1. Dietary importance of carbohydrate

Carbohydrates are the major sources of energy in human diets. Earlier they were just considered as a means of obtaining energy. But, nowadays it is recognized as an important food component. The physiological effects associated with dietary carbohydrates are thought to be highly dependent on the rate and extent of digestion and absorption in the small intestine and its fermentation in the large intestine.

2. Significance of glycogen

Glycogen is the storage polysaccharide and is deposited in liver and skeletal muscles. It is structurally similar to starch. Glycogen from animal tissues and lactose in milk and other dairy products are one of the most significant sources of non-plant carbohydrates.

3. What are polysaccharides?

Polysaccharides generally include; cellulose, hemicelluloses, pectins, gums and mucilages which are largely regarded as insoluble fractions.

4. Write short notes on lactose

Lactose is the disaccharide of glucose and galactose which occurs naturally in milk and milk products and hence, the name milk sugar. Its solubility is comparatively lesser than other disaccharides. It can be readily hydrolyzed by the enzyme lactase. However, individuals lacking this enzyme are prone to develop lactose intolerance. Its sweetness potency is only 1/6th of the glucose. It is the only carbohydrate which is synthesized by mammals

5. Enzymes involved in the digestion of carbohydrates

Digestion begins in mouth by the enzyme α - amylase. The partial hydrolysis of polysaccharide to dextrin and maltose takes place by pancreatic amylase. Maltose, sucrose and lactose would be hydrolyzed by maltase, surcease and lactase present in the intestinal juice.

6. Absorption of glucose in the blood stream

The blood stream mainly absorbs glucose, galactose and fructose. Through the capillaries of the villi simple sugars pass into the portal circulation and are then transported to the liver where fructose and galactose would be converted to glycogen the storage from of carbohydrate. The stored glycogen can be reconverted back to glucose when there is a need for the energy. Glucose and galactose will be absorbed at a much faster rate than fructose. Whereas pentoses are absorbed at a relatively slower rate.

7. Write short notes on glucose transport mechanism

The glucose transport mechanism also transports galactose. Fructose absorption mainly takes place through a carrier mediated diffusion system and its absorption is not dependent on the

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concentration of sodium ions. Some fractions of fructose will be converted to glucose in the mucosal cells.

8. Synthesis of glycogen

Consumption of excess carbohydrate through the diet is known to be converted into a reserve form of energy known as glycogen. Both liver as well as muscle synthesize glycogen from the excess amount of glucose. Liver is capable of storing only limited amount of glycogen. When the need arises the reserve store is quickly converted to glucose. The muscle can store 150g of glycogen and the liver stores about 90g which mainly exercises control over blood sugar and this mechanism is well regulated by hormones. The liver stores of glycogen can last only for about 12-18 hours of fasting.

9. Write short notes on hypoglycemia

Hypoglycemia, also known as low blood sugar or low blood glucose. This condition is seen when the glucose levels in the blood drop below the critical level. While hypoglycemia is often associated with diabetes, it can be caused by a lack of carbohydrates in the diet of healthy people. Carbohydrates are the main source of glucose because they are broken down into simple sugars during digestion and enter the cells with the help of insulin for further utilization by the cells. Symptoms of hypoglycemia include tiredness, weakness, light-headedness, confusion and hunger.

10. What are the effects of consuming excess carbohydrate

Consuming excessive amounts of carbohydrate, especially those which are known to have high glycemic load, can increase the risk of several disorders, including Type 2 diabetes. This can cause a sudden rise in blood glucose puts a high demand on pancreas for insulin secretion and significantly increases the likelihood of developing Type 2 diabetes. A diet containing too many carbohydrates can raise the blood level of triglycerides, a type of unhealthy fat that circulates in the blood. The combined effect of excessive carbohydrate intake coupled with sedentary life style increases persons chance of becoming obese. This in turn is related to the occurrence of several life style related disorders such as diabetes, cardiovascular diseases, certain type of cancer.

11. Give the RDA for carbohydrate

The minimum recommendation for carbohydrate is 100g per day which is very much needed for preventing ketosis. ICMR has not given any specific recommendation for carbohydrate. Our daily diet is known to contain much higher levels than this. A normal balanced diet should provide 60% calories which is mainly derived from carbohydrate. A 2000Kcal diet should contain 275-300g carbohydrate. About 100g should be obtained from sugar and the remaining should be from complex carbohydrate sources.

12. Major food sources of carbohydrate

Whole grains are an excellent source of complex carbohydrates and dietary fiber. Some grains that contain carbohydrates include rice, corn, wheat, barley, oats and buckwheat. Whole grains like brown rice and whole grain wheat are the best sources of complex carbohydrates. Legumes rank next in importance to cereals as good food sources. Just like grains, nuts and legumes are also rich in complex carbohydrates. Which may be beneficial for regulating the blood glucose level. Roots and tubers are another group of foods providing maximum amount of carbohydrate. Sweet potatoes provide ample amount of carbohydrate. An eight ounce of sweet potato contains 240 calories and 55 grams of carbohydrates. Among the fruits banana is the richest source of carbohydrate.

13. What are the characteristic properties of starch

Gelatinization and dispersion of starch granule is the most important characteristic property of starch and this particular mechanism is known to be facilitated by hydrolysis of starch. Starch from raw cereals is said to be digested on a slower pace and are known to exert modest amount of glycemic response.

14. Write a note on protein sparing action of carbohydrate

When the diet comprises adequate amount of carbohydrate, it is used as a source of energy and the available protein is used solely for tissue building. If the diet does not supply sufficient calories from carbohydrate, the dietary protein tends to be oxidized and will be utilized as a source of energy for carrying out the functions

15. What are the effects of excess ketone

Excess ketones results in water loss and removal of sodium from the body. This may cause tiredness and lethargy. The major symptoms include fatigue, exercise intolerance, nausea, headaches, dehydration and flu-like symptoms.