

# Biochemistry of Nutrition

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# Unit 3

- Macronutrients
- Carbohydrates
- Proteins
- Fats

# Macronutrients

- Nutrients that are needed in large quantities are known as macronutrients for normal function and good health. These are also energy-yielding nutrients, meaning these nutrients provide calories.
- Carbohydrates
- Proteins
- Fats



1. Nutrition 1 - Carbohydrates, Proteins and Fats.mp4



2. What are Macronutrients\_.mp4



3. Basic Nutrition and Macro - Nutrients Video Animation by Train With Kane.mp4

# Carbohydrates

- A carbohydrate is a biomolecule consisting of carbon (C), hydrogen (H) and oxygen (O) atoms, usually with a hydrogen–oxygen atom ratio of 2:1 (as in water); in other words, with the empirical formula  $C_m(H_2O)_n$  (where m may be different from n). 1 gram = 4 kilocalories

Class (DP*)	Subgroup	Components
Sugars (1–2)	Monosaccharides	Glucose, galactose, fructose, xylose
	Disaccharides	Sucrose, lactose, maltose, trehalose
	Polyols	Sorbitol, mannitol
Oligosaccharides (3–9)	Malto-oligosaccharides	Maltodextrins
	Other oligosaccharides	Raffinose, stachyose, fructo-oligosaccharides
Polysaccharides (>9)	Starch	Amylose, amylopectin, modified starches
	Non-starch polysaccharides	Glycogen, Cellulose, Hemicellulose, Pectins, Hydrocolloids

1. Energy production;
2. Energy storage;
3. Building macromolecules;
4. Sparing proteins;
5. Fat sparing effect;
6. Preventing ketosis



# Proteins

- Proteins are large biomolecules, or macromolecules, consisting of one or more long chains of amino acid residues.
- 20-30 amino acids – polypeptides/oligopeptides
- 1 gram protein = 4 kilocalories

- Some proteins are enzymes
- Some proteins are hormones
- Some proteins provide structure
- Some proteins are antibodies
- Proteins maintain fluid balance
- Proteins transport nutrients and other compounds
- Proteins maintain acid-base balance
- Protein is a back up source of energy



5. Proteins.mp4

# Fats

- Fats, also known as triglycerides, are esters of three fatty acid chains and the alcohol glycerol.
  - saturated, unsaturated and trans fattyacids
  - 1 gram protein = 9 kilocalories
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- Fats are an energy reserve
  - Fats provide essential fatty acids
  - Fats carry fat-soluble nutrients
  - Fats add to the texture and flavor of foods



6. Lipids.mp4

# Sources

## Video sources

Basic Nutrition and Macro - Nutrients Video Animation by Train With Kane:

<https://www.youtube.com/watch?v=cKRf53I737E>

Macros: Explained! Mind Over Munch Kickstart 2016

<https://www.youtube.com/watch?v=7HXkkanqPKA>

What are Macronutrients?

<https://www.youtube.com/watch?v=9Jnz-lx1GPg>

Carbohydrates

<https://www.youtube.com/watch?v=LeOUIXbFygk>

Proteins

<https://www.youtube.com/watch?v=AUMJwjLXh1M>

Lipids

<https://www.youtube.com/watch?v=5BBYBRWzSLA>

Nutrition 1 - Carbohydrates, Proteins and Fats

<https://www.youtube.com/watch?v=jgrVI4V5ttQ>

## Textual source

<http://www.innerbody.com/nutrition/macronutrients>

<https://www.runtastic.com/blog/en/what-are-macronutrients/>

<https://www.medicalnewstoday.com/articles/161547.php>

<https://en.wikipedia.org/wiki/Carbohydrate>

<https://2012books.lardbucket.org/books/an-introduction-to-nutrition/s08-03-the-functions-of-carbohydrates.html>

<https://www.sciencelearn.org.nz/resources/209-role-of-proteins-in-the-body>