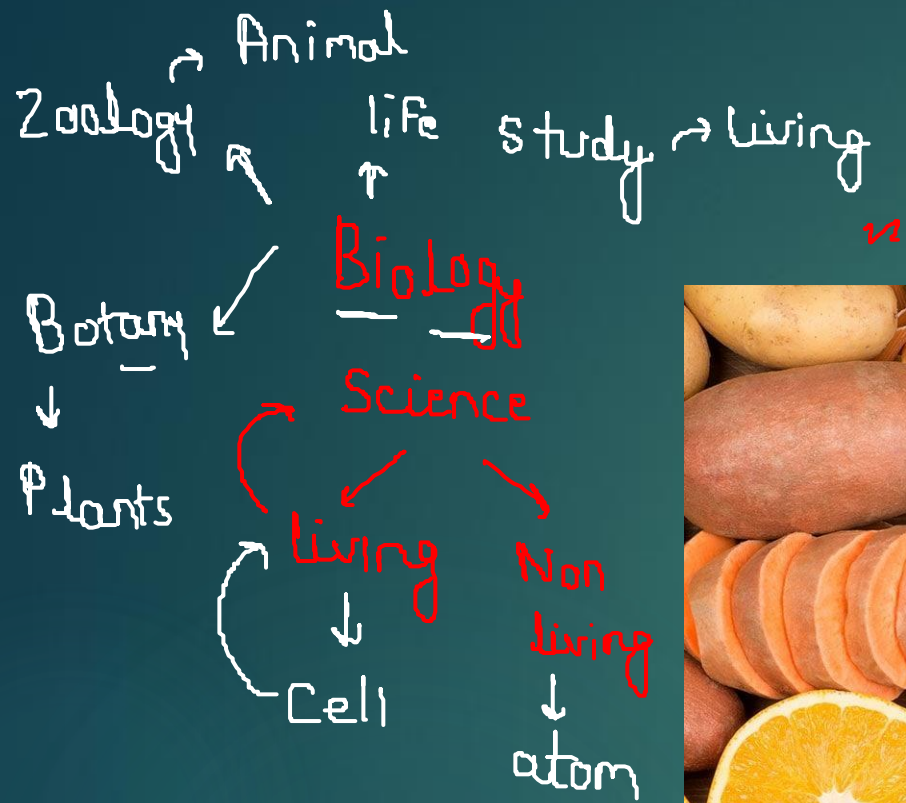




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NUTRIENTS



TYPES OF NUTRIENTS:

1. Carbohydrates : 300gm
(Sugar)

2. Protein (Polypeptides) : • adult : (0.8gm / kg) $50\text{kg} \times 0.8 = 40\text{gm}$

• teen - (0.95 / kg) $60\text{kg} \times 0.8 = 48\text{gm}$
(13-19) yrs

3. Fats (Lipids) - 80gm

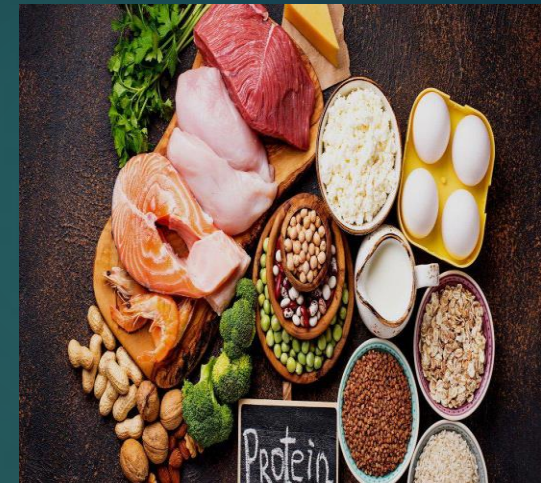
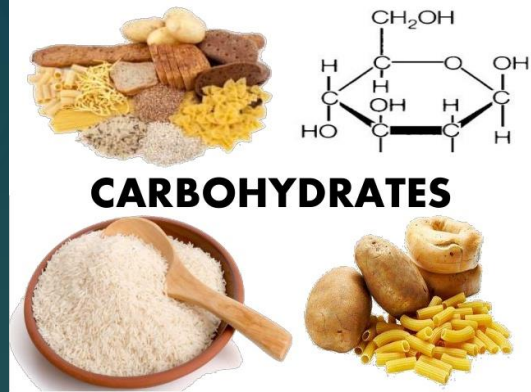
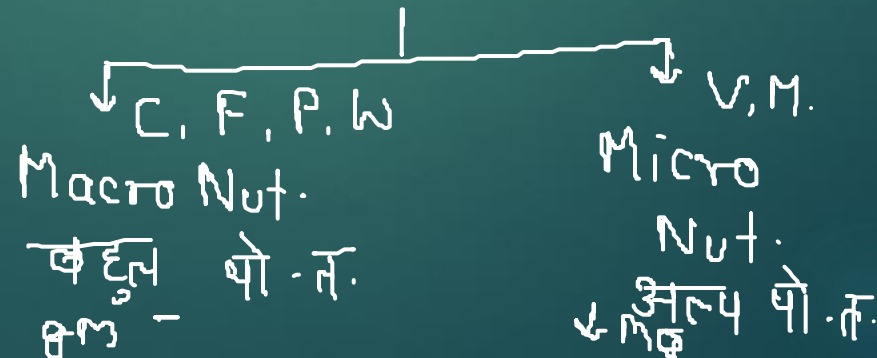
• Child (below 13 yrs) : (2gm / kg)

* Pregnant : (55-70) gm

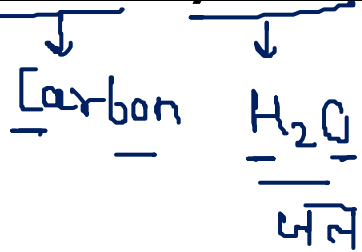
4. Vitamins - mg

5. Minerals - mg

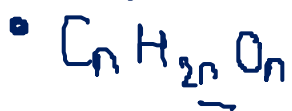
6. Water - (5-6)L



► Carbohydrates: (C, H, O) 'ose'



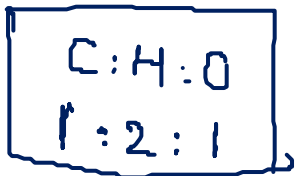
- Sugar शर्करा



$$n = 3$$



trigsc



Hexose - $C_6H_{12}O_6$

Pentose: $C_5H_{10}O_5$

- ▶ The compounds which is composed of Carbon and water ($C+H_2O$)
- ▶ Carbohydrates are mainly composed of three elements namely Carbon, Hydrogen, Oxygen.
- ▶ Commonly Carbohydrates are known as Sugar.
- ▶ General formula of Carbohydrate is $C_nH_{2n}O_n$.
- ▶ Main function of Carbohydrate is to provide energy i.e works as an 'energy fuel.'
- ▶ Smallest unit of Carbohydrate is Glucose.

1 gm - 4 kcal

► Types of Carbohydrates:

► It can be divided into 3 parts:

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

2. ^{↗ (2-10) Sugar} Oligosaccharides: The carbohydrates which contain 2-10 monosaccharides. Disaccharide is a subtype of Oligosaccharides.

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

CARBOHYDRATES			
Monosaccharides (one sugar molecule)	Disaccharides (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
समसंख्यक
(समसंख्यक)
Functional group
फ़ंक्शनल ग्रुप

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 $C_6H_{12}O_6$.

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 $C_6H_{12}O_6$

It is the 'sweetest natural carbohydrate'.

The sweetness of Fruits is due to Fructose.

Que: Aldohexose - glucose, galactose
↓
 C_6 Ketohexose - Fructose

→ Aldehyde

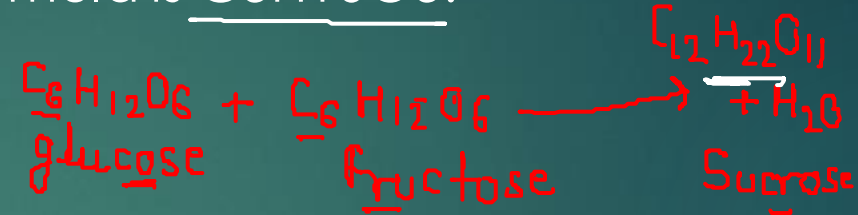
3. Galactose: It is also a type of Hexose. Hence the formula of Hexose is $C_6H_{12}O_6$.

4. Ribose: It is a Carbohydrate found in RNA

It is a type of Pentose hence the formula is $C_5H_{10}O_5$. *

EXAMPLES OF OLIGOSACHARIDES:

1. Sucrose: (2-10)



► It is a mixture of Glucose ($C_6H_{12}O_6$) and Fructose ($C_6H_{12}O_6$).

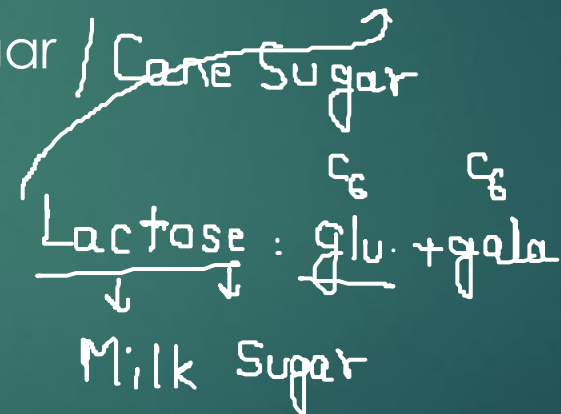
► Glucose ($C_6H_{12}O_6$) + Fructose ($C_6H_{12}O_6$) $\longrightarrow$ Sucrose ($C_{12}H_{22}O_{11}$) + H_2O

► It is also known as Household Sugar / Table sugar / Cane Sugar

2. Lactose: घरेलू चीनी

► It is a mixture of Glucose and Galactose.

► It is commonly known as Milk Sugar.



3. Maltose:

► It is a mixture of C_6 Glucose and C_6 glucose. $C_{12}H_{22}O_{11}$

► It is found in boiled rice water.

Cell wall की रीका मिले

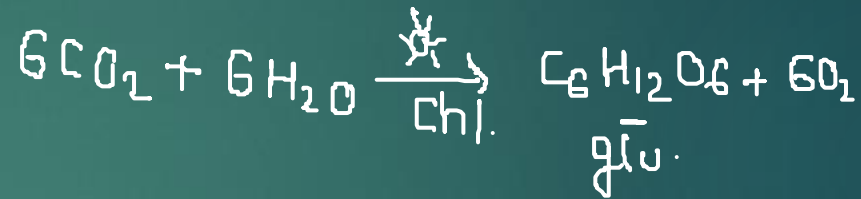
EXAMPLES OF POLYSACCHARIDES:

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: मंड

Capsule - Starch

► Storage form of Carbohydrates in Plants

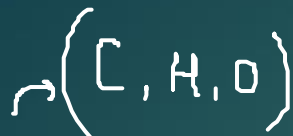
► Most edible Carbohydrate in human (rice, wheat, potato).

3. Glycogen:

► Storage form of Carbohydrate in animal including Human.

► It is stored in Liver. यकृत

4. Heparin: Anti clotting agent $\rightarrow$ Liver यकृत



FAT (Lipid): वसा - more calorogenic

Function:

- ▶ It provides energy in fasting condition. *
- ▶ Acts as an insulator. कुचालक $\rightarrow$ Body temp.

1gm Carb - 4 kcal

1gm Pro - 4 kcal

1gm Fat - 9 kcal

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

Types of Fats:

1. **Saturated Fat:** Hard to digest.
संतृप्त वसा

↓
Bad Fat

Can't be converted into fatty acid in Normal Condition.

Solid at room temperature (25°C)

Animal product अंतु Exception: Fish

Eg: Cholesterol, Pure Mhee

↓
Omega-3

↓
Good Fort

Liquid at room temperature. {25°C}

Exception: Coconut, Palm oil

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

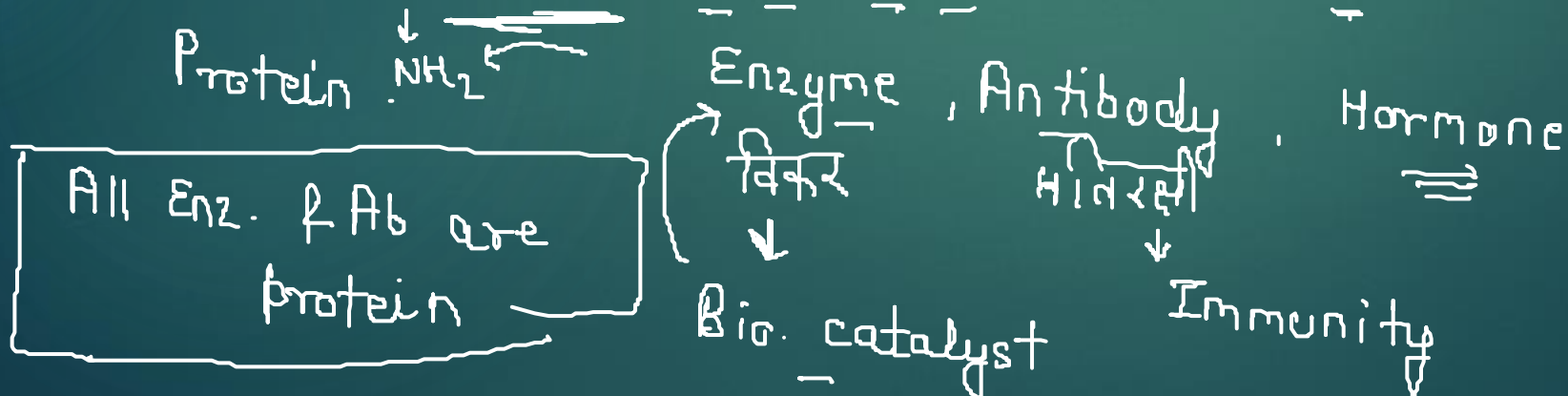
Function:

1. Growth and development of body. वृद्धि तथा विकास $\equiv$ Child: Pro.
2. Helps in Muscle formation. मांसपेशियों को बनाने में
3. Helps in the formation of Enzymes, Antibodies and Hormones.

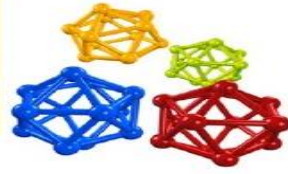
*** All Enzymes and antibodies are protein.

*** All hormones are not protein.

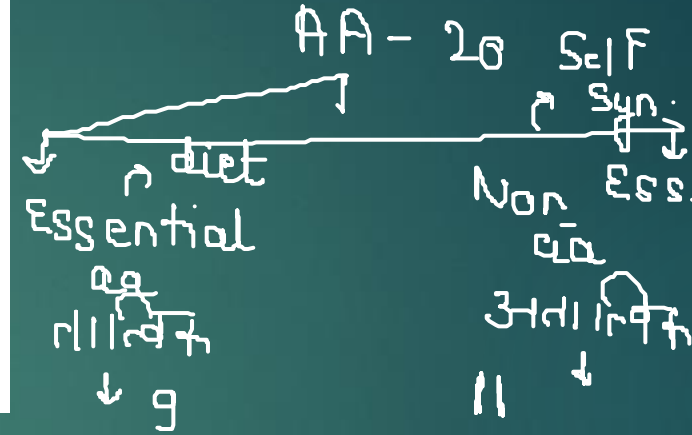
Smallest Unit: Amino Acid ($\text{NH}_2 + \text{COOH}$) – Amphoteric in nature



Difference between essential and non-essential amino acids



- There are 20 different amino acids 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 - non-essential 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 }

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	Shrunk
Facial appearances	Moonface	Like old man's face

Vitamins	Chemical Names	Disease	Source
A	Retinol	Night Blindness	Fish in general, liver and dairy products; ripe yellow fruits, leafy vegetables, carrots,
C	Ascorbic Acid	Scurvy	Citrus fruits and vegetables
D	Calciferol	Rickets	Egg, liver, Mushroom, Whole Grains, Dairy Product
E	Tocopherol	Infertility	Many fruits and vegetables, nuts and seeds, and seed oils
B1	Thiamine	Beri Beri	whole meal grains, brown rice, vegetables, potatoes, liver, eggs
B2	Riboflavin	Chelosis (cracking of angle of lips)	Dairy products, bananas, green beans

Vitamin	Chemical Names	Disease	Source
B3	Niacin/Nicotinic Acid	Pellagra (3D disease-diarrhea, Dermatitis, Dementia)	Meat, fish, eggs, many vegetables, mushrooms
B5	Pantothenic Acid	Whitening of Hair, Infertility	Meat, broccoli
B6	Pyridoxin	Muscle Cramp	Meat, vegetables, tree nuts, bananas
B7	Biotin	Hair loss, Skin Problems	Raw egg yolk, liver, peanuts, leafy green vegetables
B9	Folic Acid	Megaloblastic Anemia	Leafy vegetables, pasta, bread, cereal, liver
B12	Cyanocobalamin	Pernicious Anemia	Meat, poultry, fish, eggs, milk
K	Naphthoquinone/ Phylloquinone	Bleeding	Leafy green vegetables such as spinach; egg yolks; liver

WATER:

70% of our body is composed of water.

Ph of water: 7

Function:

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









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