

# Cell = The unit of structure and functions in living organism.

\* micromolecules  $\left\{ \begin{array}{l} \text{inorganic compounds :- Water/mineral} \\ \text{organic compounds :- monosaccharides/ amino acid} \\ \text{fatty / nucleotides.} \end{array} \right.$

\* macromolecules.  $\Rightarrow$  polysaccharides/ proteins/ lipids/ nucleic acids.

# Metabolism :- the interconversion process of micro... to macro...  
or Macro.. to micro.

① \* The micromolecules converted to macromolecules in (energy requiring)  
(Synthesis) (anabolism). تحويل

② \* The macromolecules converted to micromolecules (liberation energy)  
(break down) (catabolism). تحرير

### Carbohydrates.

① Provide fast energy. (4 Kcal/gram).

② number of (saccharides) تعدد

mono saccharide	Disaccharide.	Poly saccharide.
* (3-7) carbon atoms.	* formed when	* created without
* general formula $C_nH_{2n}O_n$	OH (hydroxyl group)	template by
* glucos $C_6H_{12}O_6$ etc	on anomeric group	addition of
* number of carbon <span style="float: right;">عدد</span>	of first sugar linked	particular
* hydroxyl + aldehyde <span style="float: right;">هيدروكسيل + ألدهيد</span>	with (OH) in the other	mono saccharide
(OH) $\rightleftharpoons$ , Ketone group.	sugar.	residues.
	* O-glycosidic bond $\Rightarrow$	
	* dehydration reaction	
	(syntheses).	

Five Apple  
سفر  
البراق

linear form  $\Rightarrow$  Fisher projection  $\xrightarrow{\text{cyclize}}$

Cyclic form  $\Rightarrow$  Haworth projection.

glucose  $\Rightarrow$  pyranose / hemiacetal  $\Rightarrow$  alcohol + aldehyde  
 $C_5$   $C_1$

**Poly saccharide** = monomer units joined together by  
(glycosidic bond)

\* the range in structure from ① linear , highly branch.

they differ

- ① the identity of their monosaccharide
- ② length of their chains
- ③ degree of branching.

Ex glycosidic bond  $\Rightarrow$  1000 monosaccharides  $\Rightarrow$  \*  
\* 999 glycosidic bond.

سلسلة زنجري  
999

Hydrocarbons	Alcohols	Aldehydes
1) H + C that ending methyl (CH <sub>3</sub> )	① hydroxyl (OH)	① Polar
2) non polar	② Polar	② hydrophilic
③ hydrophobic	③ hydrophilic	③ Aldehyde group.
④ Not Soluble water	④ good fuel	
⑤ backbone	⑤ Soluble water easily dissolve	
* CH <sub>4</sub> (methane)	* (ethanol) CH <sub>3</sub> CH <sub>2</sub> OH	* form aldehyde HCHO
Ketones (ketone group)	organic phosphates	carboxylic acids
① Polar	① phosphate group.	① carboxyl group.
② hydrophilic	② found in ATP/DNA	② soluble water
③ steroids contain (ketones)	③ Acidic	③ Polar
* acetone CH <sub>3</sub> COCH <sub>3</sub>	④ Polar	* weak acid (aromatic)
	⑤ hydrophilic	* acetic (vinegar) CH <sub>3</sub> COOH
Amines (amino group)		
① Polar		
② hydrophilic		
③ Soluble water		
④ weak bases		
* ammonia NH <sub>3</sub>		

H → one bond / O = two bond / N = Three bond  
C = four bond / P phosphorus.

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