **Blood transfusion (in severe anemia)**
  - O2 supplementation
  - Treatment of cause.

	IRON DEFICIENCY ANEMIA	VITAMIN B12 DEFICIENCY
MC cause	hookworm	Dietary deficiency
Findings	Koilonychia, pica, microcytic anemia, decresed serum ferritin and serum iron	Macroglossia, macrocytic anemia, megaloblastic blood smear (hypersegmented neutrophils), neurological disorders
Treatment	Iron therapy	Dietary supplemenatation of vitamin B12 and folic acid

Hemoglobinopathies



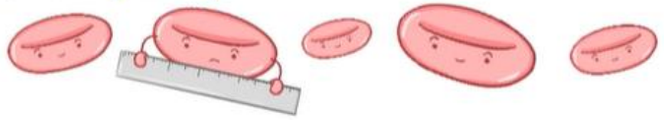
No symptoms upto 3-6 months d/t fetal Hb



DIAGNOSIS

BLOOD TEST

- ↓ HEMOGLOBIN
- ↓ MEAN CORPUSCULAR VOLUME (MCV)
- ↑ RED BLOOD CELL DISTRIBUTION WIDTH (RDW) *



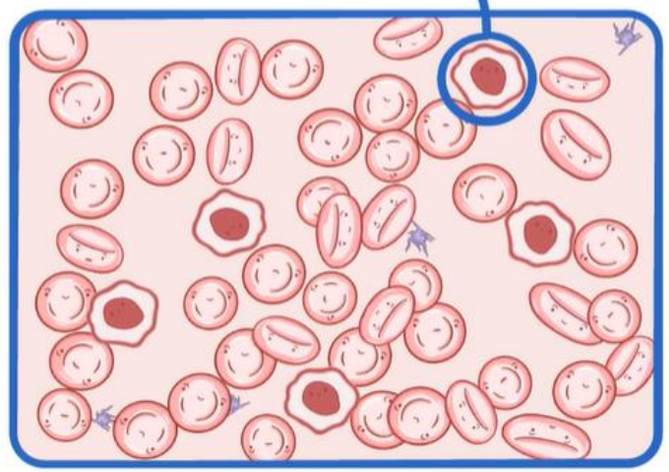
* NORMAL w/ β THAL. MINOR

LAB WORK

- HIGH:
  - IRON
  - FERRITIN
  - TRANSFERRIN

BLOOD SMEAR

- MICROCYTIC (SMALL)
- HYPOCHROMIC (PALE)
- TARGET CELLS



BETA THALASSEMIA doesn't always require TREATMENT

* **BLOOD TRANSFUSIONS**
  - CORRECT ↓ HEMOGLOBIN LEVELS

TRANSFUSION-DEPENDENT

*** **RECURRENT BLOOD TRANSFUSIONS** ***

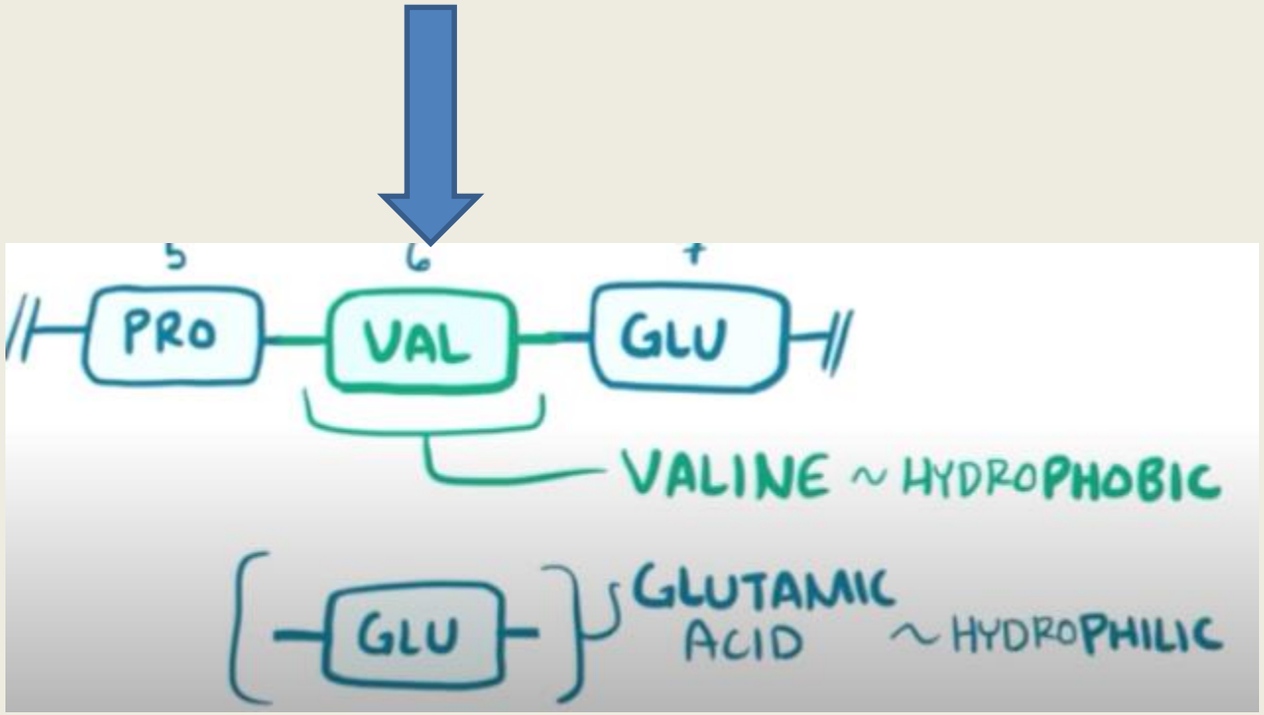
- ~ BETA-THALASSEMIA MAJOR
- ~ INTERMEDIATE BETA-THALASSEMIA w/ ↓ BETA-CHAIN SYNTHESIS

NON-TRANSFUSION-DEPENDENT

- ~ BETA-THALASSEMIA MINOR
- ~ INTERMEDIATE BETA-THALASSEMIA w/ MILD SYMPTOMS

Sickle cell disease

Autosomal recessive, point mutation in globin gene, substitution



Sickle cell trait, 1 gene affected

Sickle cell disease, both gene affected

SICKLE CELL DISEASE

* GENETIC *

SICKLE

RED BLOOD CELL

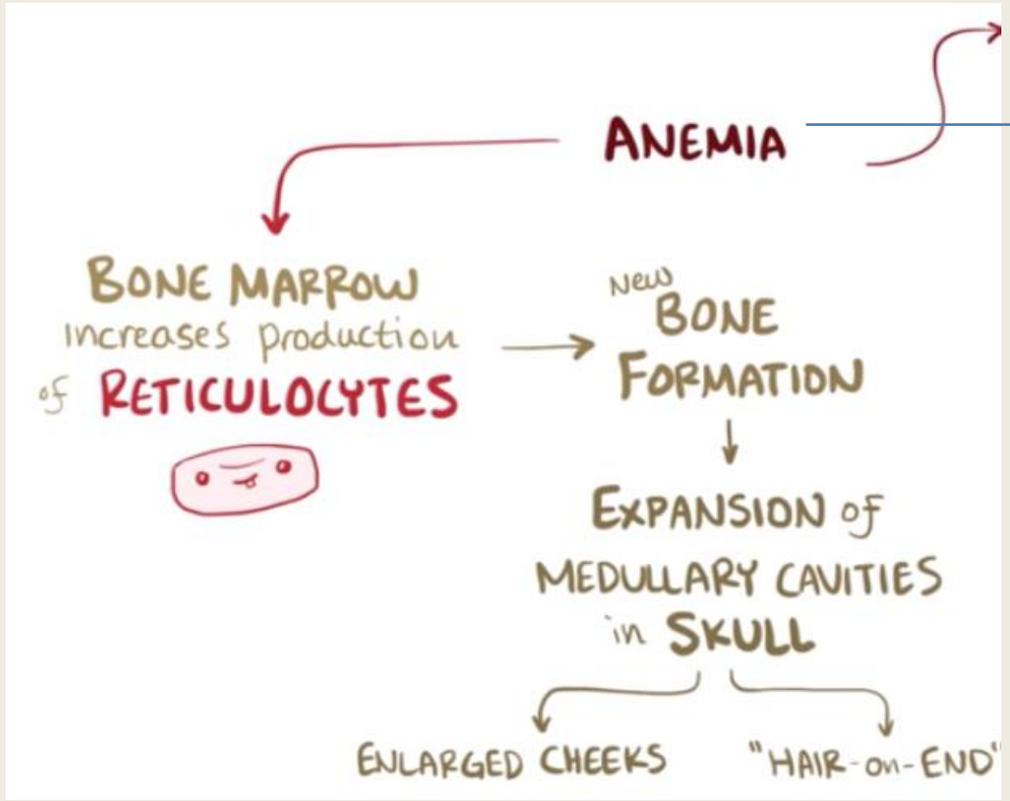
MORE EASILY DESTROYED

ANEMIA

Bone of hands and digits, dactylitis

Bone : necrosis

Spleen; infarct, sequestration of blood



Extramedullary production; liver-hepatomegaly

Treatment

IMPROVED with OXYGEN & FLUIDS
- * HYPOXIA
- * DEHYDRATION
- * ACIDOSIS

* OPIOIDS ~ manage pain
* ANTIBIOTICS ~ underlying bacterial infection from acute chest syndrome
* BLOOD TRANSFUSION
  - RISK of IRON OVERLOAD & ANTIBODIES against FUTURE TRANSFUSIONS
* CHILDREN → PENICILLIN & POLYSACCHARIDE VACCINE

ANEMIA of CHRONIC DISEASE

CHRONIC DISEASE STATES	* INFECTIONS * MALIGNANCY  * AUTOIMMUNE CONDITIONS 
MECHANISM	* INFLAMMATORY FACTORS ~ HEPCIDIN
TREATMENT	* CORRECTING UNDERLYING CONDITION * SEVERE CASES: ~ RBC TRANSFUSIONS ~ ERYTHROPOIETIN INJECTIONS

MECHANISMS

* COMPLEX & UNDER INVESTIGATION

1. ↓ RBC LIFESPAN
   - ~ DIRECT CELLULAR DESTRUCTION via TOXINS from:

CANCER CELLS

VIRUSES

BACTERIAL INFECTIONS

2. ↓ RBC PRODUCTION
   - ~ COMPLEX
   - ~ INVOLVES SEVERAL MECHANISMS

* DYSREGULATION of IRON HOMEOSTASIS *

* SIGNALS → RBC PRODUCTION *
  - └ CYTOKINES → KIDNEY, IMMUNE SYSTEM & GI TRACT

MECHANISMS

↳ ↓ IRON for PRODUCTION of HEMOGLOBIN ⊣ RBCs PRODUCTION

- LOCKED UP in MACROPHAGES
- ✕ ABSORBED

SYMPTOMS

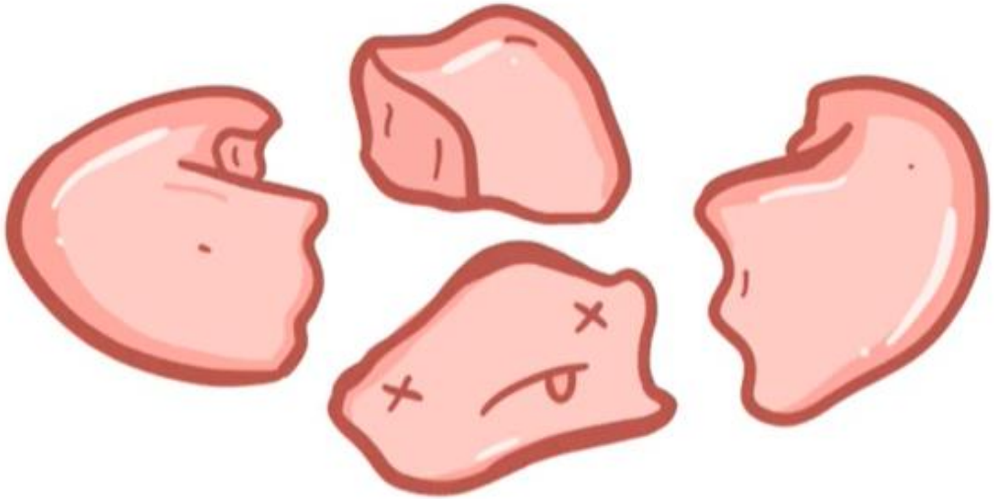
* FATIGUE

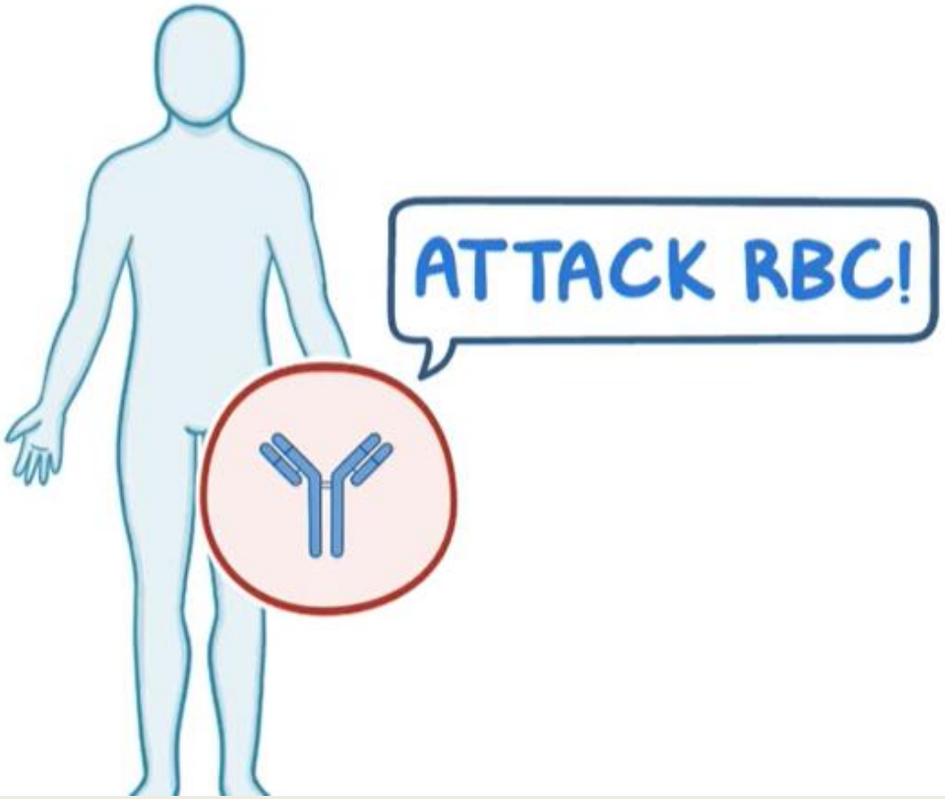
* PALLOR

* SHORTNESS of BREATH
  - PHYSICAL ACTIVITY

AUTOIMMUNE HEMOLYTIC ANEMIA

* ↑ RBC HEMOLYSIS
  ↳ ↓ RBCs than NORMAL





* IDIOPATHIC
* CAN be RELATED to:
  ↳ MEDICATION SIDE EFFECT
  ↳ UNDERLYING DISEASE PROCESS

Etiology

- Warm antibody
  - Primary
  - Secondary
    - Systemic lupus erythematosus
    - Chronic lymphocytic leukemia
    - Babesiosis
- Cold antibody
  - Post-infectious
    - *Mycoplasma*, Epstein-Barr virus, cytomegalovirus
  - Associated with lymphoproliferative disease
  - Paroxysmal cold hemoglobinuria
- Drug-induced

MCQs

1. A cranial nerve with the highest number of branches

(a) Facial nerve

(b) Trigeminal nerve

(c) Vagus nerve

(d) Both (b) and (c)

Ans -1b

2.The cranial nerve that regulates the heartbeat

(a) VII

(b) VIII

(c) IX

(d) X

Ans- 2d

3. Afferent neurons carry nerve impulses from

(a) CNS to muscles

(b) CNS to receptors

(c) receptors to CNS

(d) effector organs to CNS

Ans: 3c

4. The cushing triad in raised ICP excludes

a. Hypertension
b. Projectile vomiting
c. Bradycardia
d. Decreased respiratory rate

4 B

5. The most common cause of encephalitis is

a. Streptococcus
b. Neisseria
c. Herpes simplex
d. Herpes zooster

5 c

6. DOC in acute bacterial meningitis is

a. Vancomycin
b. Ciprofloxacin
c. Ceftriaxone
d. Metronidazole

6 c

7. Status epilepticus should have continuous seizures for more than

a. 5 minutes
b. 30 minutes
c. 1 hour
d. 10 minutes

7 b

8. Which of the following is not risk factor for ischaemic stroke?

a. High BP
b. Regular use of OCP
c. Anticoagulants
d. Chronic smoking

8 c

9. The GCS of a dead person is

a. 0

b. 3

c. 5

d. 15

9 B

10. Lumbar puncture should not be done in meningitis if you find features of

a. High grade fever
b. Confusion and disorientation
c. Negative results of blood culture
d. Raised intracranial pressure

10 D

MCQs

1.Most common cause of anemia worldwide:

a. Anemia of chronic disease
b. Hemolytic anemia
c. Beta Thalassemia
d. Iron deficiency anemia

Ans: 1d

2. Absorption of iron occurs in:

a. Ileum

b. Duodenum

c. Gastric antrum

d. colon

Ans : 2a

3.Beta thalassemia has :

a. Autosomal dominant inheritance
b. Autosomal recessive inheritance
c. X-linked disease
d. Mitochondrial disease

Ans: 3b

4.Example of normocytic normochromic anemia:

a. Iron deficiency anemia
b. Anemia d/t chronic kidney disease
c. Folate deficiency
d. B12 deficiency

Ans: 4b

5. Suppression of entire CBC :

a. Erythroplasia
b. Thrombocytopenia
c. Leucopenia
d. Pancytopenia

Ans: 5d

6. Storage form of iron in body is called:

a. Ferritin
b. Transferrin
c. Hepcidin
d. Hemosiderin

Ans: 6a

7.Lifespan of RBC:

a. 80 days
b. 100 days
c. 120 days
d. 200 days

Ans: 7c

8.Leukemia is cancer of:

a. RBC
b. WBC
c. Lymphocytes
d. Glial cells

Ans:8b

9.Which of the following is iron chelator:

a. Deferoxamine
b. D- penicillamine
c. EDTA
d. Succimer

Ans: 9a

10. 15 year boy on a vegetarian diet presented with anemia and neurological symptoms, what may be the cause:

a. Iron deficiency anemia
b. Hemolytic anemia
c. Anemia of chronic disease
d. B12 deficiency

Ans:10 d