**SECTION THREE ASSIGNMENTS**

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**(DIPLOMA IN HUMAN TUTRITION)**

**INSTITUTION: AFRICA INSTITUTE FOR PROJECT MANAGEMENT STUDIES(AIPMS)**

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1.**Explain types of Carbohydrates and** **Functions of carbohydrates in the human body**.They are energy production, energy storage, building macromolecules, sparing protein, and assisting in lipid metabolism.

**Carbohydrates** also is to provide  **body** with energy.our cells convert **carbohydrates** into the fuel molecule ATP through a process called cellular respiration.Carbohydrates are critical to support life’s most basic function-the production of energy. Without energy none of the other life processes are performed. Although our bodies can synthesize glucose it comes at the cost of protein destruction. As with all nutrients though, carbohydrates are to be consumed in moderation as having too much or too little in the diet may lead to health problems. **The Functions of Carbohydrates in the Human Body**

There are five functions of **CARBOHYDRATES**in the human body. They are **ENERGY** **PRODUCTION**, **ENERGY STORAGE**, **BUILDING MACROMOLECULES**, **SPARING PROTEIN**, and assisting in lipid **METABOLISM**.

**Energy Production**

The primary role of carbohydrates is to supply energy to all cells in the body. Many cells prefer **GLUCOSE** as a source of energy versus other compounds like fatty acids. Some cells, such as red blood cells, are only able to produce cellular energy from glucose. The brain is also highly sensitive to low blood-glucose levels because it uses only glucose to produce energy and function (unless under extreme starvation conditions).

About 70 percent of the glucose entering the body from digestion is redistributed (by the liver) back into the blood for use by other **TISSUES**. Cells that require energy remove the glucose from the blood with a transport protein in their membranes.

The energy from glucose comes from the chemical bonds between the carbon atoms. Sunlight energy is required to produce these high-energy bonds in the process of photosynthesis. Cells in our bodies break these bonds and capture the energy to perform cellular respiration. Cellular respiration is basically a controlled burning of glucose versus an uncontrolled burning.

A cell uses many chemical reactions in multiple enzymatic steps to slow the release of energy and more efficiently capture the energy held within the chemical bonds in glucose.

The first stage in the breakdown of glucose is called. Glycolysis, or the splitting of glucose, occurs in an intricate series of ten enzymatic-reaction steps. The second stage of glucose breakdown occurs in the energy factory organelles, called mitochondria. One carbon **ATOM** and two oxygen atoms are removed, yielding more energy. The energy from these carbon bonds is carried to another area of the mitochondria, making the cellular energy available in a form cells can use.Cellular respiration is the process by which energy is captured from glucose.

**Energy Storage**

If the body already has enough energy to support its functions, the excess glucose is stored as **GLYCOGEN** (the majority of which is stored in the muscles 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 amount of glycogen in the body at any one time is equivalent to about 4,000 kilocalories—3,000 in muscle tissue and 1,000 in the liver. Prolonged muscle use (such as exercise for longer than a few hours) can deplete the glycogen energy reserve. And is characterized by fatigue and a decrease in exercise performance. The weakening of muscles sets in because it takes longer to transform the chemical energy in fatty acids and proteins to usable energy than glucose. After prolonged exercise, glycogen is gone and muscles must rely more on **LIPIDS** and proteins as an energy source. Athletes can increase their glycogen reserve modestly by reducing training intensity and increasing their carbohydrate intake to between 60 and 70 percent of total calories three to five days.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 tissues in the body when blood glucose is low. Approximately one-quarter of total body glycogen content is in the liver (which is equivalent to about a four-hour supply of glucose) but this is highly dependent on activity level. The liver uses this glycogen reserve as a way to keep blood-glucose levels within a narrow range between meal times. When the liver’s 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 as RNA, DNA, and ATP. Glucose is additionally utilized to make the molecule NADPH, which is important for protection against **OXIDATIVE STRESS** and is used in many other chemical reactions in the body. If all of the energy, glycogen-storing capacity, and building needs of the body are met, excess glucose can be used to make fat. This is why a diet too high in carbohydrates and calories can add on the fat pounds.

**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 acids, this process requires the destruction of proteins, primarily from muscle tissue. The presence of adequate glucose basically spares the breakdown of proteins 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.Glucose additionally has a “fat-sparing” effect. This is because an increase in blood glucose stimulates release of the hormone **INSULIN**, which make 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 ketone 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 become too acidic. This is rare in healthy adults, but can occur in alcoholics, people who are malnourished, and in individuals who have Type 1 diabetes. The minimum amount of carbohydrate in the diet required to inhibit ketosis in adults 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. Although our bodies can synthesize glucose it comes at the cost of protein destruction. As with all nutrients though, carbohydrates are to be consumed in moderation as having too much or too little in the diet may lead to health problems. ltose arise from the digestion of starch.

2.For the following nutrients,can you say why they are important and name three sources? Are these foods micronutrients or macronutrients ?.They are Importance.Each of these macronutrients provides energy in the form of calories

**Macronutrients.** They are Importance because these nutrients are required in large amounts that provide the energy needed to maintain body functions and carry out the activities of daily life.

a) Carbohydrates (Three are Macronutrients)

b) Proteins

c) Lipid (Fats and Oils)

The Nutrient participates in one of the following functions:

1.Carbohydrates -providing the body with energy

2. Fats – providing energy

3 .Proteins –building and repair body tissues provide energy

3 .What nutrient deficiency do the following clinical signs/symptoms indicate?

A) PALLOR- anaemia.

B) GOITRE- iodine deficiency disorder

C) BITOT’S SPOTS- vitamin A deficiency

D) BILTERAL PITTING OEDEMA-severe acute malnutrition, reduced fat and muscle tissue, skin lesion

E) SEVERE VISIBLE WASTING- acute malnutrition

4.What is the impact of malnutrition on communities? How can you help prevent some of the negative effects of malnutrition?

malnutrition, is related to body mass  Malnutrition in patients, especially those who are lacking food to eat? and suffering from other diseases with diabetes old ages or Sick Children, leads to impaired muscle function and wound healing, decreased bone mass, immune dysfunction, and general functional decline.effective ways to treat malnourished children. Preventing Blindness

Malnutrition’ is most often associated with undernutrition, it can also result from overnutrition, specific nutrient deficiencies, increased dietary requirements, or poor nutrient absorption, or increased nutrient losses due to certain diseases. Malnutrition is also inadequate nutrient intake.Acute or chronic diseases and treatment interventions may also lead to the aggravation of malnutrition, especially undernutrition, due to changes in metabolism.

Other disease-related malnutrition complicates treatment plans and negatively impacts patient outcomes such as recovery time, risk for complications, and re-admission rates, which exert a greater pressure on health services.Hence, it can cause growing recognition of the importance of malnutrition on health-related and economic outcomes. Malnutrition is also a common, but frequently under-recognized, health concern in older adults. Depending on the screening and assessment methods use malnutrition is present in a community-dwelling older adults and Children.

**How can you help prevent some of the negative effects of malnutrition?**

**The Challenges some communities have their own ways of food choice According to theirs Cultural beliefs.**

Each year, more children die before their fifth birthday. **Solution**

increasing awareness and capacity in impoverished communities so that local health workers have faster, more efficient ways of treating malnourished children.

By focus on ensuring that knowledge and skill in managing acute malnutrition is reinforced and retained in local health systems so that communities can help themselves in times of crisis.

by training local health workers in managing acutely malnourished children with an aim to minimize the time most mothers and children need to stay at health centers and away from home. Also provide support for community volunteers, women’s groups, and community leaders to counsel mothers on good nutrition and feeding practices to prevent a recurrence of malnutrition. Using holistic approach provides medications, instruction and therapeutic foods that mothers can give at home, significantly reducing the risk of infection and the financial burden on poor families.

Poor nutrition is the underlying cause of nearly half of these deaths. Parents seeking care at hospitals in impoverished, under-served regions are often met with overcrowded facilities where infections spread rapidly and long wait times keep mothers and children away from their families.

**The Challenge**

Pre-school children are vitamin A deficient. This silent syndrome compromises immune system function, leaving young children unable to fight common childhood infections such as measles or diarrhea. Vitamin A deficiency is also the leading cause of preventable childhood blindness in developing countries, very many children going blind because of it each year. In addition, half of these children will die within a year of losing their sight.

**Solution**

The governments, the private sector and other charities throughout can have to ensure that health systems include vitamin A supplementation-a cost-effective and life-saving intervention for children six months to five years old-as part of regular wellness practices for impoverished communities.

**5.Who are the individuals most vulnerable to vitamin A deficiency, iodine deficiency disorder and iron deficiency anaemia in your Community? .Imagine you have identified people in your community who are suffering from vitamin A deficiency, iodine deficiency disorder and iron deficiency anaemia.What can you do to address these problems?**

number of **individuals affected** among preschool-age children and pregnant Mothers ..significance in some Communities: **iodine deficiency**, **iron deficiency** . **Vitamin A deficiency** is one of the **most** important causes pregnant women **and** children are at greatest risk of developing **deficiencies**. **Iron deficiency anemia** is a common type of **anemia** -a condition in which blood lacks adequate healthy red blood cells. Red blood cells carry oxygen to the body's tissues. **iron deficiency anemia** is due to insufficient **iron**

**Vitamin A is an essential nutrient needed for vision, growth, development, and a healthy immune system.**

Implementing, and monitoring programs that ensure delivery of vitamin A to vulnerable populations .In addition to vitamin A supplementation, to use a multi-program strategy that includes the promotion of breastfeeding, maternal and child nutrition education, fortification of staple foods, recognized family-led agricultural programs design to improve access to vitamin A-rich foods and make them part of daily diet .dietary improvement, including increased production and consumption of micronutrient-rich foods; food fortification; supplementation; public health and other disease control measures - can be implemented to overcome micronutrient malnutrition. Food-based strategies, which include food production, dietary diversification and food fortification, are the most sustainable approaches to increasing the micronutrient status of populations. These approaches not only prevent micronutrient deficiency problems but also contribute to general malnutrition prevention.

Iodine and vitamin A deficiencies and to reduce substantially,other important micronutrient deficiencies, including iron.

To give priority to food-based strategies to control and prevent micronutrient deficiencies Policy making and planning that can recognized the short-term supplementation programmes implemented succeeded in solving the problem of micronutrient malnutrition in a sustainable manner.

Formulate and implement programmes to correct micronutrient deficiencies and prevent their occurrence, promoting the dissemination of nutrition information and giving priority to breastfeeding, and other sustainable food-based approaches that encourage dietary diversification through the production and consumption of micronutrient-rich foods, including appropriate traditional foods. Processing and preservation techniques allowing the conservation of micronutrients should be promoted at the community and other levels, particularly when micronutrient-rich foods are available only on a seasonal basis.

To ensure that sustainable food-based strategies are given first priority, particularly for populations deficient in vitamin A and iron, favoring locally available foods and taking into account local food habits. Supplementation of intakes with vitamin A, iodine and iron may be required on a short-term basis to reinforce dietary approaches in severely deficient populations, utilizing primary health care services when possible. Supplementation should be directed at the appropriate vulnerable groups, especially women of reproductive age (iodine and iron), infants and young children, the elderly Supplementation should be progressively phased with micronutrient-rich food-based strategies enable adequate consumption of micronutrients.

**Reasons for Implementing Food-based Strategies**

Micronutrient deficiencies hinder both national economic development and the development of individual human potential. Because children are frequently the victims of this deficiencies, failure to overcome micronutrient malnutrition in a sustainable fashion jeopardizes a nation's future. Reasons for implementing food-based strategies to overcome micronutrient deficiencies include the following: .

1. Food-based strategies are preventive, cost-effective, sustainable and income generating;

are culturally acceptable and feasible to implement promote self-reliance and community participation

 take into account the crucial role of breastfeeding and the special needs of infants during the critical weaning period;

foster the development of environmentally sound food production systems; and  build alliances among government, consumer groups, the food industry and other relevant groups to achieve the shared goal of preventing micronutrient malnutrition.

2. Food, fortification, one of the food-based strategies has the potential for wide populations coverage and can involve a combination of micronutrients.

3. Nutrition education as a component of food based strategies emphasizes .

4. Adoption of food-based strategies can make possible redirection of funds previously devoted to curative health care and social welfare to other developmental activities.

**6. Identify at least four ways in which fiber helps us maintain a healthy digestive system.**

Four key benefits come from eating a diet rich in fiber.

**1.Fiber slows the rate that sugar is absorbed into the bloodstream.** When aperson eat foods high in fiber, such as beans and whole grains, the sugar in those foods is absorbed slower, which keeps your blood glucose levels from rising too fast. This is good for people because spikes in glucose fall rapidly, which can make aperson feel hungry soon after eating and lead to overeating.

**2.Fiber makes intestines move faster.** When aperson eat whole grains rich in insoluble fiber, it moves faster through intestines, which can help signal that you are full.

**3.Fiber cleans colon, acting like a scrub brush.** The scrub-brush effect of fiber helps clean out bacteria and other buildup in intestines, and reduces risk for colon cancer.

**4.Fiber helps keep you regular.** A high-fiber diet helps have soft, regular bowel movements, reducing constipation.

### Adding Fiber to Your Family's Diet????

The benefits of fiber are important for both you and your child, and the entire family should eat a diet rich in fiber. To add fiber to your family's diet, include the following foods. Check food labels for the grams of dietary fiber to find breads, cereals and other foods high in fiber.

* **Whole grain breads** with at least 3 grams of fiber per serving. Choosing whole wheat bread is not enough, as many varieties of whole wheat bread have very little fiber. Make sure to check the fiber content by reading the nutrition label.
* **Cereals** with at least 5 grams of fiber per serving. To find high-fiber cereals look for those made from whole grains, bran and rolled oats. Check the nutrition label to make sure it has enough fiber.
* **Brown rice** is brown because it still has the husk, which is the fiber. White rice does not have any fiber because the husks have been removed.
* **Beans and legumes** are great sources of both fiber and protein.
* **Fruits and vegetables** also contain fiber. This is one reason that eating fruit is much healthier than [drinking juice](https://www.ucsfbenioffchildrens.org/education/sweet_drinks_and_obesity/index.html), which does not contain fiber.

Reviewed by health care specialists at UCSF Benioff Children's Hospital.

**This information is for educational purposes only and is not intended to replace the advice of your doctor or health care provider. We encourage you to discuss with your doctor any questions or concerns you may have**.

REFERENCES LIST

JOHN WATERLOW

MILLWARD