
بسم الله الرحمن الرحيم
In the name of ALLAH
the most Beneficent and the most merciful

NUTRITION AND HEALTH-3

MICRONUTRIENTS – VITAMINS

MICRONUTRIENTS – VITAMINS

- Vitamins are organic compounds categorized as "essential nutrients"
- These carry out vital functions of the body
- These are required by the body in very small amounts

MICRONUTRIENTS – VITAMINS

- Vitamins do not yield energy but enable the body to use other nutrients
- Body is *generally* unable to synthesize these (except vitamin B complex) & these must be provided by food

MICRONUTRIENTS – VITAMINS

- A well balanced diet supplies the vitamin needs of a healthy person
- Each vitamin has specific functions to perform
- Deficiency of any vitamin may lead to specific deficiency disease

MICRONUTRIENTS – VITAMINS

CLASSIFICATION

I. FAT SOLUBLE VITAMINS

Vitamin A,D,E and K

II. WATER SOLUBLE VITAMINS

Vitamin B complex group and vitamin C

VITAMIN A

It occurs in two forms;

1. A pre formed vitamin, retinol; in animal foods
2. A pro-vitamin beta carotene in plant foods which is converted to retinol in intestinal mucosa

The international unit(IU) of vitamin A is equivalent to 0.3 µg of retinol(or 0.55 µg of retinol palmitate)

FUNCTIONS OF VITAMIN A

- It is indispensable for normal vision
- It helps in synthesis of retinal pigment "Rhodopsin", needed for vision in dim light
- It supports growth especially skeletal growth

FUNCTIONS OF VITAMIN A

- It is anti-infective; there is increased susceptibility to infections and lowered immune response in vitamin A deficiency
- It may protect against some epithelial cancers such as bronchial cancers

FUNCTIONS OF VITAMIN A

- It maintains integrity and normal functioning of glandular & epithelial tissue which lines the intestinal, respiratory and urinary tracts as well as skin and eyes

SOURCES OF VITAMIN A

Vitamin A is widely distributed in animal and plant foods-in animal foods as preformed Vitamin A (retinol) and in plant foods as provitamin (carotenes)

- **Animal Foods** e.g. Liver, eggs, butter, cheese, whole milk, fish and meat. Fish liver oils are the richest sources, but these are generally used as nutritional supplements

SOURCES OF VITAMIN A

- **Plant Foods** e.g. green & yellow fruits(papaya, mango, apricot) and green leafy & yellow vegetables like spinach & carrots
- **Fortified Foods** like vanaspati, margarine, milk; can be important sources

VITAMIN A

- The liver has an enormous capacity for storing vitamin A, mostly in the form of retinol palmitate.
- A well-fed person has sufficient vitamin A reserves to meet his needs for 6-9 months or more

DEFICIENCY OF VITAMIN A

The symptoms and signs of vitamin A deficiency are predominantly *OCULAR* – **xerophthalmia,** which comprises all of the following:

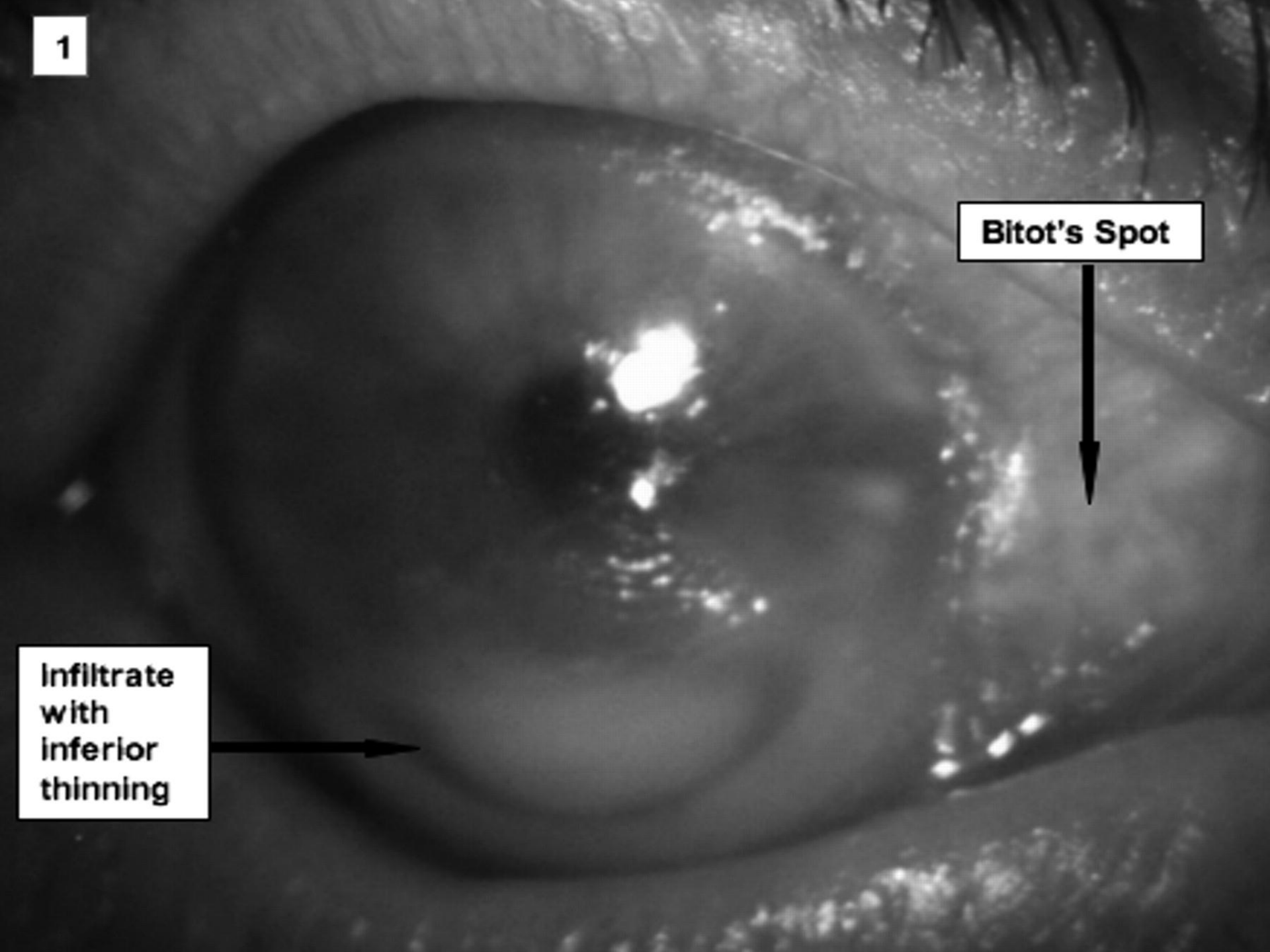
DEFICIENCY OF VITAMIN A

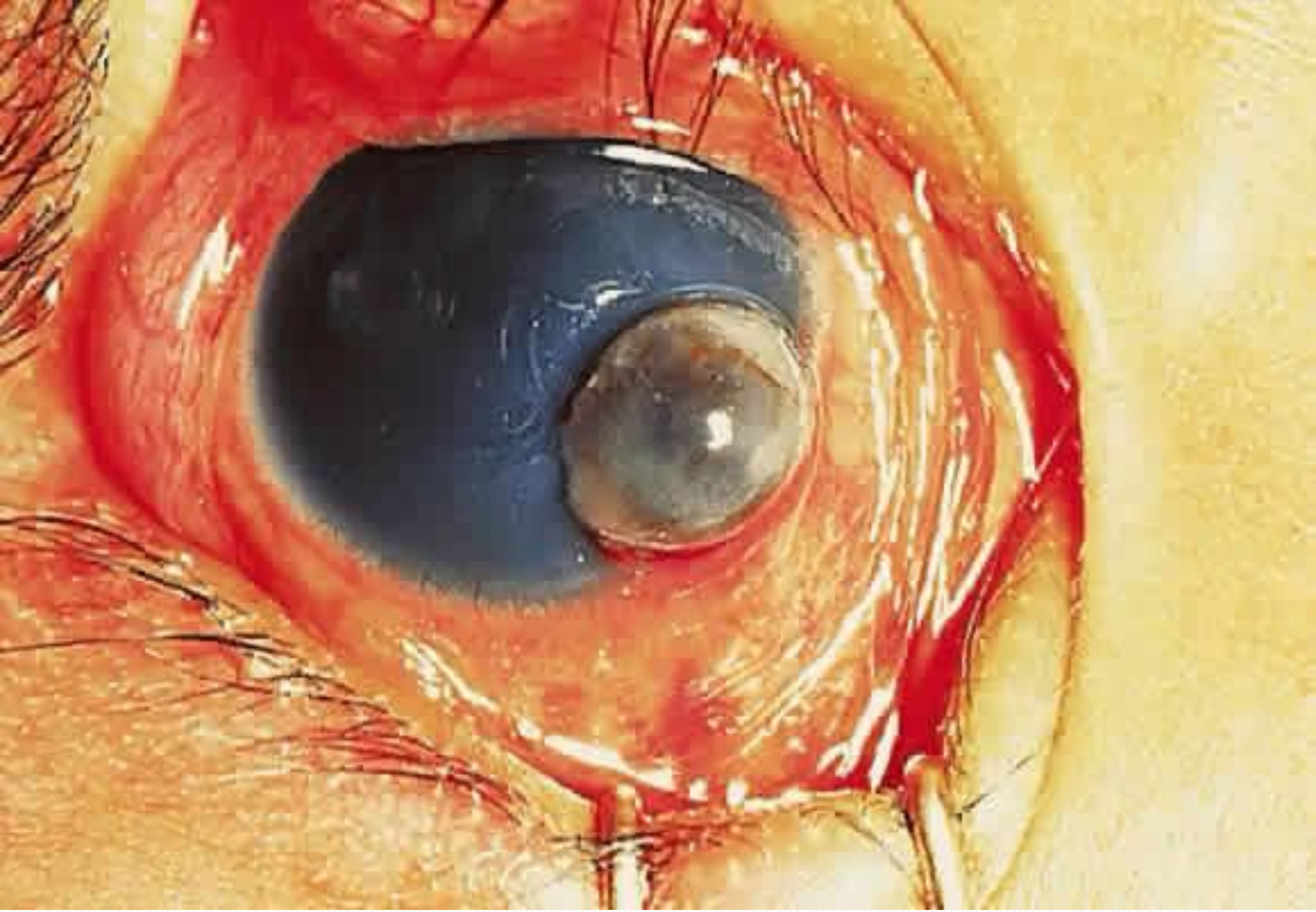
XEROPHTHALMIA

a) Night blindness (Nyctalopia)
b) Conjunctival xerosis
c) Bitot's spots
d) Corneal xerosis and ulceration
e) Keratomalacia(liquefaction of cornea)


EyX 4


EyeRounds.org


1
Bitot's Spot
Infiltrate with inferior thinning



DEFICIENCY OF VITAMIN A

- **ALL PERSONS WITH OCULAR MANIFESTATIONS must urgently receive massive dose of 200,000 IU of vitamin A orally on two successive days**

DEFICIENCY OF VITAMIN A

OTHER EXTRAOCULAR MANIFESTATIONS

f) Follicular hyperkeratosis

g) Anorexia

h) Growth retardation

DEFICIENCY OF VITAMIN A

i) Even mild Vitamin A deficiency causes an increase in morbidity and mortality due to respiratory and intestinal infections

j) Development of urinary calculi

VITAMIN A DEFICIENCY

- **PREVENTION & CONTROL** includes:

a) Improvement of people's diet

b) Reducing the frequency of PEM, ARI, measles and diarrhoea

Both of the above are long term measures involving intensive nutrition education and community participation

VITAMIN A

- Vitamin A supplements are also given to preschool children twice a year during NID's in the following doses:

Age	6 months – 11 months	100,000 IU
Age	1 year – < 5 years	200,000 IU

- RDA of vitamin A is 600 mcg for adults

HYPERVITAMINOSIS A

- Excess intake of retinol causes anorexia, nausea, vomiting, sleep disorders, enlarged liver, papilledema, brittleness of bones, fractures and skin desquamation
- Massive doses given during pregnancy may cause teratogenic effects

VITAMIN D

- Nutritionally important forms are calciferol (vitamin D_2)and Cholecalciferol (vitamin D_3)
- Cholecalciferol is naturally occurring vitamin D and is found in animal fat & fish liver oil.

VITAMIN D

- Chemically, these are steroids
- It is also derived from exposure of body to UV rays of sun, which convert cholesterol in the skin to vitamin D.
- It is stored largely in fat depots.

VITAMIN D

FUNCTIONS

1. Vitamin D promotes intestinal absorption of calcium and phosphorus.
2. It affects collagen maturation, stimulates normal mineralization, enhances bone resorption

VITAMIN D

(FUNCTIONS)

3. It increases tubular reabsorption of phosphate / calcium in kidneys
4. It permits normal growth.

SOURCES OF VITAMIN D

1. **Foods;** Vitamin D occurs only in foods of animal origin e.g. liver, eggs, butter, milk, cheese, fish liver oils. Vegetable foods do not contain this vitamin
2. **Artificially fortified foods** like vanaspati, margarine, infant foods & milk.

SOURCES OF VITAMIN D

3. **Sunlight (UV rays)** converts 7-Dehydrocholestrol (present as provitamin D) under the skin, to vitamin D

DEFICIENCY OF VITAMIN D

It causes:

a) **Rickets** in children of 6 months to 2 years

b) **Osteomalacia** in adults, mainly women who are strict purdah observer.


Child with Rickets

PREVENTION OF VITAMIN D DEFICIENCY

Following are measures of prevention

a) Health education – about good nutrition and sun bath.

b) Periodic dosing/supplementation of young children with vitamin D.

c) Fortification of foods such as milk, vegetable ghee .

DAILY REQUIREMENTS OF VITAMIN D

Adults	100 I.U. (2.5 mcg)
Infants	200 I.U. (5 mcg)
Children	400 I.U. (10 mcg)
Pregnancy & Lactation	400 I.U. (10 mcg)

(1 microgram = 40 I.U.)

HYPERVITAMINOSIS D

The margin between the daily requirement dose of vitamin D and the toxic dose is narrow

Overdose results in nausea, vomiting, anorexia, thirst and drowsiness

Hypercalcaemia may result not only in the calcification of tissues but may also result in cardiac arrhythmias and renal failure

VITAMIN E (TOCOPHEROLS)

- These are a group of closely related and naturally occurring fat soluble compounds, the tocopherols
- Of these alpha-tocopherol is biologically the most potent.
- Vit. E is widely distributed in foods.

VITAMIN E (TOCOPHEROLS)

- The richest sources are cotton seed, sunflower seed, vegetable oils, egg yolk and butter.
- Foods rich in PUFA are also rich in vitamin E.
- Vitamin E requirement is 10mcg (15 IU) per day

VITAMIN K

- It occurs in two major forms vitamin K1 & vitamin K2
- Vitamin K1 is found in fresh green vegetables, some fruits, cheese, egg, liver and milk
- Vitamin K2 is synthesized by intestinal bacteria

VITAMIN K

- Long term administration of antibiotics may temporarily suppress intestinal flora; thus causing deficiency of vitamin K
- Vitamin K is stored in liver

VITAMIN K

- The role of vitamin K is to stimulate the production and/or the release of certain coagulation factors
- In vitamin K deficiency the blood clotting time is considerably prolonged, resulting in haemorrhages

VITAMIN K

- Newborns tend to be deficient in vitamin K and bleed more from umbilical cord. (Give 0.5 mg of vitamin K immediately after birth)
- Daily requirement is about 0.03mg/Kg for an adult


Thank You