Protein—as a macro nutrient (1.1.1)

Key Words

Amino acids—the 'building blocks' that join together to make protein molecules

Essential amino acids—amino acids the body cannot make by itself and must get ready made from foods

Biological value—the number of essential amino acids that a protein food has

Protein complementation – eating different LBV protein foods together in order to get all the essential amino acids the body needs

Protein alternatives - manufactured food products, with a high protein content

What is it and what is it made of? - a macronutrient found in animal and plant food. Made up of 'building blocks' called amino acids

Amino acids: there are 20 in total. 10 are essential for the growth of children; 8 are essential for adults

High Biological Value (HBV) proteins contain all the 10 essential amino acids (EAA).

Low Biological Value (LBV) proteins are missing one or more essential amino acids (EAAs).

Functions in the body.

- Growth and repair
- Repair of the body when it is injured
- Giving the body energy (if it does not have enough carbohydrate and fats)
- Also needed for hormones (for growth and reproduction), enzymes (e.g. to digest food) and antibodies (to fight infection)

Sources:

HBV foods: meat, poultry, cheese, soya beans, milk, quinoa, eggs, fish., yogurt, quark, soya beans, quinoa.

LBV foods: peas, beans, nuts, lentils, cereals (rice, oats, barley, rye, millet, sorghum) and cereal products (bread, pasta), seeds and gelatine.

Protein alternatives are manufactured food products, with a high protein content, e.g. mycoprotein (Quorn), tofu, TVP and tempeh. They are used instead of meat in meals.

Useful to people who have decided to change from eating meat to a vegetarian diet as often made to look like meat or chicken, so they can help someone get used to not eating meat as they become fully vegetarian. Can be made into similar meals such as stir fries, pies, curries and burgers. They do not have much flavour on their own but easily take up the flavours of other ingredients.

LBV proteins do not contain all the essential amino acids we need but if you eat a mixture of them the missing essential amino acids in one may be provided by one of the others. This is called

Protein complementation. If you put two LBV foods together in a meal, the EAAs missing in one will be provided by the other – they complement each other. Beans and bread are both LBV protein foods so, as beans on toast, they are a good example of protein complementation. Other examples are: Pitta bread and hummus, baked beans on toast, bean and rice salad (not with soya beans), peanut butter on toast, bulgur and bean salad (not with soya beans) and vegetable satay and rice.

Effects of deficiency

Children will not grow properly and may never reach full height

Hair loss (hair is made of protein. People can live without hair so if protein is deficient the body will use it for more important body needs.

Nails and skin in poor condition

Easily develop infections due to weakened immune system

Not able to digest food properly

Specific groups:

Pre-school children need protein for rapid growth.

Children ages 5—12 are growing in 'spurts'

Vegetarians

Need to make sure they mix their LBV protein foods

Vegans—eat no animals or animal products and rely on plant based protein foods

Convalescing from illness or injury —need protein to repair damaged cells, repair wounds

Effects of excess: Too much nitrogen in the body is dangerous. The liver and kidneys have to work harder to remove it. This puts them under stress and could harm them.

Amount needed for different life stages

0.75g of protein is needed per 1 kg of body weight. Some groups need more than others e.g. teenagers (boys in particular) and breastfeeding women.

All teenagers need protein for growth, repair of body and energy. • Hormones (for growth and reproduction), enzymes and antibodies (to fight infection) are made from protein – teenagers need more of these as their body changes from a child to an adult. • Muscles made of protein – males are usually more muscular and taller than females, so need more protein.

Breast feeding women: • Protein is essential for growth and development of baby. • Breast milk provides protein. • Mother needs enough protein for her own body plus extra for the baby.