Benha University
Faculty of Science
Department of Zoology

HEALTHY NUTRITION
Uni 152

Lecture 3

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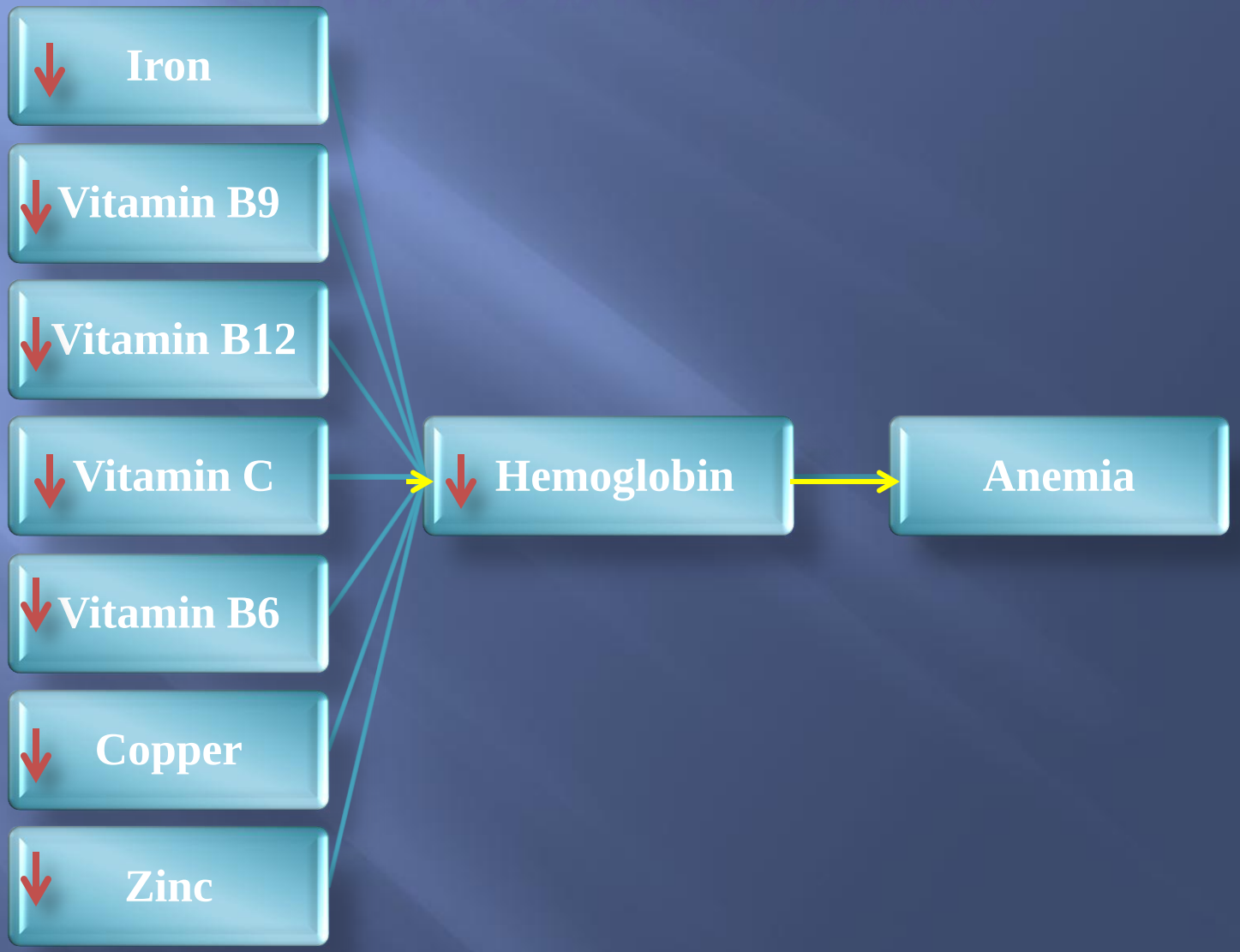
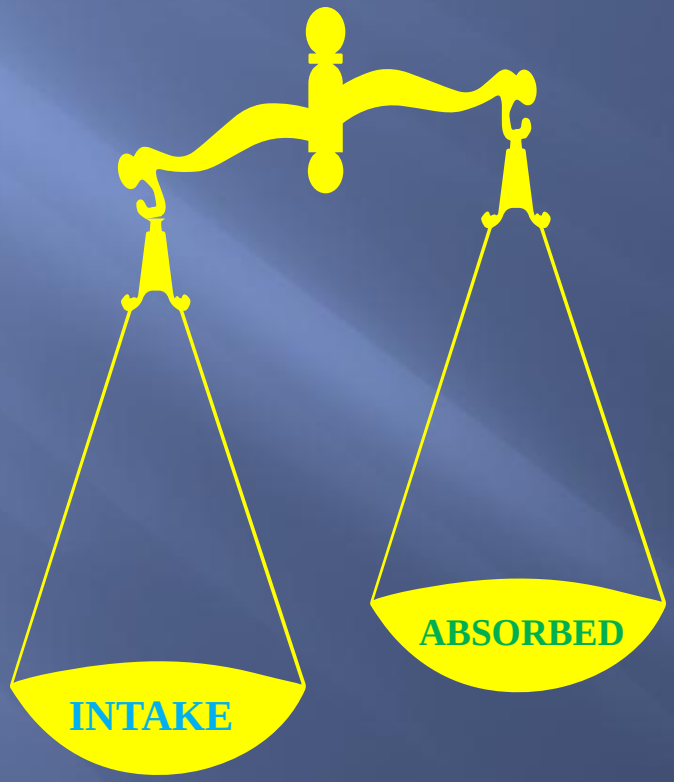
THERAPEUTIC NUTRITION FOR PATIENTS WITH ANEMIA



INTAKE

The speed of cell division, the formation of new tissues during growth and pregnancy.



ABSORBED

Disturbance in the absorption of iron, Vitamin B9, Vitamin B12, Vitamin C, Vitamin B6, copper and zinc.

Infants and children before school age, adolescents, pregnant and lactating women.

The normal concentration of hemoglobin according to age groups

Age group	Hb (Range in gm/dl)
Newborn (< 1 week old)	14-22
6 months old	11-14
Children (1-15 yrs)	11-15
Adults	
Men	14-16
Women	12-16

Symptoms of anemia

Irregular menstrual cycle

Low hemoglobin & hematocrit

Iron deficiency

Lethargy & Fatigue

Inability to concentrate & Insomnia

Paleness of the face & hands

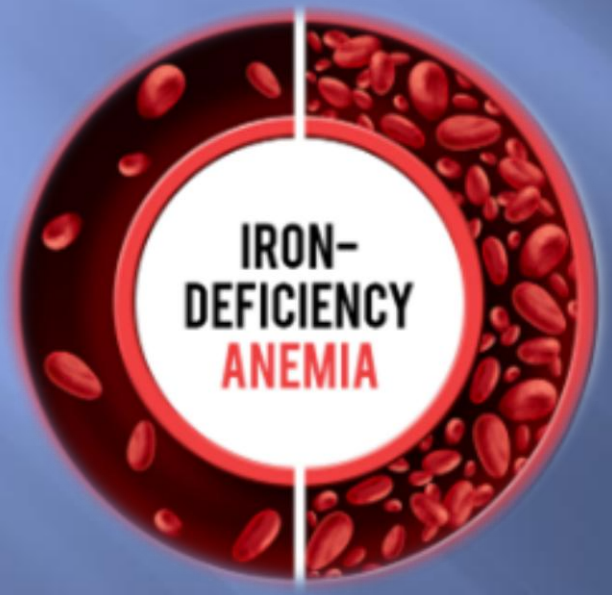
Checkpoint

Which of the following is NOT a common cause of nutritional anemia?

A) Iron deficiency
B) Vitamin B12 deficiency
C) Excessive protein intake
D) Folic acid deficiency

Which group is at the highest risk of developing iron deficiency anemia?

A) Elderly men
B) Adolescent girls and pregnant women
C) Middle-aged men with a sedentary lifestyle
D) Athletes with a high-protein diet



Iron deficiency anemia is the most common type of anemia.

STAGES OF IRON DEFICIENCY ANEMIA

1

- **Iron Storage Depletion Stage**
- Iron deficiency in bone marrow
- Increased intestinal iron absorption
- No changes in hemoglobin or transferrin saturation

2

- **Latent Anemia Stage**
- Iron deficiency reaches the blood serum
- Decreased transferrin saturation
- Diagnosed by low ferritin levels in serum

3

- **Early Anemia Stage**
- Hemoglobin levels decrease
- Minor or no changes in red blood cell shape and size
- Continued iron deficiency in serum

4

- **Obvious Anemia Stage**
- A significant drop in hemoglobin levels
- Red blood cells become smaller with reduced hemoglobin concentration

TYPES OF IRON

Heme Iron	Non-Heme Iron
Come from animal sources (component of hemoglobin and myoglobin)	Come from plant sources
Meat, fish, poultry, liver	Whole grains, vegetables, dried fruits, legumes
High absorption rate (20-30%)	Low absorption rate (5-10%)
Iron positively affected by the presence of ascorbic acid and an acidic environment.	
Iron inhibited by compounds such as phytates (found in wheat and other grains), tannins (present in tea and coffee), and polyphenols (found in walnuts, hazelnuts, and legumes).	

The bioavailability of iron depends on the type and composition of meals

Low bioavailability

when consuming plant sources such as grains, roots and tubers with a very small amount of meat, and iron absorption in this case ranges from 5-10%

Medium bioavailability

when consuming plant foods with animal food sources and good amounts of vitamin C, and here absorption ranges from 11-18%

High bioavailability

when the diet is varied with high amounts of meat, poultry, fish and foods rich in vitamin C, where absorption exceeds 19% of the iron present in the meal.

Checkpoint

Which of the following stages of iron deficiency anemia is characterized by a decrease in hemoglobin levels with clear changes in red blood cell shape and size?

A) Iron Storage Depletion Stage
B) Latent Anemia Stage
C) Early Anemia Stage
D) Obvious Anemia Stage

Which of the following factors enhances iron absorption in the body?

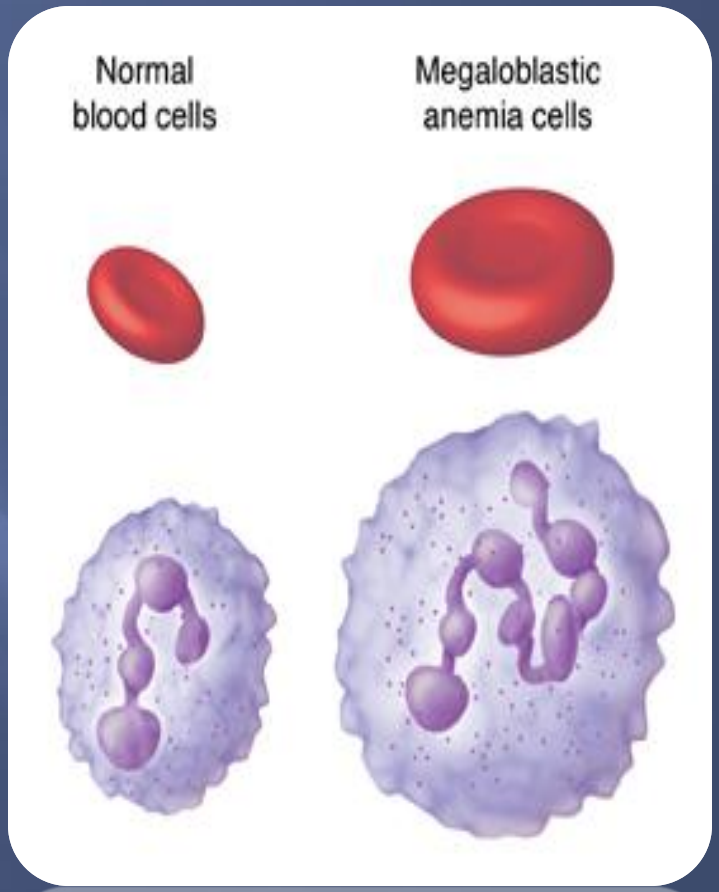
A) Tannins found in tea and coffee
B) Phytates found in wheat and grains
C) Ascorbic acid
D) Polyphenols found in nuts and legumes

FOLIC ACID DEFICIENCY

• Folic acid deficiency occurs when the body lacks sufficient folate (Vitamin B9), essential for red blood cell formation and DNA synthesis.

• A deficiency leads to megaloblastic anemia, where red blood cells become larger, fewer, oval-shaped, and have a shorter lifespan.

•Excess folate from food is stored in the body, providing reserves for several months. Folate storage begins in the last trimester of pregnancy, making preterm infants more vulnerable to anemia due to inadequate folate reserves at birth.



CAUSES OF FOLATE DEFICIENCY ANEMIA

1. **Poor diet:** Inadequate intake of folate-rich foods, bottle feeding, and consuming foods exposed to high cooking temperatures.

2. **Malabsorption disorders:** Digestive system conditions affecting folate absorption, often linked to protein and energy deficiency in children.

3. **Increased nutritional needs:** Pregnancy, lactation, rapid growth in children, and conditions like skin diseases, bacterial infections, and cancer.

4. **Medication interference:** Certain drugs, including painkillers and epilepsy treatments, can interfere with folate absorption or metabolism.

VITAMIN B12 DEFICIENCY ANEMIA

- Vitamin B12 deficiency disrupts DNA synthesis, altering red and white blood cells, platelets, and epithelial cells.

- Unlike folate deficiency, it also affects the nervous system, particularly the spinal cord, causing neurological symptoms.

CAUSES OF VITAMIN B12 DEFICIENCY ANEMIA

1. **Maternal deficiency :** Newborns of deficient mothers.
2. **Dietary deficiency:** Strict vegetarians avoiding animal products.
3. **Surgical factors:** Stomach surgeries removing intrinsic factor production, essential for absorption.
4. **Parasitic infections:** Tapeworms absorbing B12 from the intestines.
5. **Malabsorption disorders:** Small intestine diseases impairing B12 absorption

Checkpoint

Which of the following conditions is most commonly associated with folic acid deficiency anemia?

A) Hypertension
B) Megaloblastic anemia
C) Iron overload
D) Sickle cell anemia

Which of the following is a common cause of Vitamin B12 deficiency anemia?

A) Excessive consumption of animal products
B) Infection with a tapeworm in the small intestine
C) High intake of folic acid
D) Overproduction of intrinsic factor

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