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Protein : The Master Nutrient for Growth

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Abstract

The foods we eat regularly contains various nutrients, which nourishes human body to perform various voluntary as well as involuntary functions of our body nutrients are the chemical substances with essentially obtained from our regular diet since the human body is unable to produce them internally Nutrients have are as mare of their basic functions : they provide energy , contribute to build body structure and regulate many chemical processes in the body .All nutrients are helping as a fuel for our body to function and maintain overall health.

Nutrients are mainly classified as Macro nutrients and micro nutrients .The nutrients which are needed in large amounts are called macro nutrients. There are mainly three macronutrients: Carbohydrates, proteins and lipids. There macro nutrients are able to generate cellular energy through metabolic processes in our body.

This cellular energy is used to perform day to day activities, allowing our bodies to conduct their basic functions.

The another type of nutrient is micro nutrients which are generally required by our body in lesser amounts but still are very crucial, to carry out our regular vital body functions. Micro nutrients include all the essential minerals and vitamins. These micronutrients are not meant for generation of energy like macronutrients but they assist in the process as cofactors or components of many enzymes like co-enzymes. Also vitamins and minerals which are referred as micronutrients, both are responsible to protect our body with enhancing our immunity.

Proteins are one of the macronutrients which are very essentially required for the growth and development our body. They are the structural pioneers of human body. One fifth of an adult's total body weight is protein. It is found in each and every cell of human body. All the tissues in our body which are located in every muscles, blood , bone , skin and hair are structured by proteins made up of proteins. Our body has many hormones and enzymes which performs many vital functions in our body are either protein or protein derivatives. Thus the protein is a macromolecule essential to maintain cellular integrity and function for health and reproduction. As Protein is a basic structural part of our

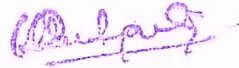
body, it essentially required for the healing process of wounds too.

Proteins are the macronutrients which are composed by carbon, hydrogen, oxygen and nitrogen. The Basic unit of all proteins is amino acid by which all proteins are synthesized. Amino acids are classified into two groups essential and non essential amino acids. The amino acids which cannot be synthesized by our body to meet physiological needs and hence must be supplied by the diet are called as essential amino acids. The examples of essential amino acids are histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonines, tryptophans and valin. Non essential amino acids are those that our body is able to synthesize inside it. They are alnine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, praline, serine and tyrosine.

All proteins are functionally classified as complete proteins, partially complete and incomplete proteins. The protein which contains all the essential amino acids, is called as complete protein which has high biological value. Biological value of the protein is the degree of percentage of nitrogen content of that protein that is absorbed and easily available for further use by our body to perform functions which lead to growth and maintenances.

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Daily dietary requirements of protein(RDA) - ICMR (Indian council of medical research) have been recommended 1.0 gm / of protein per kilogram of our body per day. During pregnancy and lactation, additional amount of protein are recommended. Protein requirements for children differs the basis of their body weight and expected weight gain.

Food sources of Proteins – We can get good amount of proteins from plant based as well as animal based foods. These all food sources of protein are very accessible and locally available to the individual. Animal foods like meat, fish, egg, milk and milk products and plant food like all types of pulses like green gram dhal, red gram dhal, black gram dhal, etc, and legumes like mothbean, lentil, green gram, Bengal gram, red and black gram, etc; various oilseeds which included groundnuts, sesamum, sunflower seeds, etc and nuts like almonds, walnuts contain high amounts of proteins so they are classified as rich as concentrated sources of proteins. Hence one must have regular good amount of inclusion of all pulses, legumes, and oilseeds to the diet which are locally available and economically also accessible to every individual.

There are some plant foods like cereal and millets and tender legumes such as green peas are moderate food sources of protein.

Leafy vegetables roots and tubers contain very less amount of protein, so they are considered as poor sources of proteins where they are rich in micro nutrients like minerals and vitamins. Soyabean is an oilseed which has high amount of protein i.e. 42 gm of protein per 100 gms of soyabean. So it must be included into the daily diet as a concentrated source of protein. Only care should be taken while consuming the Soyabean is, it must be well processed before to minimize its trypsin inhibitor content which acts as a anti-nutritional factor by binding the protein and make it unavailable for absorption. Simple processes like soaking, dehusking, malting can also be very beneficial to reduce Trypsin Inhibitor from the soyabean.

Functions of Proteins :-

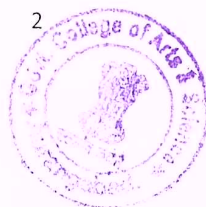
As the proteins are made up of integral parts of most body structures, they build and repair body tissues, finally they support the growth and development of our body. They play very vital functions in our body and its deficiency also affects very badly.

Proteins are the vital constituent at all enzymes and hormones which essentially regulate all the body processes. Proteins also help to maintain the volume and composition of body fluids with this function, protein maintain the fluid and electrolyte balance of the body.

Proteins can also be responsible to maintain the acid base equilibrium of the body fluids by acting as a buffer agent. Like carbohydrates, proteins also provide 4 kcal energy per gm of it, so thus they are also the major energy producing nutrient. It also can act as a storage for iron and copper. Homeostasis, maintenance of normal osmotic balance among body fluids is also one of the major function of protein. Protein is especially engaged in carrying the many nutrients to the tissues which are called as transport proteins e.g. lipoprotein carry lipids and haemoglobin transports oxygen to the cells and lastly protein majorly contribute to sensory and physical properties of food by imparting colour, flavour, odour and texture to the foods. Protein provides large amount of satiety value to the food which prolongs the appetite and leads to the fullness of stomach for longer time. So the people who wants to control or reduce their weight must have more amount of protein rich foods in diet to prolong their appetite which ultimately helps in calorie management in Obesity.

Deficiency of Protein-

If we analyse the daily average protein content of an Indian diet, we definitely found it very deficient in protein. Generally the diet of an Indian adult approximately has only 20 to 30 gm of protein per day whereas 60 gm is the recommended amount of protein. The regular deficiency of protein results in retarded growth and development, muscular weakness, etc. As protein and



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carbohydrates generates 4 kcal per one gm, if diet is deficient in protein, it also be deficient in energy too. Deficiency of protein and energy commonly results in many developing countries like India where it occurs regularly due to poverty as well as unawareness due to illiteracy among the people. This results in marasmus as Energy deficiency and Kwashiorkar as Protein deficiency especially in children of developing countries. In children, protein deficiency has serious clinical disorders which is known as Kwashiorkar. Kwashiorkar is due to quantitative and qualitative deficiency of protein in diet. Whereas Marasmus is a result of continuous energy deficient diet. In total, PEM (protein Energy malnutrition) is a term generally referred to describe clinical symptoms of varying degrees of deficiency of protein and energy. PEM is most prevalent in all parts of world and in all stages of life. In India, PEM is a mostly widespread form of malnutrition found in preschool children.

PEM is generally depicts with following clinical symptoms:

The children failed to grow with thinning, weakening and wasting of muscles.

They also have behavioural changes like irritability.

Children with PEM, especially suffering from Kwashiorkar which is a purely protein deficiency are found with edema which is the accumulation of watery fluid in tissues. These tissues becomes very soft and spongy which remains with an impression after pressing the skin. Children are identified with a Moon face in Kwashiorkar which is due to this edema.

During PEM, colour changes are observed in skin, it becomes pale or colourless and also peeling with ulcerations.

PEM prominently observed with Flagg syndrome in children in which hair of the children become very dry, sparse, and brown in colour. It's a very significant symptom of protein energy malnutrition.

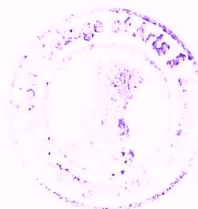
Regular loss of appetite, vomiting, and diarrhea is also associated with PEM.

The children who are severely suffering from Protein energy malnutrition are also with enlarged size of liver.

With all these clinical disorders, the child becomes more susceptible to the infections and fever. Anaemia which is caused of deficiency of iron is also found very common in PEM children. So children must be supplemented good quality and amount of protein on daily urgent basis. Because as we have seen above that PEM results in the stagnancy of growth and development. Hence regular intake of good quality protein is very essential through all stages of life. It must be ensured very seriously in the diet of children as they are in growing stages and protein is the most vital structural part of our body.

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