

## Sources of Carbohydrates

Sugar  
sweets  
cakes  
jam  
fizzy drinks

starch  
bread  
pasta  
potatoes  
cereals

cellulose  
fruit  
vegetables  
whole grain cereals

## Functions

- ★ heat and energy
- ★ spares protein for growth and repair
- ★ Excess CHO converted to glycogen, stored in liver and muscles as an energy reserve or converted to fat stored as adipose tissue as an insulator
- ★ Cellulose assists digestion preventing constipation

## Sugar

- Solubility: white crystalline compounds soluble in water
- Flavour: varying degrees of sweetness eg sucrose sweeter than lactose
- Maillard Reaction: Browning occurs when sugars and amino acids react when heated (non-enzymic browning).
- Hydrolysis: capable of hydrolysis, react with water and enzymes, break down into monosaccharides eg digestion
- Inversion: capable of inversion, inverted sugars are the monosaccharides resulting from hydrolysis of disaccharides eg when sucrose is hydrolysed it is inverted to glucose + fructose
- Crystallisation: occurs if more sugar is added than can be absorbed by a liquid. Crystals deposited from the solution, used in sweet industry
- Assists aeration: sugar denatures egg protein, allowing aeration to occur.

## *Classes of Carbohydrates*

- **Monosaccharides** contain a single polyhydroxy aldehyde or ketone unit (*saccharo* is Greek for “sugar”) (e.g., glucose, fructose).



- **Disaccharides** consist of two monosaccharide units linked together by a covalent bond (e.g., sucrose).



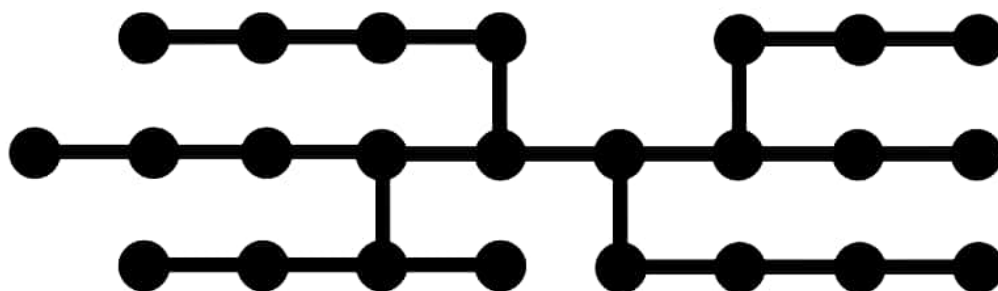
- **Oligosaccharides** contain from 3 to 10 monosaccharide units (e.g., raffinose).



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## *Classes of Carbohydrates*

- **Polysaccharides** contain very long chains of hundreds or thousands of monosaccharide units, which may be either in straight or branched chains (e.g., cellulose, glycogen, starch).



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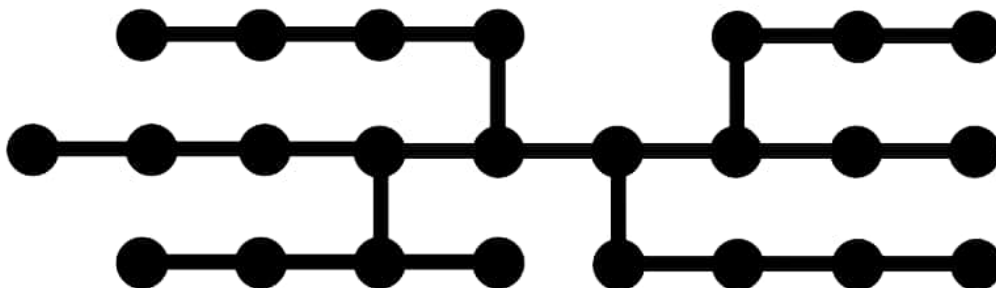
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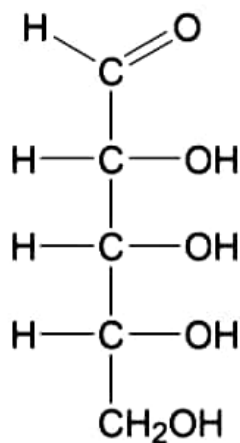


# Classification of Carbohydrates

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ribose

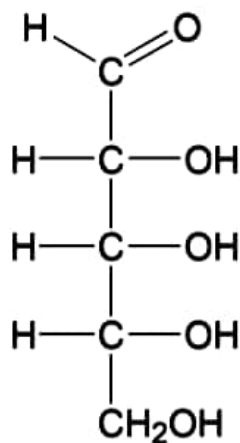
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## *Carbohydrates and Biochemistry*

- Carbohydrates are compounds of tremendous biological importance:
  - they provide energy through oxidation
  - they supply carbon for the synthesis of cell components
  - they serve as a form of stored chemical energy
  - they form part of the structures of some cells and tissues
- Carbohydrates, along with lipids, proteins, nucleic acids, and other compounds are known as **biomolecules** because they are closely associated with living organisms. **Biochemistry** is the study of the chemistry of biomolecules and living organisms.

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