Animal
Zoology
life
study
Living
4/4th and
Botany
Biology
Science
Plants
living
Non living
Cell
atom

NUTRIENTS

TYPES OF NUTRIENTS:

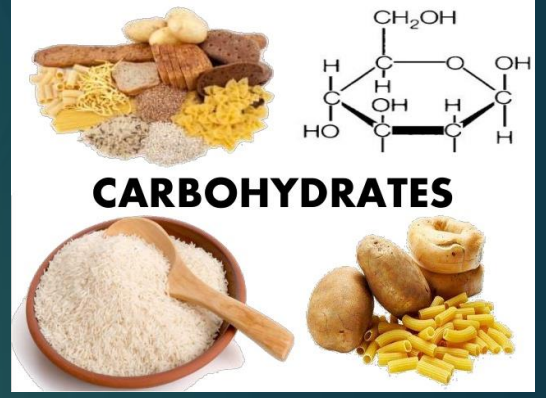
1. Carbohydrates : 300gm
   (Sugar)
2. Protein (Polypeptides) :
   - adult : (0.8gm / kg)
   - teen (13-19 yrs) – (0.95 / kg)
   - Child (below 13yrs) : (2gm/kg)
   - * Pregnant : (55-70) gm
3. Fats (Lipids) – 80gm
4. Vitamins – mg
5. Minerals – mg
6. Water – (5-6) L

50kg × 0.8
40gm

60kg × 0.8
48gm

↓ C, F, P, W
Macro Nut.
बहुत थो.न.
gm –

↓ V, M.
Micro Nut.
अल्प थो.न.
↓ mg



- **Carbohydrates:** (C,H,O) 'ose'

  Carbon H_2O

  भात

  - The compounds which is composed of Carbon and water (C+H2O)
  - Carbohydrates are mainly composed of three elements namely Carbon, Hydrogen, Oxygen.
  - Commonly Carbohydrates are known as Sugar.
  - General formula of Carbohydrate is CnH2nOn.
  - Main function of Carbohydrate is to provide energy i.e works as an 'energy fuel.'
  - Smallest unit of Carbohydrate is Glucose.

- Sugar शर्करा
- $C_n H_{2n} O_n$ *

C : H : O
1 : 2 : 1

$n = 3$

$C_3 H_6 O_3$

triose

Hexose – $C_6 H_{12} O_6$

Pentose : $C_5 H_{10} O_5$

1gm – 4 Kcal

- **Types of Carbohydrates:**
  - It can be divided into 3 parts:

1. Monosaccharides: As the name suggest all the carbohydrates which is composed of a single sugar and cannot be hydrolyzed to give simple sugar.

2. Oligosaccharides: The carbohydrates which contain 2-10 monosaccharides. Disaccharide is a subtype od Oligosaccharides.

3. Polysaccharides: The Carbohydrates which is composed of more than 10 Monosaccharides

CARBOHYDRATES			
Monosaccharides (one sugar molecule)	**Disaccarides** (two sugar molecules)	**Oligosaccharides** (two to ten sugar molecules)	**Polysaccharides** (ten or more sugar molecules)
- Glucose	- Sucrose	- Raffinose	- Starch
- Fructose	- Lactose	- Stachyose	- Glycogen
- Galactose	- Maltose		- Cellulose

- **Examples of Monosaccharides:**

having same Formula but diff. property
↓
Isomers
समावयवी (समरूप)

Functional group
क्रियात्मक समूह

1. Glucose: $C_6H_{12}O_6$ → Aldehyde — Grapes

It is a type of Hexose means it is composed of six Carbon.

Formula of Glucose is C6H12O6.

Glucose provides instant energy to our body because it is a type of monosaccharide and it can not be hydrolyzed into further any simple form

2. Fructose: $C_6H_{12}O_6$ → Ketone — honey

It is also a type of Hexose and the formula is C6H12O6

It is the sweetest natural carbohydrate.

The sweetness of Fruits is due to Fructose.

Que: Aldohexose – glucose, galactose
↓
C_6

Ketohexose – Fructose

Aldehyde

3. Galactose: It is also a type of Hexose. Hence the formula of Hexose is C6H12O6.

4. Ribose: It is a Carbohydrate found in RNA

It is a type of Pentose hence the formula is C5H10O5. *

EXAMPLES OF OLIGOSACCHARIDES:

$C_6H_{12}O_6$ glucose + $C_6H_{12}O_6$ Fructose → $C_{12}H_{22}O_{11}$ + H_2O Sucrose

1. Sucrose: (2-10)

- It is a mixture of Glucose(C6H12O6) and Fructose (C6H12O6).
- Glucose (C6H12O6)+ Fructose (C6H12O6) → Sucrose(C12H22O11) +H2O
- It is also known as Household Sugar/Table sugar (घरेलू चीनी) / Cane Sugar

2. Lactose:

- It is a mixture of Glucose and Galactose.
- It is commonly known as Milk Sugar.

Lactose : C_6 Glu. + C_6 gala

Milk Sugar

3. Maltose:

- It is a mixture of Glucose and glucose. (C_6 + C_6) $C_{12}H_{22}O_{11}$
- It is found in boiled rice water.

EXAMPLES OF POLYSACHARIDES:

1. Cellulose:

- It is commonly known as Plant Carbohydrates(because the cell wall of plant is composed of Cellulose).
- It is a polymer of Glucose.
- Used in Textile Industry, Paper Industry

2. Starch:

- Storage form of Carbohydrates in Plants
- Most edible Carbohydrate in human (rice, wheat, potato).

3. Glycogen:

- Storage form of Carbohydrate in animal including Human.
- It is stored in Liver.

4. Heparin: Anti Clotting agent → Liver

(C, H, O)

FAT (Lipid):

वसा – more Calorigenic

1gm Carb – 4 kcal
1gm Pro – 4 kcal
1gm Fat – 9 kcal

Function:

- It provides energy in fasting condition.*
- Acts as an insulator. कुचालक → Body temp.

Smallest unit: Fatty acid (monoglyceride). It is also composed of carbon, Hydrogen and oxygen. वसीय अम्ल

Types of Fats:

संतृप्त वसा

1. **Saturated Fat:** Hard to digest.
   ↓
   Bad Fat
   Can't be converted into fatty acid in Normal Condition.
   Solid at room temperature (25°C)
   Animal product जंतु Exception: Fish
   ↓
   Omega-3

Eg: Cholesterol, Pure Ghee

Unsaturated fat: Easy to digest.

↓

Good Fat

Can be converted into fatty acid in normal condition.

Liquid at room temperature. (25°C)

Mainly plant products

Exception: Coconut, Palm oil

Eg: Mustard oil, olive oil, Omega 3 (Fish)

HDL (High Density Lipoprotein) → Good Cholesterol

Density ∝ 1/Volume

Eg: Pure ghee

LDL (Low ") → Heart attack

↓

Bad chol.

Vanaspati ghee

Polypeptide (Protein): Composed of Nitrogen, Carbon, Hydrogen and Oxygen.

Function:

1.Growth and development of body. वृद्धि तथा विकास Child : Pro.

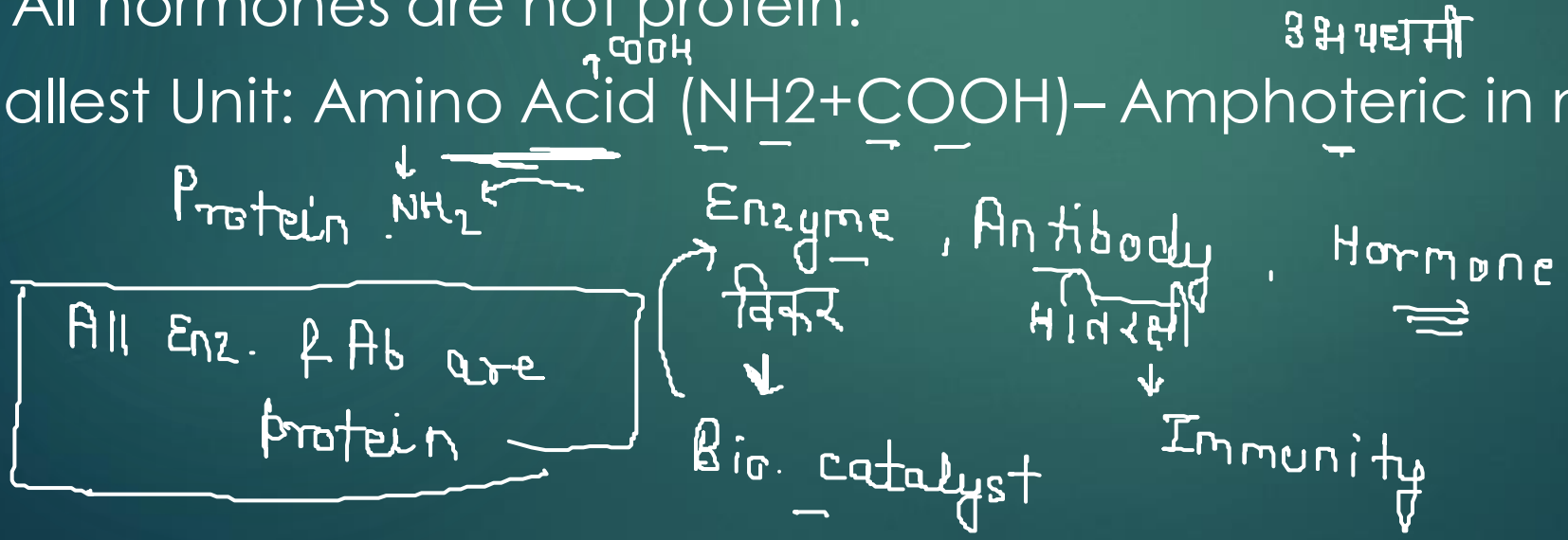
2. Helps in Muscle formation. मांसपेशियों को बनाने में

3. Helps in the formation of Enzymes, Antibodies and Hormones.

*** All Enzymes and antibodies are protein.

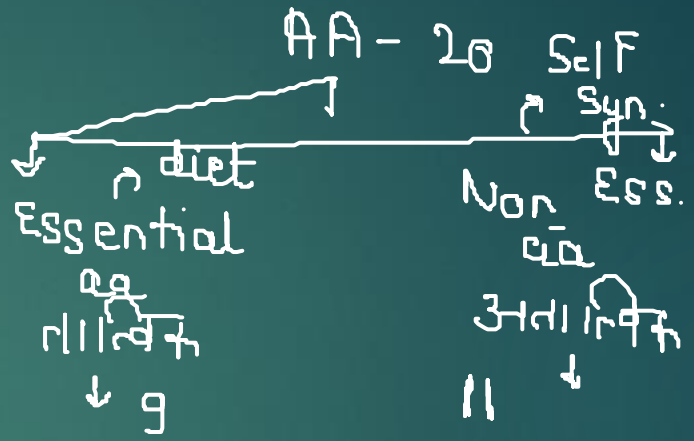
*** All hormones are not protein.

Smallest Unit: Amino Acid (NH2+COOH)– Amphoteric in nature



Difference between essential and non-essential amino acids

- There are 20 different amino that make up all proteins in the human body.
- These amino acids are needed to replenish tissue, red blood cells, enzymes, and other substances.
- 9 - 12 can be manufactured by the body-nonessential amino acids, not obtained from the diet.
- The remaining 8 to 11 -essential amino acids, must be obtained from the diet.



Source: Meat मांस
Egg
Soya
Mushroom
Pulse

Disease:
Deficiency:
Kwashiorker
Malnutrition
↓
Excess:
Kidney fail

Kwashiorkor vs. Marasmus

Clinical parameter	Kwashiorkor	Marasmus
Age of onset	Pre- school (1-5 years old)	Weaned infants (<1years old)
Main nutritional cause	Low protein intake	Low calorie intake
Body weight	60-80% of normal	< 60% of normal
Growth	Mild retardation	Severe retardation
Abdomen	Protruding	Shrunken
Facial appearances	Moonface	Like old man's face

Catalyst उत्प्रेरक , Casimir Funk

B ← A B C D E K Fat sol: वसा घु.

C ← Water soluble घुल घु.

SAFALTA CLASS™ An Initiative by अमर उजाला

Vitamins	Chemical Names	Disease	Source
A	Retinol	Night Blindness रतौंधी	Fish in general, liver and dairy products; ripe yellow fruits, leafy vegetables, carrots,
C – Immunity रोगप्रतिरोधक क्षमता → * Wound healing	Ascorbic Acid	Scurvy	Amla = Citrus fruits and vegetables खट्टे फल
D – Self Synthesised (Kidney, Liver)	Calciferol	Rickets सूखा रोग	Egg, liver, Mushroom, Whole Grains, Dairy Product
E – Beauty Vit. Antioxidant → Free e⁻ → active → organ → Kill long life of oil seed	Tocopherol	Infertility वंध्यता	Many fruits and vegetables, nuts and seeds, and seed oils
B1	Thiamine → Sulphur *	Beri Beri	whole meal grains, brown rice, vegetables, potatoes, liver, eggs
B2 : Yellow → β Carotene → Riboflavin	Riboflavin	Chelosis (cracking of angle of lips)	Dairy products, bananas, green beans

× B_4 B_8 $B_{10,11}$ B complex (B_1 - B_{12}) – B comp + ACDEK = 13 Vit

Vitamin	Chemical Names	Disease	Source
B3 (P)	Niacin/Nicotinic Acid पेट खराब	Pellagra (3D disease- diarrhea, Dermatitis, चर्म रोग Dementia)	Meat, fish, eggs, many vegetables, mushrooms
B5	Pantothenic Acid	Whitening of Hair, Memory loss Emotion less Infertility बांझपन	Meat, broccoli
B6 – dream Formation	Pyridoxin	Muscle Cramp	Meat, vegetables, tree nuts, bananas
B7 (H)	Biotin	Hair loss, Skin Problems (dermatitis)	Raw egg yolk, liver, peanuts, leafy green vegetables
B9 (M) → Iron	Folic Acid	Megaloblastic Anemia रक्त हीनता	Leafy vegetables, pasta, bread, cereal, liver
B12 – Cobalt	Cyanocobalamin	Pernicious Anemia अरक्तता	Meat, poultry, fish, eggs, milk
K – Blood Clotting → Self Synthesis → Liver	Naphthoquinone/ Phylloquinone	Bleeding रक्तस्राव	Leafy green vegetables such as spinach; egg yolks; liver

WATER:

70% of our body is composed of water.

Ph of water: 7 – Neutral उदासीन

Function:

1. Provides humidity to body. नमी
2. Regulates body temperature.
3. Helps in the formation of blood.
4. Helps in Digestion.
5. Reduce the toxicity of body.
   विषैलेपन

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