Leaving Certificate Notes

VITAMINS

Key areas that you need to know:

- Sources of vitamins
- Functions of vitamins
- Effects of vitamin deficiencies
- Recommended dietary allowances (RDA's)
- Properties of all the FAT-SOLUBLE & WATER-SOLUBLE vitamins (***Higher level only***)
- Sources / functions/ effects of deficiency and properties of other B-COMPLEX vitamins including THIAMINE, RIBOFLAVIN, NIACIN & PYRIDOXINE

MINERALS:

Key areas that you need to know:

- Be able to identify the major mineral elements
- Be able to identify the trace minerals needed in the diet (***Higher level only***)
- Sources of calcium, iron, zinc***, iodine***, potassium***, sodium***
- Functions of calcium, iron, zinc***, iodine***, potassium***, sodium***
- Effects of deficiency of calcium, iron, zinc***, iodine***, potassium***, sodium***
- Recommended dietary allowances of calcium, iron, zinc***, iodine***, potassium***, sodium***
- Factors affecting absorption of mineral elements in the body including
  -the role of vitamins in assisting the absorption of calcium & iron in the body
- Sources of Haem iron and Non-haem iron
- Effects of PHYTATES & OXALATES on the absorption of calcium (***Higher level only***)

Water:

Key areas that you need to know:

- General properties
- Biological importance

VITAMINS

- Definition of Vitamins—"compex organic nutrients (made of Carbon, Hydrogen, Oxygen) needed by the body in small amounts to keep the body healthy.
- Humans either cannot make the vitamin or cannot make it fast enough so it must be got from food. ***EXCEPTION--- VITAMIN D (got from sunlight)

- **CLASSIFICATION OF VITAMINS:**

Fat-soluble Vitamins	Water-soluble Vitamins
• ***Vitamins A,D,E,K,***	• ***Vitamin C*** • ***B group (thiamine, riboflavin, niacin, pyridoxine, folic acid & cobalamin)***

Fat-soluble Vitamins:

- Found in association with fats in foods
- Absorbed in the digestive system along with fats
- Fat-slouble vitamins **can be stored** in the body
- Too much of some fat-soluble vitamins can build up to toxic levels (hypervitaminosis A + D)

(**Excess Retinol—too much vit A in the diet is poisonous Hypervitaminosis A can result in death**)

Water-soluble Vitamins:

- Water-soluble vitamins are **not stored** in the body (exception Vit. B_{12})
- Water-soluble Vitamins must be eaten regularly
- Excess consumption of water-soluble vitamins are excreted/ remved from the body in urine

FAT- SOLUBLE VITAMINS:

Vitamins A, D,E, & K

Vitamin A:

- 2 types of vit A-
  (1) **Retinol** (pure vitamin A)
  (2) **Beta- Carotene** (pro-vitmain A)

- **Retinol-** found in animal foods
- **Beta-carotene** – found in yelllow, green and orange fruit & vegetables, beta-carotene is not as well absorbed as retinol, Beta-carotene can be converted to retinol retinol in the intestine
- **Vitamin A** is stored in the **liver**

Functions of vitamin A:

(1) Needed for vision in dim light (makes pigment rhodopsin)
(2) Maintains the surface/ lining tissues of mouth, respiratory & urinary tract (helps to make mucous)
(3) Regulates growth
(4) Promotes healthy skin

Deficiency of Vitamin A

1. Night Blindness
2. Lack of retinol = increased risk of disease/ infection (dry membranes)
3. Xerophthalmia- (drying out of tear ducts)
4. Reduced growth in children
5. Bad skin

Sources of Vitamin A

Pure Vitamin A (RETINOL) (animal)	***Pro-Vitamin A (Beta-carotene)***(plant)
• Liver • Fish oils • Fortified milk • Eggs • Margarines	• **Dark green vegetables** -spinach -kale -cabbage -lettuce -broccoli • **Orange veg. & some fruits** -carrots -red peppers -apricots -tomatoes

Properties of Vitamin A

Pure Vitamin A (RETINOL)	***Pro-Vitamin A (Beta-carotene)***
• Yellow, fat-soluble alcohol • Insoluble in water • Destroyed by oxygen • Stable during ordinary cooking, destroyed by high temperatures • Some loss on drying & canning	• Bright yellow/ orange oil • Insoluble in water • Heat stable (exception canning) • Powerful antioxidant • Effected by drying & canning • Not readily effected by heat

RDA's for Vitamin A

Children- 400-500 ug/ day (micro-grams)
Adults- 600-700 ug/day

Vitamin D

- 2 TYPES
  (1) Cholecalciferol (D_3)
  (2) Ergocalciferol (D_2)

- **Cholecalciferol-** found in foods but is can be made in the body by the action of UV light on 7-dehydrocholestrol (a form of cholestrol) found in the skin
- **Ergocalciferol-** found in plants but also produced by the action of the sun on skin- UV light activates ergosterol a substance found in fungi & yeasts producing ergocalciferol

****Hypervitaminosis D –** too much reaches toxic levels

Functions of Vitamin D

(1) Controls the absorption of calcium and phosphurus
(2) Regulates the calcium and phosphurous in the bones and teeth
(3) Prevents rickets and osteomalacia

Deficiency of Vitamin D

1. Rickets in children
2. Osteomalacia in adults
3. Retarded growth in children
4. Dental decay

Sources of Vitamin D

- Sunlight
- Fish
- Fortified milks
- Cod liver oil
- Egg yolk
- Liver
- Margarine

Properties of Vitamin D

- Fat-soluble vitamin
- Insoluble in water
- Heat stable
- Oxygen, acids, alcohol have no effect

RDA's

Children 0-10 ug/day
Teenagers 0-15 ug/ day
Adults 0-10 ug/day

Vitamin E

- Vitamin E = Tocopherols- found in all the cell membranes of the body

Function of Vitamin E

1. Antioxidant
2. Necessary for metabolism to take place (chemical reactions involved in the breaking down of food)
3. Helps improve the absorption of Vitamin A
4. Believed to protect red blood cells

Deficiency of Vitamin E

- Deficiency is unlikely
- Anaemia / eye disorders in newborns
- Nerve disorders in adults

Excess Vitamin E

- No reported cases

Sources of Vitamin E

- Most foods
- Good sources – vegetable oils , fish, eggs, poultry, fortified cereals, wholegrains

Properties of Vitamin E

1. Fat soluble
2. Insoluble in water
3. Heat stable to 100C
4. Antioxidant

RDA's

None