''बेटी बचाओ, बेटी पढ़ाओ''

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

FACULTY OF HOMOEOPATHIC SCIENCE

Faculty Name : JV'n Dr. M.P. Sharma

Teaching Methodology of physiology

Program : BHMS 1st year

Course : Physiology

Session : Biochemistry Carbohydrate

Academic Day starts with –

- Greeting with saying **'Namaste'** by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **National Anthem**

Lecture Starts with-

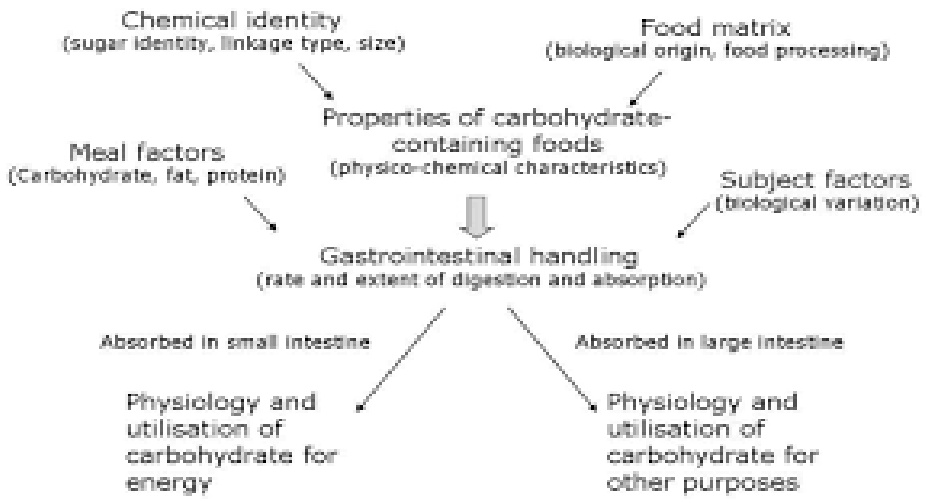
- **Review of previous Session-** In previous session as I had discussed about introduction of protein. Now tell me about tertiary protein?
- **Topic to be discussed today-** Today I will discuss about carbohydrate. I will start this topic from introduction of carbohydrate structure.

Carbohydrate

- Carbohydrates are polyhdroxy aldehydes or ketones
- Carbohydrates are the main ***source of energy*** to body.
- General ***molecular formula*** of carbohydrates is $Cn(H_2O)n$

- ***Classified*** into monosaccharide, disaccharides, oligosaccharides & polysaccharides.
- Molecules having only one actual or potential sugar group are called ***monosaccharides,***which cannot be hydrolysed further.
- ***Polysaccharides*** having only one type of monosaccharide unit are called*homopolysaccharides* & those having different monosaccharide units are*heteropolysaccharides.*
- Glyceraldehyde is the ***reference*** molecule for carbohydrate.
- ***D sugars*** are naturally occurring sugars & body can metabolise only D sugars.
- ***Common monosaccharides***

carbon atom	Generic name	Aldoses	Ketoses
3	Triose	Aldotriose Glyceraldehydes	Ketotriose Dihydroxyacetone
4	Tetrose	Erythrose	Erythrulose
5	Pentose	Arabinose Xylose Ribose	Xylulose Ribulose
6	Hexose	Glucose Galactose Mannose	Fructose
7	heptose	Glucoheptose	sedoheptulose



Properties of carbohydrate

- Carbohydrates show streoisomer, optical activity, epimers & Anomerism.
- ***Stereoisomers:*** compounds having same structural formula but differ in spatial configuration.
- ***Epimerism:*** when sugars are different from one another, only the configuration with regard to a single carbon atom (other than the reference carbon atom).

Reactions of carbohydrate

- ***Osazone*** formation (Phenyl hydrazine): All reducing sugars form characteristic osazone crystals.
    - Glucose & fructose form needle shaped crystals,
    - Maltose form sun flower shaped crystals &
    - Lactose form hedge-hog shaped crystals.
    - Important ***disaccharides*** are sucrose, maltose, isomaltose & lactose.
    - ***Sucrose*** is not a reducing sugar because it does not have free aldehyde or ketone group. (invert sugar).
    - ***Isomaltose*** is a reducing sugar, contains 2 glucose units combined in ∞ – 1, 6 linkages.
- Salient features of important sugars

Monosaccharides	
Glucose	Aldohexose
Galactose	4^{th} epimer of glucose
Mannose	2^{nd} epimer of glucose
Fructose	Ketohexose

Disaccharides	
Glucose + galactose	Lactose (reducing)
Glucose + glucose	Maltose (reducing)
Glucose + Fructose	Sucrose(reducing) ∞ – 1, 2 glycosidic bond

- ***Starch*** is the reserve carbohydrate of plant kingdom.
- Starch is made of unbranched part, **amylase**formed of ∞ – 1, 4 glycosidic linkages & branched part, amylopectin made by ∞ – 1, 6 linkages.
    - Amylopectin gives red colour to iodine reaction.
    - ***Cellulose*** is a chief carbohydrate in plants. Due to the absence of enzyme cellubiase, man cannot digest cellulose.
    - ***Inulin*** is a long chain homoglycan composed of D-fructose units with repeating beta-1, 2 linkages.
    - ***Glycogen*** is the reserve carbohydrate of animal kingdom.
    - Heteroglycans are polysaccharides containing more than one type of sugar residues.
        - ***Heparin*** is the strongest acid in human body.
        - Mucopolysaccharides or glycoaminoglycans ***(GAG)*** are carbohydrates containing uronic acid & amino sugars.
        - When the carbohydrate chains are attached to a polypeptide chain it is called ***proteoglycan.***

Reference :

1. Essentials of Medical Physiology 8th Edition 2019 (Free Review of Medical Physiology 3rd edition) By Sembulingam
2. Guyton and Hall Textbook of Medical Physiology 12th-Ed

3. Textbook of Physiology AK Jain

4. *www.ncbi.nlm.nih.gov › pubmed*

5. www.webmd.com

6 https://www.homeobook.com/biochemistry-notes-for-competitive-examinations/

7 https://academic.oup.com/mbe/article/34/5/1252/2996746

8.https://www.google.com/search?q=CARBOHYDRATE+in+ANCIENT+LITERATURE&hl=en&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjj5YXe_6DoAhXmyDgGHaAhDIMQ_AUoAXoECA0QAw#imgrc=IVHxB0Y6TtLZvM

Review of literature- in process

- **Suggestions to secure good marks to answer in exam-**
  - Give answer with complete labeled diagrams.
  - Explain answer with key point answers
- **Questions to check understanding level of students-**
  - Write about lipids?
  - What is primary protein?
- **Next Topic-**
  - carbohydrate

Academic Day ends with-

National song' Vande Mataram'