Health significance of protein
We need protein for

- Growth (especially important for children, teens, and pregnant women)
- Tissue repair
- Immune function
• Making essential hormones and enzymes
• Energy when carbohydrate is not available
• Preserving lean muscle mass

**Protein provides 4 calories per gram**
Protein quality

- Protein quality refers, in a general sense, to how well or poorly the body will use a given protein.

- Protein quality refers to how well the essential amino acid (EAA) profile of a protein matches the requirements of the body. The digestibility of the protein and bioavailability of the amino acids (AAs) also play a role.
Factors affecting the protein quality

The quality of protein is based on two factors:

1. Digestibility
2. 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.
• In order to make protein, the body needs to have all the amino acids that are needed available at once.

• The liver can produce any non-essential amino acids but the diet has to supply any essential amino acids, otherwise the body breaks down its own protein (e.g. muscle protein) to obtain them.

• In other words, the more essential amino acids the protein provides, the higher its quality.
• Apart from soy protein, plant protein from vegetables, nuts, seeds, grains, and legumes are lower in quality because they lack one or more essential amino acids.

• Consuming a combination of the aforementioned vegetable proteins enhances the quality of proteins but it is not very convenient.
Methods of improving protein quality

The nutritive value of protein can be improved in two ways:

a) Mutual supplementation
b) Supplementation with individual amino acids
Mutual supplementation

• Mutual Supplementation is the blending of two or more proteins

• So that the excess of essential amino acids present in one protein can make up the deficiencies of the same amino acids in other proteins

Ex: cereals in general are limiting in lysine and threonine. While legumes, milk, meat are the good source of amino acids
Supplementation with individual amino acids

- By supplementation of the dietary proteins with limiting essential amino acids Ex:
  - Improvement of cereal diets by supplementation with lysine and threonine
  - Improvement of soybean and cows milk protein with methionine
  - Improvement of sesame and sunflower seed proteins with lysine