

Principles of Nutrition Protein Knowledge Organiser

Function

Protein is essential for growth and repair. It allows us to maintain good health, helping the body produce chemicals such as enzymes and hormones.

Sources

High Biological Value (HBV)

Animal sources: lean meats, eggs and dairy products

Low Biological Value (LBV)

Plant sources: seeds, nuts, beans and grains

Energy Source

1g protein = 17kJ/4 kcal



Exception to the HBV Rule

Meat alternative products such as soya and tofu are vegetable proteins and are all HBV.

Amino Acids

Proteins are made up of chains called amino acids.

There are about 20 amino acids, combining to make up the millions of proteins found in nature.

Essential amino acids are **indispensable**. They **must** be supplied to us through diet and **cannot** be made by the body.

Non-essential amino acids are **dispensable**. They **can** be made by the body.

Arginine, cysteine, glycine, glutamine, proline and tyrosine are considered '**conditionally**' essential amino acids. This means they are not required except in times of illness or stress.

Essential Amino Acids for Adults

isoleucine
leucine
lysine
methionine
phenylalanine
threonine
valine
tryptophan

Additional Amino Acids Considered Essential for Children

arginine
cysteine
glutamine
glycine
histidine
proline
tyrosine

Non-Essential Amino Acids

alanine
asparagine
aspartic acid
glutamic acid



Complementary Proteins

Combining two or more LBV protein foods can provide the essential amino acids found in a meat dish:

- baked beans on wholemeal toast
- dhal with rice
- hummus and pitta bread

Excess

Too much protein can put pressure on the liver and kidneys (the organs which help process the protein).



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Deficiencies

Symptoms of protein deficiency include:

- wasting and shrinking of muscle tissue;
- oedema: buildup of fluids (especially in feet and ankles);
- anaemia: blood cannot deliver enough oxygen to the cells often caused by a lack of iron;
- slow growth in children.

Severe Cases

Kwashiorkor, a form of malnutrition, often affects children in developing countries. Symptoms include swollen stomach, extreme growth deficiency and brittle hair. The affected child will die unless treated.

How much protein do we need per day?

Children	
1 to 3 year olds	15g
4 to 6 year olds	20g
7 to 10 year olds	28g
11 to 14 year olds	42g
15 to 18 year olds	55g

Adults	
19 to 50 year olds	55g
50 years +	53g

Meat Alternative Proteins

Soya	<ul style="list-style-type: none"> • plant-based HBV source • used to make soya milk • processed to make tofu and TVP
TVP	<ul style="list-style-type: none"> • textured vegetable protein • made from soya beans • soya flour makes a dough • when baked has a meat-like texture • can be made into sausages, burgers and ready meals
Mycoprotein	<ul style="list-style-type: none"> • Quorn • made from a mushroom like fungus and egg white • vegan alternatives use potato starch • can be turned into mince, chunks and fillets
Tofu	<ul style="list-style-type: none"> • made by curdling soya milk • soft texture used for dips and desserts • firmer texture used in stir fries

