**IQRA NATIONAL UNIVERSITY**

**DEPARTMENT OF ALLIED HEALTH SCIENCES**

**Mid-term Assignment (spring– 2020), HND 2nd**

**Course title: Macronutrients in Human Nutrition**

**Course instructor:Prof. Dr. Jehangir Khan Kahlil**

**Department: Human Nutrition and Dietetics**

**Time allowed: 48 Hours**

**Date: 13/04/2020 Marks: 30**

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**QUESTION, NO 3.**

**Answer,**

 Important function of proteins in our body

Following are the function of proteins.

 **Carrier of Oxygen**

Some protein helps in the transportation of oxygen.

Example; Hemoglobin

 **Defense**

 Proteins help in the body defense against infection.

 Example; Antibodies

 Movement of muscle

 Some protein helps in the movement muscle Example; Myosin; acting

**Transportation of material.**

Plasma proteins take part in the transportation of molecules and ions

Catalyst.

Enzymes which are biological catalyst,

**Provide Structure.**

 A class of proteins known as fibrous proteins provides various parts of your body with structure, strength and elasticity.

These proteins include keratin, collagen and elastin

Keratin is a structural protein that is found in your skin, hair and nails.

Collagen is the most abundant protein in your body and is the structural protein of your bones and skin.

Elastin is several hundred times more flexible then collagen. Its high elasticity allows many tissues in your body to return to their original sheep after stretching or contracting, such as uterus, lungs and arteries.

 **Structure of protein.**

Protein being very complicated macromolecules has very complicated structures.

a- Primary Structure

b- Secondary structure

c- Tertiary structure

d- Quaternary structure

1. **Primary structure.**

Primary structure of protein consists of linear sequence of amino acids that are held together by peptide bonds. The peptide bonds form back bon

Any change in the sequence is abnormal and may effect the function and properties of protein

Example; Insulin

**b- Secondary structure**.

The folding of polypeptide chains in a specific manner that are held together by H-holding is known as secondary structure.

Example ; collagen, myosin, fibrin.

1. **Tertiary structure**.

When the secondary structure of protein further folded often itself, this super folded three dimensional structure is called tertiary structure of protein.

1. **Quaternary structure ,**

When the protein molecule is made up of more then one peptide chain

 subunits. Eche of which has its own primary, secondary , tertiary structure

Example; Hemoglobin.

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**Question No 2.**

**Answer .**

**Impacts of deficit intakes of carbohydrates**

 During physical activity, the body first uses glycogen for energy, but if insufficient carbohydrates have been consumed, glycogen reserve are depleted.

Consequently, since the body can’t get the glycogen it need for fuel, it start to break down protein in muscles to use as energy.

After a few months on low – carbohydrate diet, particularly for people with an active lifestyle, the effect become dangerous , state Rush. Metabolism slow, fat storage builds and the risk of fatigue, dehydration and muscle aches increases.

**Carbohydrates** **Deficiency** **and** **Ketosis**

The ultimate low – carbohydrate diet is the ketogenic diet, otherwise called the keto diet. It involves drastically reducing carbohydrate consumption to 5 to 10 percent of the daily calorie intake and getting most of the calories from fat and some protein.

In carbohydrate deprivation, the liver transforms fat into acid called ketoes, which the body uses for fuel. This process, referred to as ketosis, normally begins after three or four days of restricting carbohydrates.

Early weight loss on the keto diet is due to the loss of water weight associated with depletion of glycogen, notes M.D. Anderson. After a few days, people may experience short- term unpleasant effects, such as fatigue and dizziness.

Over time, ketosis may result in dehydration, altered chemical balance in the blood and perilously low blood sugar level.

Because of health concerns that may stem from the keto diet, certain people shouldn’t attempt the diet. These include those with liver failure, pancreatitis and disorders of fat metabolism.

**Impacts** **of** **excess** **intakes** **of** **carbohydrates**

Some of the health effects that come with the overconsumption of carbohydrates.

**Type** **2 Diabetes**

Type 2 diabetes is a disorder involving high blood sugar levels. In this condition, the pancreas does not produce enough insulin. Because insulin’s job is to move glucose out of the blood, having tool little means that blood sugar is able to linger in your bloodstream and this raises your blood sugar level.

Type 2 diabetes has been linked to the overconsumption of refined carbohydrates, which include white bread, pasta and many packaged snack foods. These type of carbohydrates digest quickly and cause a rush of glucose into the blood. This increase the body’s need for insulin and it’s theorized that this higher demand wears out the insulin- producing cells of the pancreas leading to the onset of the disease.

**Dental** **Caries**

Dental caries are cavities formed by the destruction of the hard tissue of the teeth. They occur when bacteria on your teeth metabolize carbohydrates. This leaves behind an acid, which sits on your teeth, slowly destroying the hard enamel covering and underlying structure of teeth, much like acid rain chips away at a statue over time. Dental caries are commonly associated with the overconsumption of refined carbohydrates and added sugar because these are the easiest carbohydrates for the bacteria to break down into acids.

**Obesity**

Weight gain is often blamed on carbohydrates, yet not all carbohydrates deserve this blame. For example , food that provide unrefined carbohydrates and high amounts of fibers, such as vegetables, beans and whole grains can actually promote weight loss. These carbohydrates are very filling and slow down digestion, which make you feel satisfied on less food. The troublesome carbohydrates, when it comes to weight gain and obesity, are the refined carbohydrates that have been processed and stripped of fiber. These carbohydrates cause a rapid rise in blood glucose, which we learned earlier stimulates the release of insulin. Insulin promotes fat storage by moving excess glucose out of the blood and into your fat cells.

**Question**- **no** **1 .**

 **Answer.**

**Carbohydrates**

 Carbohydrates are polyhydroxy aldehydes or ketones which yield such compounds on hydrolysis.

Carbohydrates contain either aldehyde or ketone as functional groups attached to one of the carbon atoms. They also contain two or more hydroxyl groups.

Carbohydrates are one of the three large energy yielding nutrients known as macronutrients.

 **Role** **of** **cayrbohydrates** **in** **our** **body**

 There are five primary function of carbohydrates in the human body.

Energy Production

The primary role of carbohydrates is to supply energy to all cell in the body. Many cells prefer glucose as a source of energy versus other compounds like fatty acids some cells, such as red blood, are only able to produce cellular energy from glucose. The brain is also highly sensitive to low blood-glucose levels because at uses only glucose to produce energy and function cells that require energy remove the glucose from the blood with the transport protein in their membranes. The energy from glucose comes from the chemical bonds between the carbon atoms.

**Energy Storage**

If the body already has enough energy to support its functions, the excess glucose is stored as glycogen which is stored muscle and liver. A molecule of glycogen may contain in excess of fifty thousand single glucose units and is highly branched, allowing for the rapid dissemination of glucose when it is needed to make cellular energy

The liver, like muscle can store glucose energy as a glycogen, but in contrast to muscle tissue it will sacrifice its stored glucose energy to other tissue in the body when blood glucose is low. Approximately one- quarter of total body glycogen content is in the liver but this is highly dependent on activity level. The liver uses this glycogen reserve as a way to keep blood glucose levels with in a narrow range between meal time. When the liver glycogen supply is exhausted , glucose is made from amino acids obtained from the destruction of proteins in order to maintain metabolic homeostasis.

**Building macromolecules**

Although most absorbed glucose is used to make energy some glucose is converted to ribose and deoxyribose, which are essential building blocks of important macromolecules, such RAN, DAN, and ATP

**Sparing protein**

In a situation where there is not enough glucose to meet the body’s needs, glucose is synthesized from amino acids. Because there is no storage molecule of amino acid, this process requires the destruction of proteins, primarily from muscle tissues. The presence of adequate glucose basically spares the breakdown of protein from being used to make glucose needed by the body.

**Lipid Metabolism**

As blood glucose levels rise, the use of lipids as an energy source is inhibited. Thus, glucose additionally has a ‘’ fat- sparing, effect. This is because an increase in blood glucose stimulates release of the hormone insulin, which tells cells to use glucose (instead) of lipids to make energy adequate glucose levels in the blood also prevent the development of ketosis. Ketosis is a metabolic condition resulting from an elevation of ketene bodies in the blood. Ketone bodies are an alternative energy source that cells can use when glucose supply is insufficient, such as during fasting. Ketone bodies are acidic and high elevations in the blood can cause it to became too acidic. The minimum amount of carbohydrates in the diet required to inhibit ketoses in adult is 50 grams per day.

Carbohydrates are critical to support life’s most basic function- the production of energy. Without energy none of the other life processes are performed.