agMOOCs

Protein

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Welcome back. In the last class we have seen the advantages of fiber and its role in health and the carbohydrate and fiber were the major nutrients though not essential nutrient because the energy can be given by the other nutrients.

So today we will let us see about the protein which is again a major nutrient and a very important nutrient.

Proteins –an overview

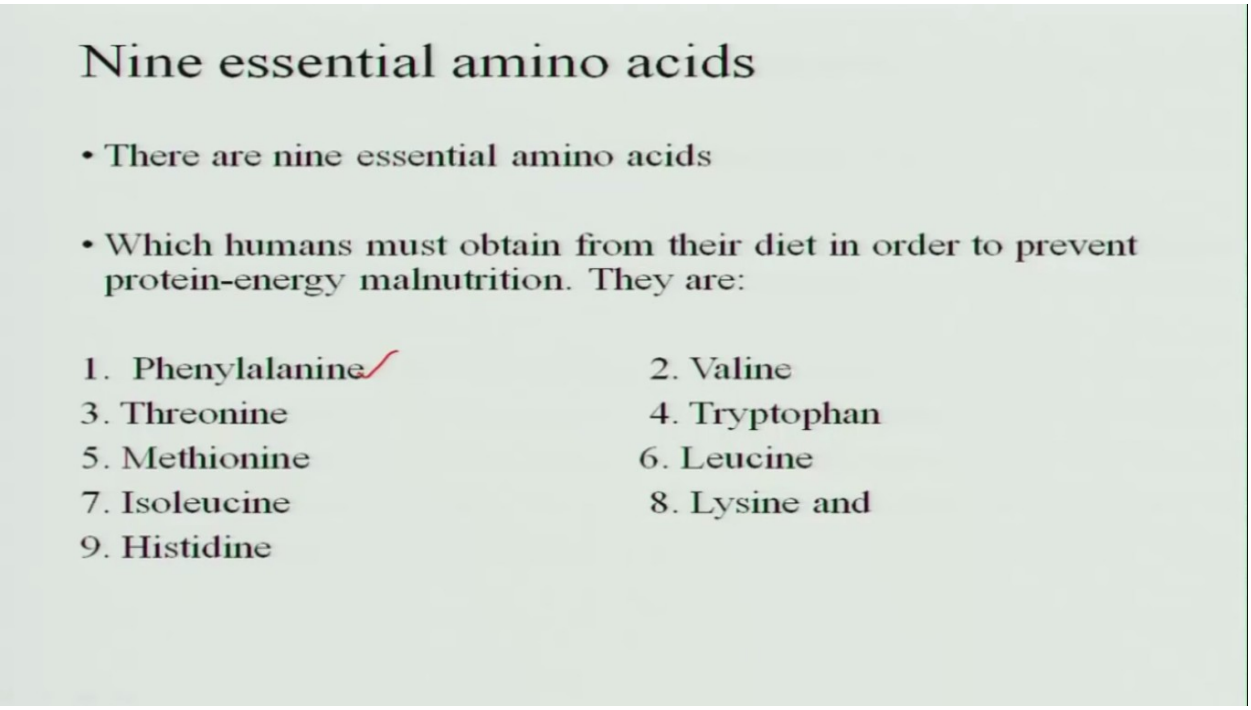
- The term protein was first suggested by Berzelius to describe the complex organic nitrogenous substances found in animal and plant tissue.
- Proteins are essential nutrients for the human body. They are one of the building blocks of body tissue, and can also serve as a fuel source

So the term protein was first suggested by Berzelius and he described a complex organic nitrogenous substance found in animal and plant tissue. So proteins are essential nutrients for the human body and they are one of the building blocks of body tissue and they also serve as a fuel source or the source of energy to the body.

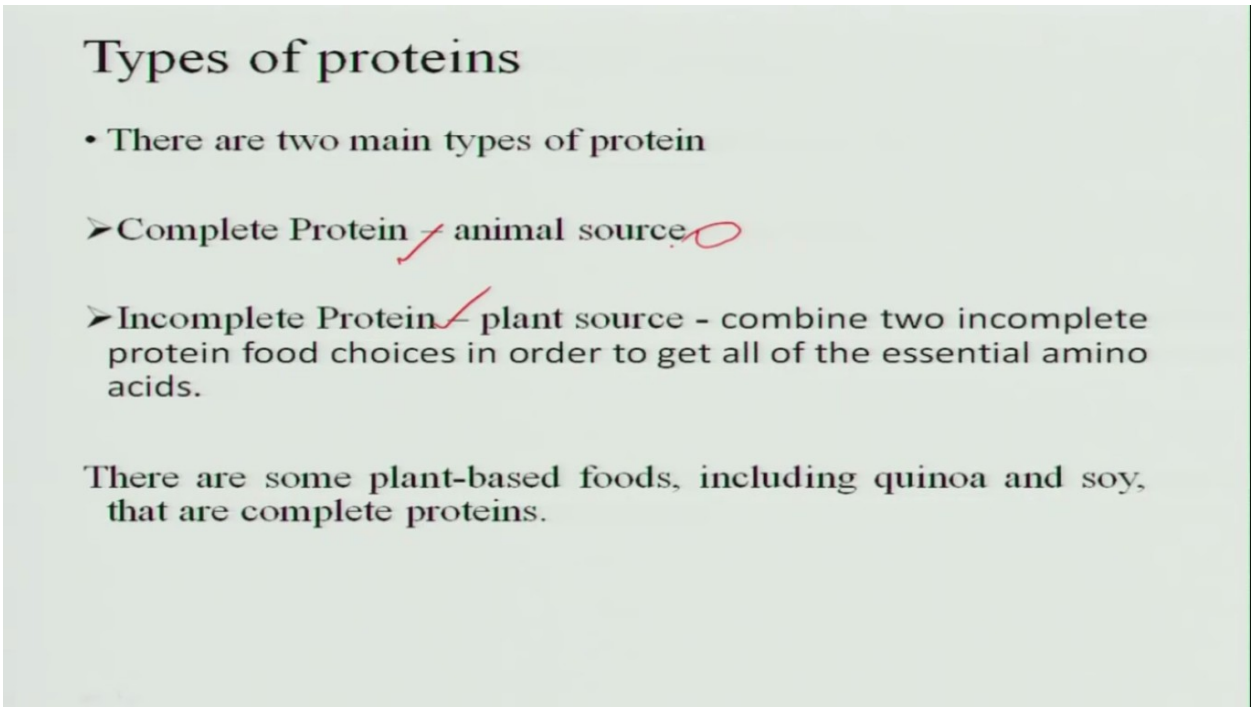
Protein a macronutrient

- Protein is a macronutrient that is essential for providing energy as well as building, maintaining and replacing muscle tissue.
- It is made of building blocks called **amino acids.** Our body needs **22** types of **essential amino acids** in order to function properly.
- It can make **13** of them, but the other **nine** must be obtained from foods to stay healthy.

Protein is called a macronutrient because it is essential for providing energy and as well as it is important for body building, maintenance, and repair of worn-out tissues and this is made up of building blocks called amino acids and our body has 22 types of essential amino acids in order to function properly. There are hundreds of amino acids out of which 22 are essential for keeping the body fit. So it can make 13 of them that means the body can synthesize 13 of the amino acids using the other material. But the other 9 have to be obtained from the food essentially so that we stay healthy. That is why they are called as essential amino acids. They have to be essentially provided through diet.

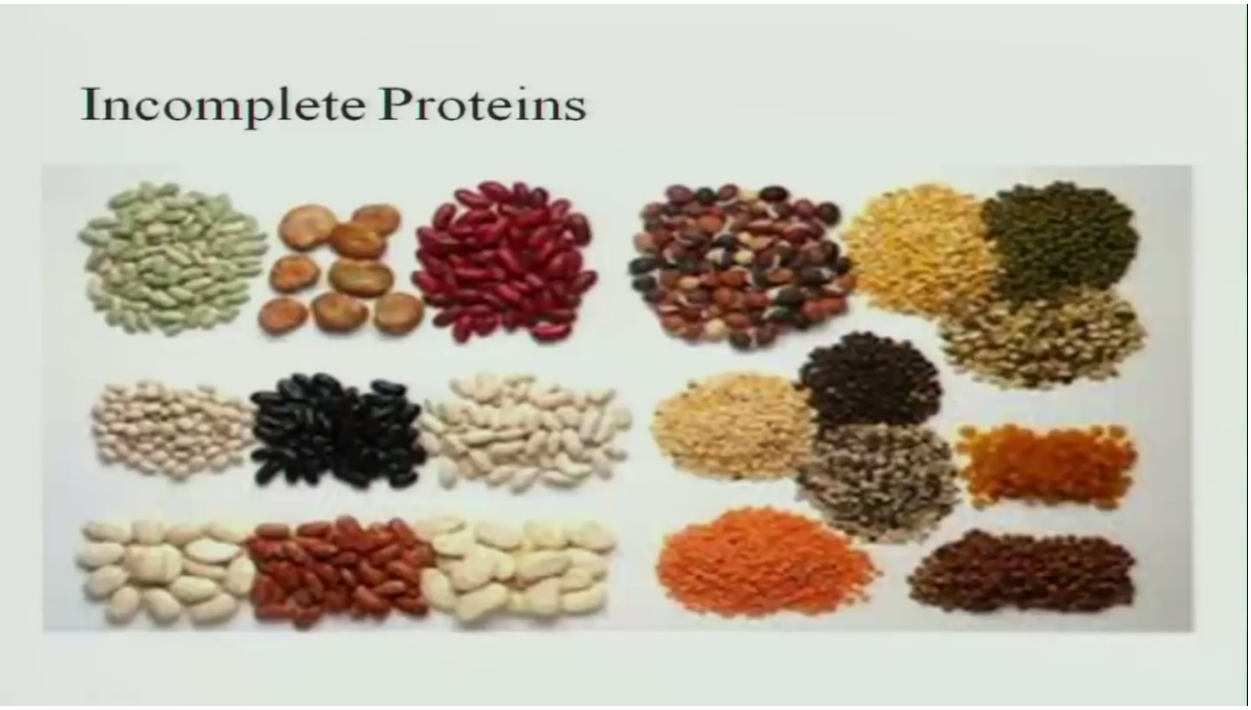


The 9 essential amino acids which human must obtain from the diet in order to prevent protein energy malnutrition are phenylalanine, valine, threonine, tryptophan, methionine, leucine, isoleucine, lysine, and histidine. And all these nine essential amino acids are present in animal foods but when you take the plant foods there are some deficient amino acids out of these. Therefore when we all these nine essential amino acids are present in a food it is called a complete protein. That means it has the function of body building, repair, and maintenance; whereas when something is deficient we have to supplement the amino acids.



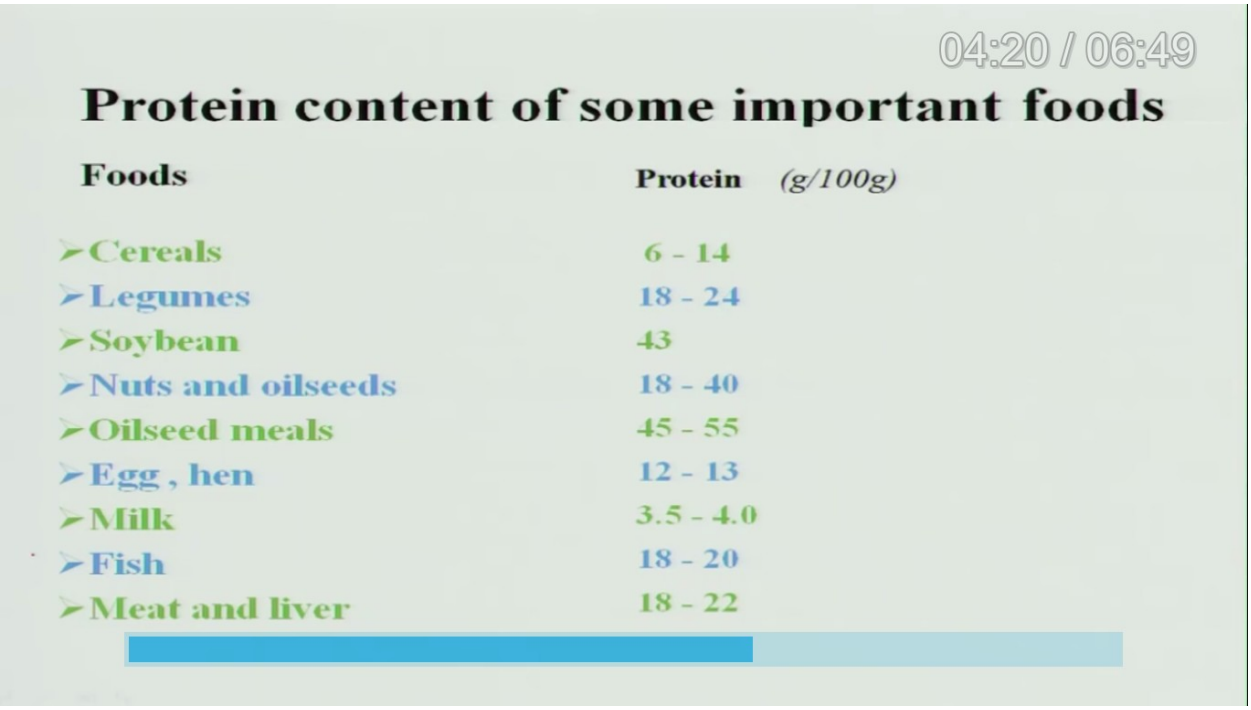
Now types of proteins. There are two types of proteins. One is complete protein and the other one is incomplete protein. As I told you a complete protein is found in animal source and plant source when we take food from plant sources we have to combine two foods which are having the incomplete protein so that we get all the essential amino acids and make it a complete protein. So there are some plant-based foods including quinoa, and soy which are complete proteins.

So we can see here all the animal foods these are supposed to be the sources of complete proteins.

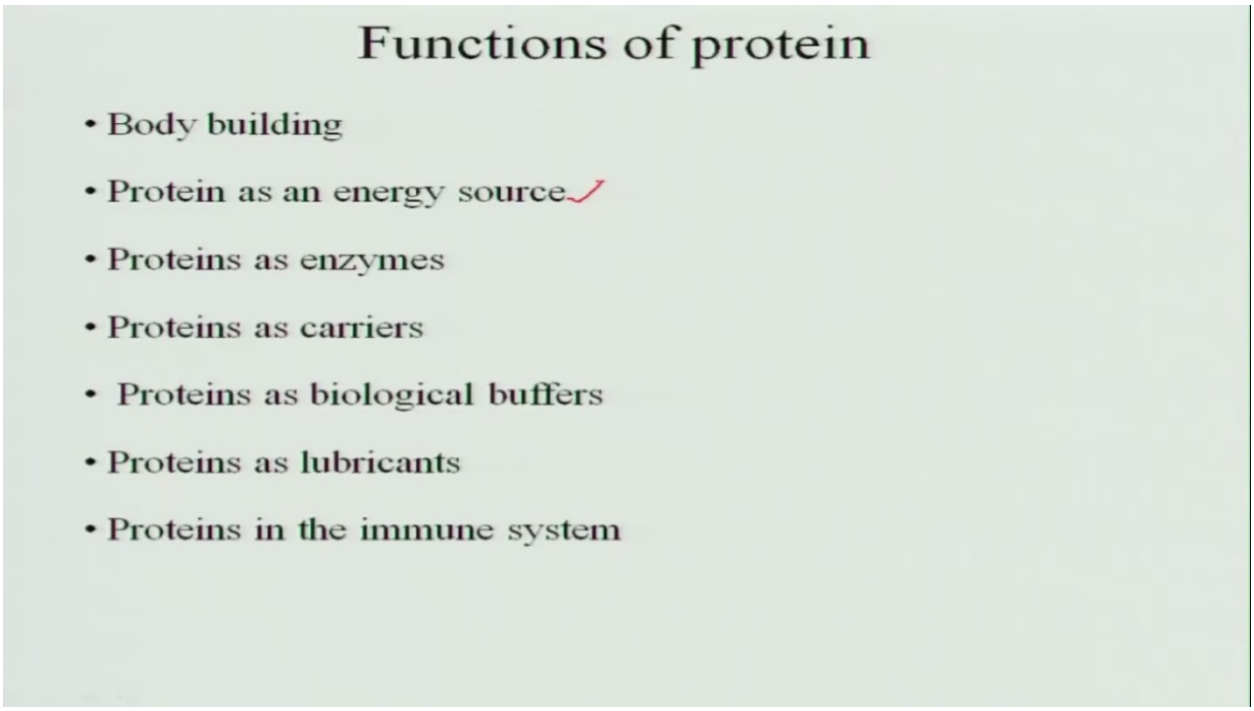


Incomplete proteins are present in cereal, grains, and pulses. So the cereal grains they are deficient in the amino acids lysine and threonine whereas these are rich in the pulses and pulses are deficient in tryptophan and methionine which are again rich in the lysine and threonine. Therefore, when we combine cereals and pulses together it becomes a complete protein. That is how we have to supplement the foods to get plant force as complete protein.

And there are many excellent sources of the vegetarian protein like milk, the paneer, and cheese. Then you have when you make some foods combining cereals and pulses, then the beans, flaxseed, then the pumpkin seeds, the sunflower seeds, hemp sesame, all these are the vegetarian protein which are good sources.



If you see the protein content of some of the foods the cereals provides 6 to 14 grams per 100 grams of cereals and legumes provide 18 to 24 grams and that is why when you combine cereals and legumes you cannot combine as one is to one because the quantity of protein present in legumes is much more than the cereals. Therefore it can be combined cereals is two pulses can be combined in the ratio of 4 is to 1. And soy bean contains 43 grams per 100 grams of proteins. So this is the richest source among the vegetable sources and this is again a complete protein. The nuts and oil seeds also contain 18 to 40 grams per 100 grams. Oilseed meals after taking out the oil it becomes richer in protein. So you have 45 to 55 grams of protein in oilseed meals. Then hen's egg contains 12 to 13 grams but this is a complete protein. Then milk also is a complete protein. So generally we call milk and egg protein as reference proteins. So we take reference from the egg and milk and compared with the other foods. Then fish contains 18 to 20 grams and meat and liver contains 18 to 22 grams of protein.



Now functions of protein. The main function is the body building and then when you don't supply sufficient amount of carbohydrates it acts as a source of energy. Then proteins are part of enzymes so they act as enzymes. Then proteins help as carriers for example hemoglobin in the blood. Hemoglobin is a combination of iron and protein therefore it acts as a carrier. Then for it acts as a buffer so to maintain the acid-base balance proteins act as buffers. Then protein act as lubricants and they are also important for immune system and they help in protection against disorders.

Therefore the functions of proteins are very important and we generally have protein for bodybuilding right from the infancy and if you see the infants they have milk as their main food which is rich in protein and the baby grows from 2 to 3 kgs to 60 kgs when it comes to an adult. So that important is the protein.

Thank you.