agMOOCs

Protein - Health Significance

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Welcome back. Last class we have seen about the importance of protein, the types of protein, the functions of protein, sources of protein and what is the amount of protein that is present in different food. So with all these you also have to know the health significance of proteins. Let us see what is it today.

We need protein for

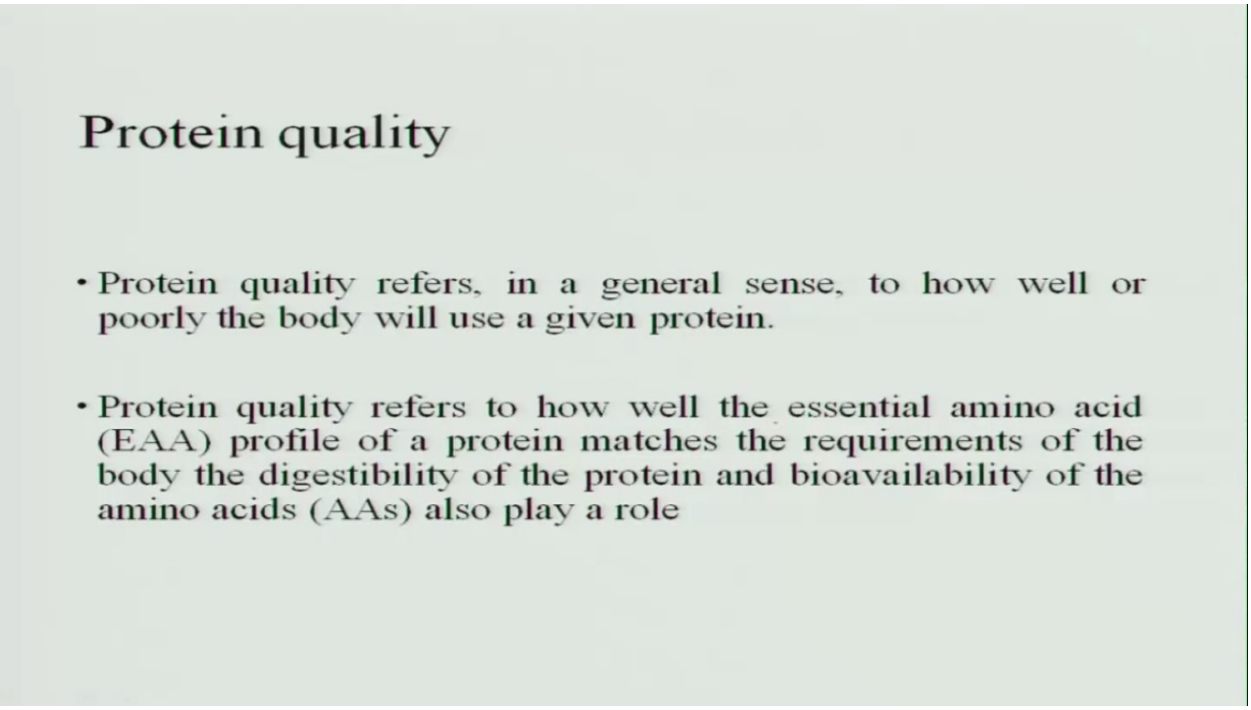
- Growth (especially important for children, teens, and pregnant women)
- Tissue repair
- Immune function

So we need protein for the growth especially it is important for the growth period like infancy, children, teens and pregnant woman where there is bodybuilding function going on in the body. Then tissue repair whenever the tissues are worn out or when you get wounded it required for tissue repair and immune function to protect the body against diseases.

- Making essential hormones and enzymes
- Energy when carbohydrate is not available
- Preserving lean muscle mass

Protein provides 4 calories per gram

Then it is also required for making the hormones and enzymes because all the hormones and enzymes are supposed to be protein in nature. Therefore these hormones are very important for the body and they are the ones which maintain the body and enzymes they are required for various actions in the body and the reactions. Now energy when carbohydrate is not available whenever there is a starvation period, when there is no energy supply in the form of carbohydrate or fat then protein they form the energy and they release the energy from the proteins. Then they also help in preserving the lean body mass. The muscle mass is preserved by the proteins and proteins also provide equal energy as carbohydrate like one gram of protein provides four kilocalories per gram.



Now protein quality is important. It is not that whatever protein we eat does all the functions. So protein quality refers in general sense to how well or poorly the body will use the given protein. So what is the amount of protein that is utilized by the body is the protein quality. So it is referred to as how well the essential amino acid profile is in the protein, and it meets the requirements of the body and how well it is digestible and utilized and what is the amount of the protein that is bio available by the body. This plays an important role in assessing the protein quality.

Factors affecting the protein quality

The quality of protein is based on two factors:

1. Digestibility
2. Amino Acid Composition

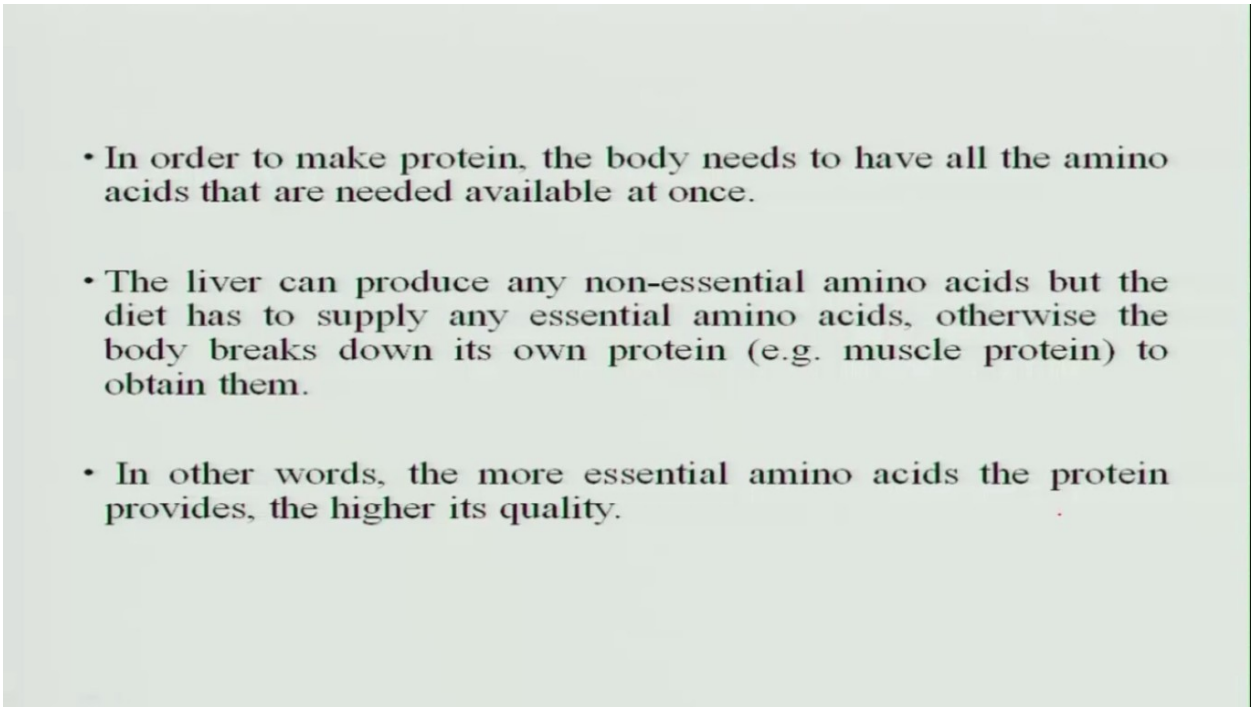
Now the factors that affect the protein quality. Two factors affect the protein quality one is the digestibility and the other one is the amino acid composition.

In order to provide the amino acids for protein synthesis, the body breaks down the protein from food sources into amino acids.

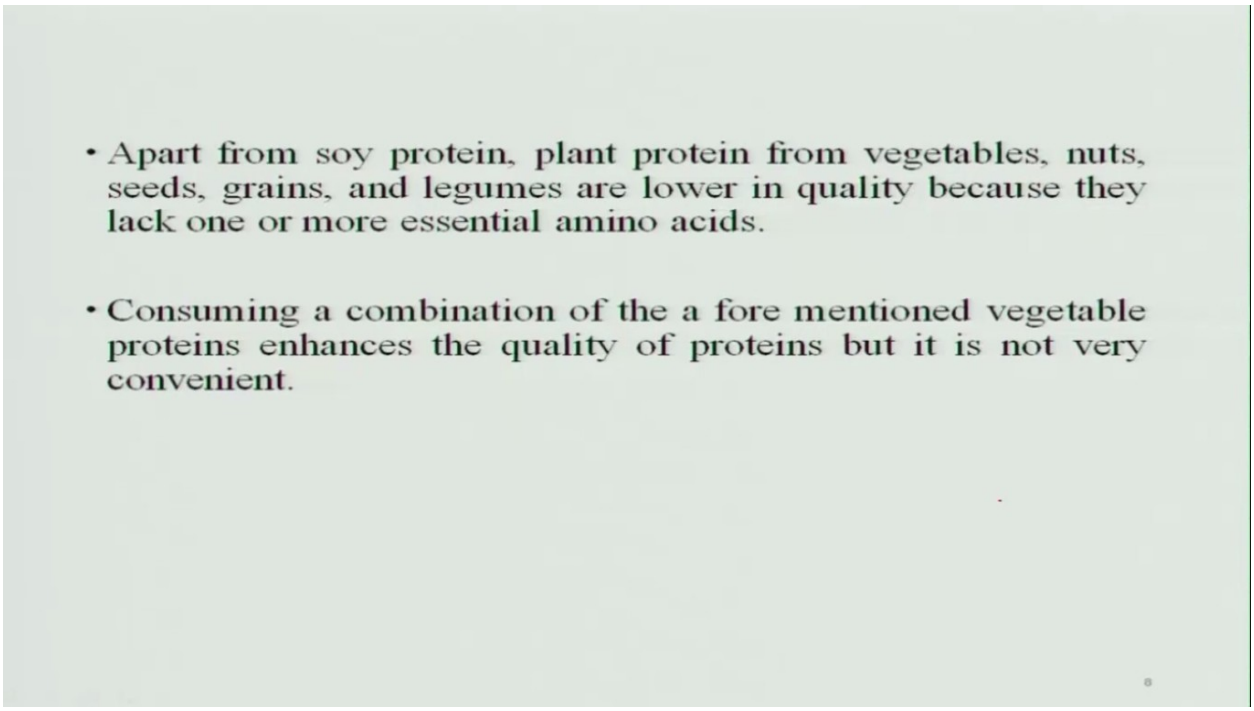
The protein's food sources influences its digestibility and hence rate of availability.

In general, animal proteins have a higher digestibility (90 – 99%) than plant proteins (70 – 90%), soy protein (>90%) being the exception.

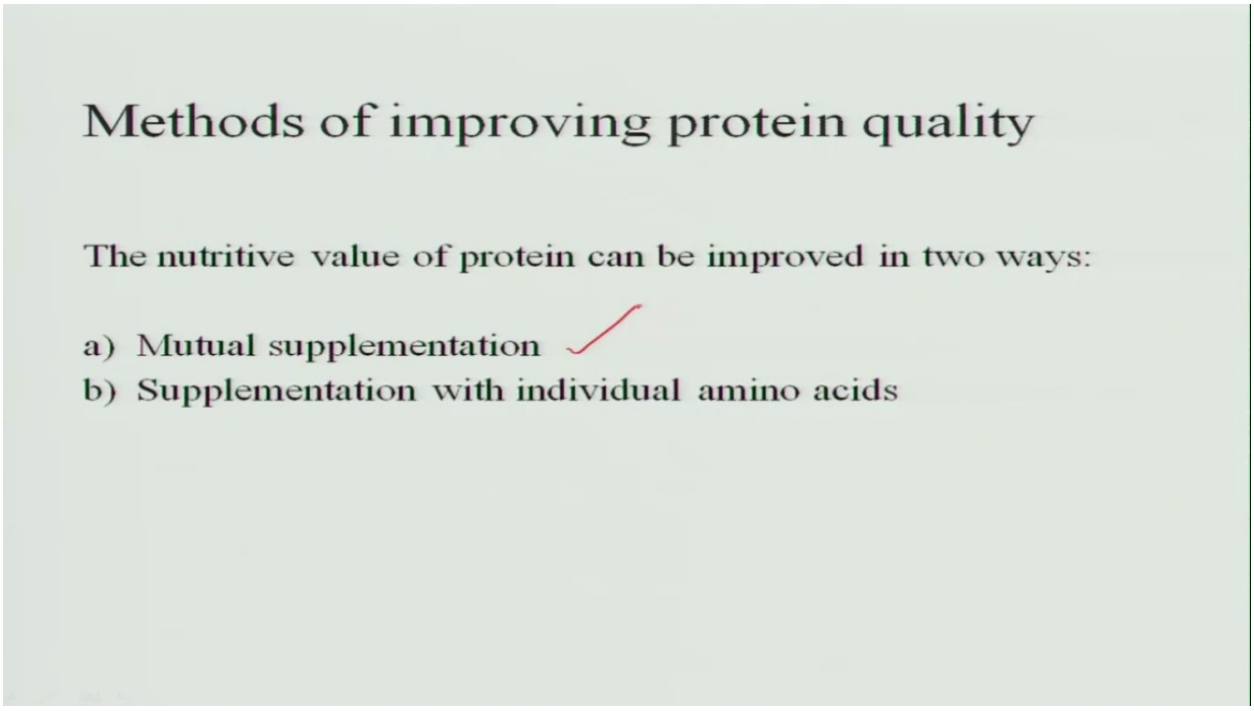
So in order to provide the amino acids for protein synthesis the body breaks down the protein from food sources to amino acids. Now protein's food sources influence its digestibility and they bioavailability. So in general the animal proteins have a higher digestibility because the animal muscle is similar to the muscle present in the human body. Therefore the bioavailability of protein from the animal sources is much higher almost up to 90 to 99% of the protein that we consume is bio available to the body. Whereas, the plant sources only 70 to 90% is available except for the soy protein which is 90% available.



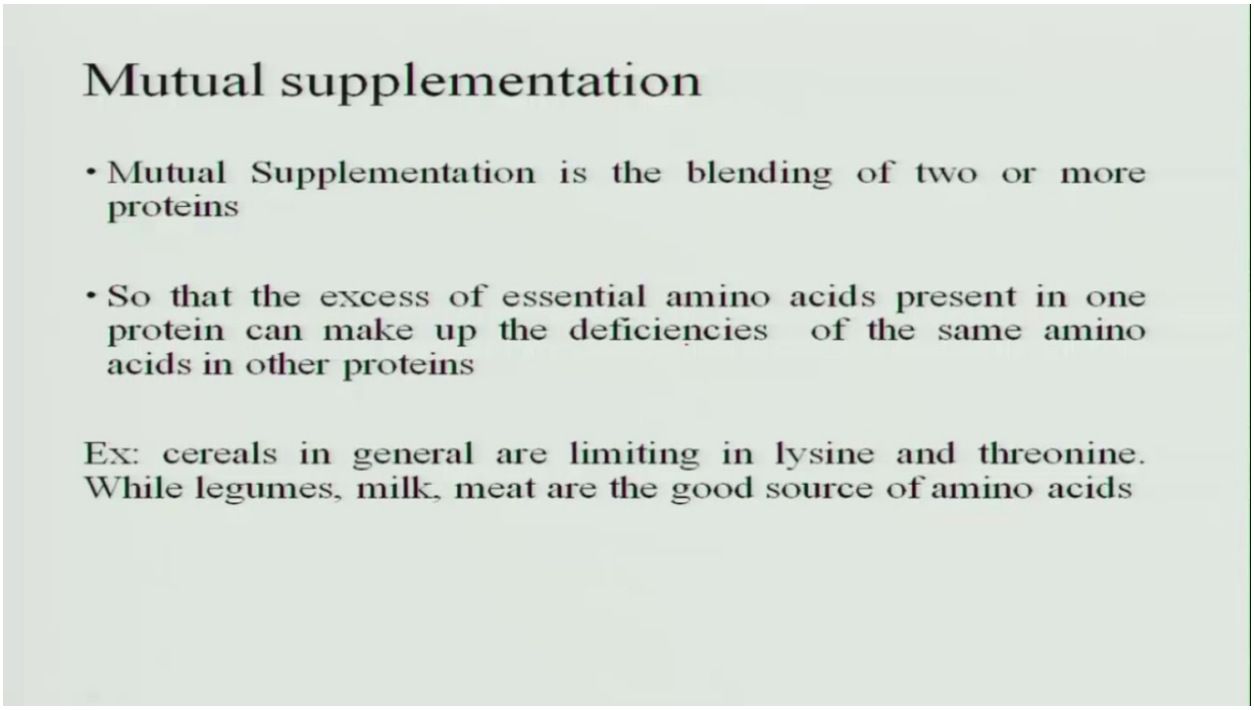
So in order to make the protein the body needs to have all the amino acids that are needed for the body at a single time. So the liver can produce any non-essential amino acids. So it can synthesize in the body but the diet has to supply all the nine essential amino acids which we have seen in the last class, otherwise the body breaks down its own protein, example the muscle protein to obtain them. That is called as muscle wastage. So whenever the individual has fever the supply of energy is not sufficient because the individual does not take food. So where does the body get energy from? It breaks down its own protein and that is why the person becomes very lean at the end of the episode of fever. In other words the more essential amino acids the protein provides the quality of protein is higher that means if all the nine essential amino acids are there it is of high quality protein otherwise the quality is lower.



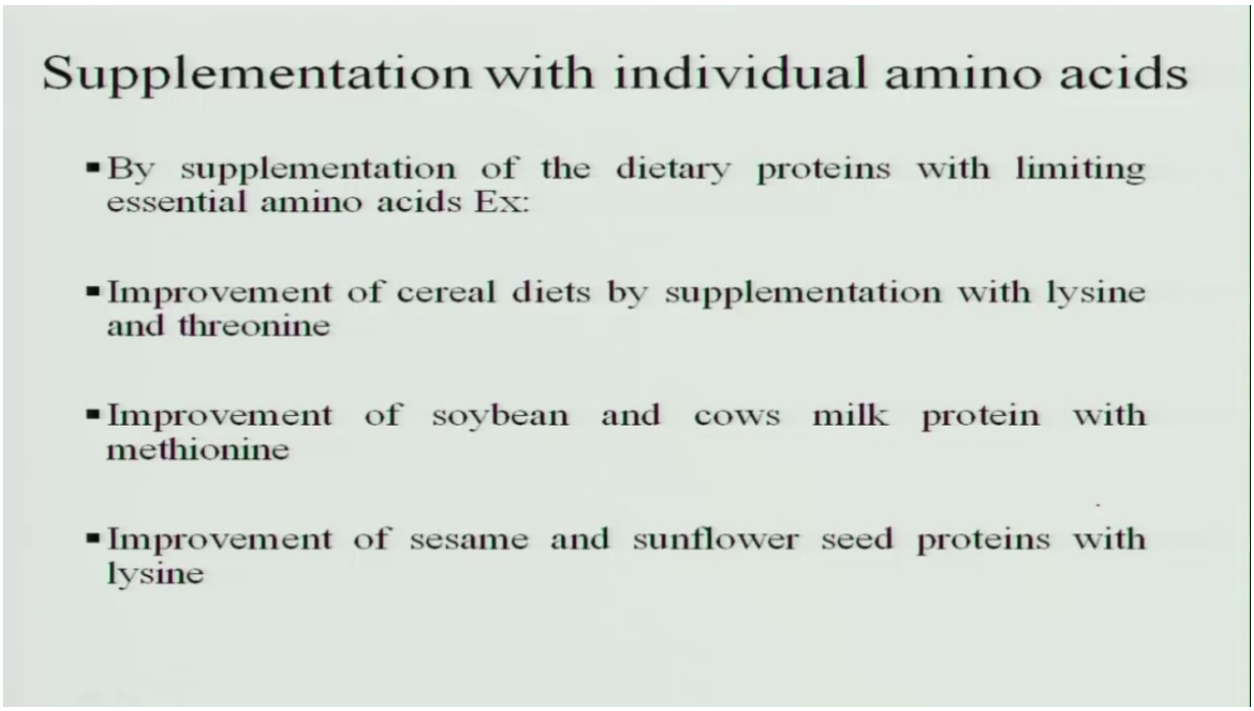
Now apart from soy protein plant proteins from vegetables, nuts, seeds, grains, and legumes have lower in quality because they lack either one or more essential amino acids. Now consuming a combination of the mentioned the vegetable proteins enhances the quality of proteins but it is not always very convenient to combine different types of foods and eat in order to get a good quality protein. It may not be convenient. You may not have sufficient resources to combine.



Now how do you improve the protein quality in a food. So nutritive value of protein can be improved in two ways one is by mutual supplementation and the other one is by supplementation of individual amino acids.



So what is mutual supplementation? It is blending of one or two proteins to get the complete protein so that the excess of essential amino acids present in one protein can make up the deficiency of the same amino acid in the other protein like I was mentioning about the cereals and proteins. The amino acids lacking in cereals are present in excess in pulses the same thing vice versa therefore when you combine cereals and pulses you get a complete good quality protein. So lysine and threonine and it is a good source of amino acids.



Then supplementation with individual amino acids. By supplementation of the dietary proteins with limiting amino acids. The improvement of cereal diets by supplementation with lysine and threonine you do not have to add pulses to it. You just supplement with lysine and threonine. It becomes a complete protein. Then improvement of soybean and cow's milk with methionine because methionine is lacking in pulses. Therefore you just supplement methionine it will become a complete protein. Then improvement of sesame and sunflower seeds with lysine. So because lysine is lacking in sesame seeds or thil seeds you just add lysine to it, it becomes a complete protein. That is supplementation with individual amino acids. Mutual supplementation is you add two foods which are lacking and which are high in amino acids so that mutually they supplement each other whereas individual amino acids you supply separately.

So this is how the protein quality can be improved in a food and thereby give a complete protein to the individual which helps in body building, then the repair, and maintenance of the food.

Thank you.