

Vitamin

- A vitamin is an organic compound required as a nutrient in tiny amounts by an organism.
- The term 'vitamin' first became popular in the early 1800's as a contraction of the words 'vital' and 'mineral', though the actual meaning of the word has developed somewhat since that time.
- A compound is called a vitamin when it cannot be synthesized in sufficient quantities by an organism, and must be obtained from the diet. Thus, the term is conditional both on the circumstances and the particular organism.

Vitamins

- Vitamins are classified as either water-soluble or fat soluble.
- In humans there are 13 vitamins: 4 fat-soluble (A, D, E and K) and 9 water-soluble (8 B vitamins and vitamin C).
- Water-soluble vitamins dissolve easily in water, and in general, are readily excreted from the body, to the degree that urinary output is a strong predictor of vitamin consumption.
- Because they are not readily stored, consistent daily intake is important.
- Many types of water-soluble vitamins are synthesized by bacteria.

CLASSIFICATIONS OF Vitamins

I. VITAMINES PREPARATIONS

A. HYDROSOLUBLE DRUGS

VITAMIN C - ASCORBIC ACID

VITAMIN B₁ – TIAMINE, PHOSPHOTIAMINE, COCARBOXILASE

VITAMIN B₂ – RIBOFLAVINE, FLAVINAT

VITAMIN B₃ (PP) –NICOTINIC ACID, NICOTINAMIDE

VITAMIN B₅ –PANTOTENIC ACID, CALCIUM PANTOTENAT

VITAMIN B₆ – PIRIDOXINE, PIRIDOXALFOSFAT

VITAMIN B₁₂ - CIANOCOBALAMINE, OXICOBALAMINE,
COBAMAMID

VITAMIN B_C - FOLIC ACID

VITAMIN H - BIOTINE

VITAMIN P - RUTOZID, CVERCERUTINE, VENORUTON

B. LIPOSOLUBLE

VITAMIN A - RETINOL, RETINOL ACETAT, RETINOL PALMITAT, FISH OIL, TRETINOIN, ETRETINAT , IZOTRETINOIN

VITAMIN D - ERGOCALCIFEROL, COLECALCIFEROL, CALCIDIOL, CALCITRIOL, DIHIDROTAHISTEROL

VITAMIN K - FITOMENADIONE, MENADIONE, SODIUM MENADIOL SULPHATE

VITAMIN E - TOCOFEROL ACETATE

I. VITAMINOIDS PREPARATIONS

VITAMIN B₄ – COLINE

VITAMIN B₈ – INOZITOL

VITAMIN B₁₃ –OROTIC ACID, POTASIUM OROTATE

VITAMIN B₁₅ - CALCIUM PANGAMATE

VITAMIN N- LIPOICACID, LIPAMIDE

VITAMIN U - METHYLMETHIONINSULFONIUM CLORIDE

VITAMIN H₁ –PARAAMINO BENZOIC ACID

II. POLIVITAMINIC PREPARATIONS

**AEVIT, REVIT, LECOVIT, MULTIBIONTA, IUNICAP,
PICOVIT, BEROCA, MULTITABS, VITRUM, BIOVITAL,
DUOVIT, UNDEVIT, DECAMEVIT etc.**

- Fat-soluble vitamins are absorbed through the intestinal tract with the help of lipids (fats).
- Because they are more likely to accumulate in the body, they are more likely to lead to hypervitaminosis than are water-soluble vitamins.
- Fat-soluble vitamin regulation is of particular significance in cystic fibrosis.

Fat Soluble Vitamins (A.D.E.K)

- Absorbed with fats in intestinal tract.
- Small amounts of vitamins A, D, E and K are needed to maintain good health.
- Foods that contain these vitamins **will not lose them when cooked.**
- The body does not need these every day and stores them in the liver when not used.
- Most people do not need vitamin supplements.
- Mega-doses of vitamins A, D, E or K can be toxic and lead to health problems.

Vitamin A “Retinol”

Properties

- Also called retinol
- Maintenance of healthy skin, hair, eyes, etc.
- Increases infection resistance
- Essential for night vision
- Promotes bones and tooth development.

Sources

- Butter 815mcg/100g
- Margarine 780mcg/100g
- Yolk 535mcg/100g
- Milk 52mcg/100g
- Liver 30mcg/100g
- Fish 45mcg/100g

Vitamin A Deficiency

- Low resistance to infection.
- Diarrhea.
- Intestinal infections.
- Psoriasis.
- inflammation of eyes.
- keratinization of skin and eyes.
- Night blindness.

Vitamin D

Properties

Needed for calcium and phosphorous absorption.

- Play a role in inhibition of calcitonin release from the thyroid gland.

- Play role in pathogenesis and prevention of diabetes mellitus.

Sources

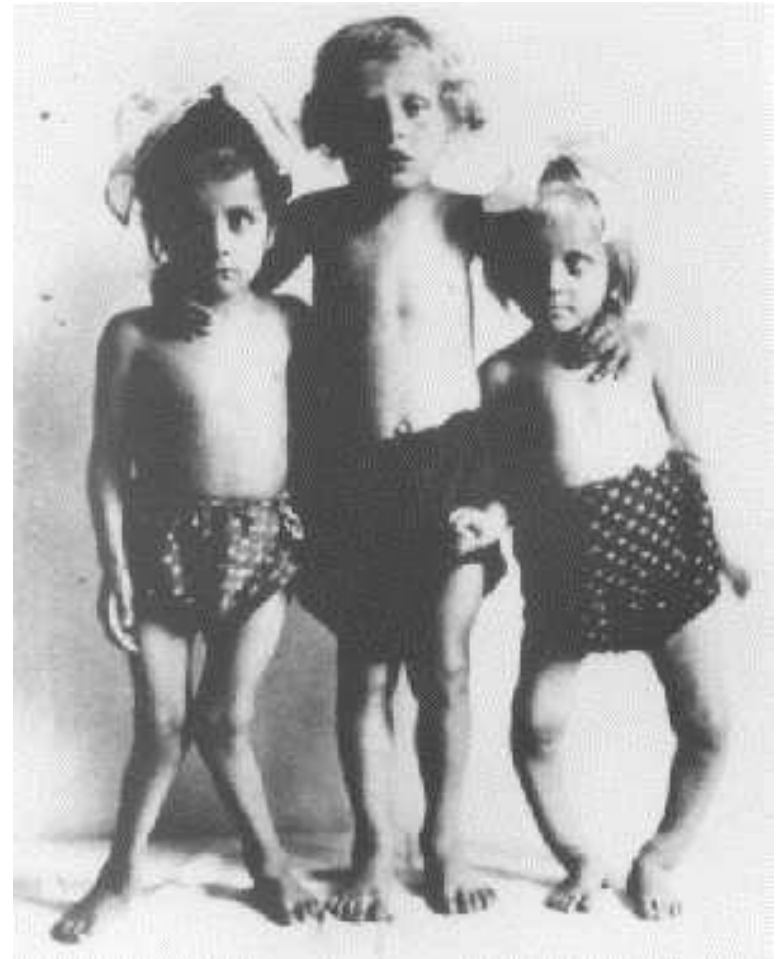
- Fish (cod) **liver** oils
210mcg/100g

- Sardines, salmon, tuna 8-11mcg/100g

- Egg 1.75mcg/100g

Vitamin D Deficiency

- Rickets
- Bone softening
- Bad teeth
- Type 1 DM



Vitamin E

Properties

- Formation of muscle, and other tissues
- Prevents abnormal breakdown of fat.
- Protects vitamins A and C and fatty acids
- Prevents damage to cell membranes.
- Antioxidant.

Sources

- Whole grain cereals
- Vegetable oils
- Nuts
- Leafy vegetables
- Avocado

Vitamin E Deficiency

- Poor circulation
- Loss of body and sexual vigor
- Muscle/heart problems
- Nose bleeds
- Skin infections
- Intermittent Claudication.
- Possible anemia in low birth-weight infants.

Vitamin K

Properties

- Part of clotting process

Sources

- Broccoli
- Cabbage
- Yogurt
- Yolk
- Soya bean
- Code liver oil

Vitamin K Deficiency

- Rare, generalized bleeding.
- Excessive bleeding.

Water Soluble Vitamins

- Absorbed in intestinal tract.
- Not as readily stored as fat soluble vitamins.
- The water-soluble vitamins, excluding vitamin C, popularly are termed the B-complex vitamins.
- There are eight of them, namely; B1 (thiamine), B2 (riboflavin), B6 (pyridoxine), niacin (nicotinic acid), B12, folic acid, pantothenic acid, and biotin.

Thiamine (B1)

Properties

- Oxidation of carbohydrates
- Glucose production.
- Depression reduction.

Sources

- Yeast 4.25mg/100g
- Peas 0.89mg/100g
- Orang 0.70mg/100g
- Corn 0.65mg/100g
- Yolk 0.30mg/100g

Thiamine (B1) Deficiency

- Loss of energy
- Depression
- Poor appetite
- Bell parleys.
- Beriberi:
- Disease from lack of thiamine
- Stiffness/Weakness
- Pain
- Muscle Damage
- Death
- Most common today in addicts.

Riboflavin (B2)

Properties

- Needed for energy metabolism in cells
- Fat synthesis
- Benefit in anemia.

Sources

- Yeast
- Liver sheep
- Cheddar cheese
- Egg
- Beef meat
- Yogurt
- Chicken (legs)
- Milk

Riboflavin (B2) Deficiency

- Tissue damage.
- Eye strain.
- Fatigue.
- Itching.
- Sensitivity to light.

VITAMIN B3 (PP)

Properties

- Involved in energy reactions in cells
- Increase HDL
- Reduce the request of narcotics.

Sources

- Poultry. 12.8mg/100g
- Meat.
- Whole wheat and enriched grains.
- Egg 3.8mg/100g

Niacin (B3) Deficiency

- Lack of concentration / poor memory
- Headaches
- Insomnia
- Backache
- Pellagra
- Aggression
- Light sensitivity
- Dermatitis
- Skin lesions
- Dementia



Vitamin B12

Sources

- Genetic molecule synthesis.
- Nervous system function.
- Benefit for mood.
- Benefit for diabetics.

- Liver 81mcg/100g
- Beef meat 2mcg/100g
- Fish 1mcg/100g

Vitamin B12 Deficiency

- Anemia / fatigue
- Bowel disorders
- Poor appetite
- Poor growth

Vitamin C

Sources

- Normal development of bones, teeth, gums, and cartilage
- Antioxidant (protects vit. A & E)
- Immune response (antihistamine)

- Guava 230mg/100g
- Black berry 200mg/100g
- Green Pepper 120mg/100g
- Broccoli 87mg/100g
- Papaya 60mg/100g
- Strawberry 77mg/100g
- Kiwi 59mg/100g
- Orange 54mg/100g

Vitamin C Deficiency



- Scurvy
- Bleeding gums
- Bruising
- Low infection resistance

Osteoporosis

- Osteoporosis is defined as a generalized decrease in bone mass (osteopenia) that affects bone matrix and mineral content equally, giving rise to fractures of vertebral bodies with bone pain, kyphosis, and shortening of the torso.
- Fractures of the hip and the distal radius are also common. The underlying process is a disequilibrium between bone formation by osteoblasts and bone resorption by osteoclasts.



Classification:

- *Idiopathic osteoporosis* type I, occurring in postmenopausal females; type II, occurring in senescent males and females (>70 y).
- *Secondary osteoporosis*: associated with primary disorders such as Cushing's disease, or induced by drugs, e.g., chronic therapy with glucocorticoids or heparin. In these forms, the cause can be eliminated.
- **Postmenopausal osteoporosis**

Treatment of osteoporoses

- I. Hormons and its analogues
 - 1. sexual hormones – oestrogens, androgens
 - 2. calcitonines (human, pork, fish)
- II. Vitaminei D3 active metabolites
 - alfacalcidol, calcitriol, calcifediol
- III. Animal horigin drugs oseina
- IV. syntetics drugs

- **Bisphosphonates** clodronat, atidronat, alendronat, pamidronat, risedronat
- **fluorides** fluorura de sodiu, monofluorfosfat
- calcium salts: Calcium citrate, calcium carbonate
- Steroidic anabolics
 - Nandrolone fenylpropionate
 - Nandrolone decanoate

Mechanism of action

- 1. Remedies inhibiting resorption of bones tissue
- Estrogens, calcitonin, Bisphosphonates
- 2. Drugs that contributes to the synthesis and mineralization of bones
- fluorides, Steroidic anabolics
- 3. compound mechanism of action
- Oseina-hydroxiapatite, calcium drugs , vit. D3.

- **Risk factors** are: premature menopause, physical inactivity, cigarette smoking, alcohol abuse, low body weight, and calcium-poor diet.

Therapy.

- Formation of new bone matrix is induced by **fluoride**.
- Administered as sodium fluoride, it stimulates osteoblasts.
- Fluoride is substituted for hydroxyl residues in hydroxyapatite to form fluorapatite, the latter being more resistant to resorption by osteoclasts. T
- o safeguard adequate mineralization of new bone, calcium must be supplied in sufficient amounts.
- However, simultaneous administration would result in precipitation of nonabsorbable calcium fluoride in the intestines.
- With *sodium monofluorophosphate* this problem is circumvented. The new bone formed may have increased resistance to compressive, but not torsional, strain and paradoxically bone fragility may increase.
- Because the conditions under which bone fragility is decreased remain unclear, fluoride therapy is not in routine use.

Calcitonin

- inhibits osteoclast activity, hence bone resorption.
- As a peptide it needs to be given by injection (or, alternatively, as a nasal spray).
- Salmonid is more potent than human calcitonin because of its slower elimination.

Bisphosphonates

- structurally mimic endogenous pyrophosphate, which inhibits precipitation and dissolution of bone minerals.
- They retard bone resorption by osteoclasts and, in part, also decrease bone mineralization. Indications include: tumor osteolysis, hypercalcemia, and Paget's disease.
- Clinical trials with etidronate, administered as an intermittent regimen, have yielded favorable results in osteoporosis.
- With the newer drugs clodronate, pamidronate, and alendronate, inhibition of osteoclasts predominates; a continuous regimen would thus appear to be feasible.
- Bisphosphonates irritate esophageal and gastric mucus membranes; tablets should be swallowed with a reasonable amount of water (250 mL) and the patient should keep in an upright position
- for 30 min following drug intake.

CLASSIFICATION OF THE PREPARATIONS USED AS ANTIENZYMES

1. INHIBITORS OF PROTEOLYTIC ENZYMES

- APROTININE

2. INHIBITORS OF FIBRINOLYSIS

- AMINOCAPROIC ACID TRANEXAMIC ACID
- AMINO BENZOIC ACID APROTININE

3. ENZYMES INHIBITORS FROM VARIOUS GROUPS

- ANTICHOLINESTERAZICS (NEOSTIGMINE ETC.)
- INHIBITORS MAO (MOCLOBEMIDE ETC.)
- INHIBITORS OF CARBOANHYDRASE (ACETAZOLAMIDE.)
- INHIBITORS OF CONVERCE ENZYME (CAPTOPRIL ETC.)
- INHIBITORS OF FOSFODIESTERASE (PAPAVERINE ETC.)
- INHIBITORS OF CYCLOOXYGENASE (DICLOFENAC ETC.)
- INHIBITORS OF NITROXID SINTETASE (IZOTHYUREIC DERIVATIVES ETC.)
- INHIBITORS OF XANTINOXIDASE (ALLOPURINOL ETC.)
- INHIBITORS OF ACETALDEHYD DEHYDROGENASE (DISULPHIRAM ETC.)

CLASSIFICATION OF THE ENZYMATIC PREPARATIONS

- ***I. PROTEOLYTIC ENZYMATIC PREPARATIONS***

- **TRIPSINE CHIMOTRIPSINE CHIMOPSINE TERILITINE**
- **RIBONUCLEASE DEZOXIRIBONUCLEASE**
- **COLAGENASE ELASTOLITINE**

- ***II. FIBRINOLYTIC ENZYMATIC PREPARATIONS***

- **FIBRINOLIZINE STREPTOKINASE ANISTREPLASE**
- **UROKINASE NASARUPLASE ALTEPLASE**

- ***III ENZIMATIC. PREPARATIONS THAT AMELIORATE THE DIGESTION***

- **PEPSINE ACIDIN-PEPSINE ABOMINE**
- **PANCREATIN TRIFERMENT FESTAL**
- **PANZINORM SOMILASE DIGESTAL**

- ***IV. ENZIMATIC PREPARATIONS THAT HAVE ANTIBACTERIAL PROPIERTIES***

- **BACTISUBTIL**

- ***ENZIMATIC PREPARATIONS WITH VARIOUS ACTIONS***

- **HIALURONIDASE RONIDASE PENICILINASE**
- **L-ASPARAGINASE LECOZIM CITOCROM C**

CLASIFICACION OF ANTIATHEROSCLEROTICS

- 1. HYPOLIPIDEMIC REMEDIES
- 2. ENDOTELIOTROPIC REMEDIES
(ANGIOPROTECTIVES)
 - *PIRICARBAT, ETAMZILAT, CALCIUM DOBESILATE, ASCORBIC AC., RUTOZID*
- 3. LIPOTROPIC REMEDIES
 - *CHOLINE, METIONINE, TRIPTOFAN, INOZITOL, LIPOIC AC., CIANOCOBOLAMINE*
- 4. ANTIOXIDANTS
 - *TOCOFEROL, ASCORBIC AC., PROBUCOL*

CLASIFICACION OF HYPOLIPIDEMIC DRUGS

- **FIBRIC ACID DERIVATIVES**

- *CLOFIBRATE, BEZAFIBRATE, CIPROFIBRATE, GEMFIBROZIL*

- **STATINES**

- *LOVASTATINE, SIMVASTATINE, PRAVASTATINE, COMPACTINE*

- **NICOTINIC ACID'S REMEDIES**

- *NICOTINIC AC., PIRIDINOLCARBINOL, XANTINOL NICOTINATE,*

- *INOZITOLNICOTINATE*

- **RESINS**

- *CHOLESTYRAMINE, COLESTIPOL*

- **UNSATURATED FATTY ACIDS PREPARATIONS**

- *FISH OIL, LINETOL, ARAHIDEN*

- **ANTIOXIDANTS**

- *TOCOFEROL, PROBUCOL, ASCORBIC AC.*

- **VARIOUS GROUPS**

- *BETA-SITOSTEROL, NEOMICINE, DEXTROTHYROXINE, HEPARIN,*

- *LIPOSTABIL, ESENTIALE, PREPARATION FROM GARLIC*

MECHANISMS OF ACTION OF HYPOLIPIDEMIC DRUGS

1. DECREASING OF CHOLESTEROL ABSORPTION, FIXATION OF BILIARY ACIDS AND THEIR ELIMINATION THROUGH THE INTESTIN: RESINS, NEOMICINE, BETA-SITOSTEROL
2. INHIBITION OF LIPOPROTEINLIPASE IN ADIPOUS TISSUE: NICOTINIC ACID'S REMEDIES
3. STIMULATION OF ENDOTELIAL LIPOPROTEINLIPASE: FIBRIC ACID DERIVATIVES, HEPARIN, NICOTINIC ACID'S REMEDIES.
4. INHIBITION OF HMG-CoA- REDUCTASE AND ITS SYNTHESSES: , STATINELE FIBRAȚII
5. ACTIVATION OF THE LIPID CAPTURE AND HEPATIC LIPOPROTEINS THROUGH SINTHYSES STIMULATION OF LIPOPROTEIN RECEPTORS
 - STATINES FIBRIC ACID DERIVATIVES, RESINS
6. INHIBITION OF SINTHYSES AND SECRETION OF VLDL WITH THEIR DIMINISHING IN SERUM
 - STATINES, NICOTINIC ACID'S REMEDIES, FIBRIC ACID DERIVATIVES
7. DECREASING OF LDL IN SERUM
 - STATINES, NICOTINIC ACID'S REMEDIES, FIBRIC ACID DERIVATIVES, RESINS
8. ENHANCING OF CHOLESTEROLIC CATABOLISM IN THE BODY:
 - PREPARATELE ACIZILOR GRAȘI NESATURAȚI, DEXTROTHYROXINE
9. INCREASING OF ANTIATHEROGEN LIPOPROTEINS (HDL) – FIBRIC ACID DERIVATIVES, STATINES, NICOTINIC ACID'S REMEDIES
10. INHIBITION OF THE LIPID OXIDATION – ANTIOXIDANTS