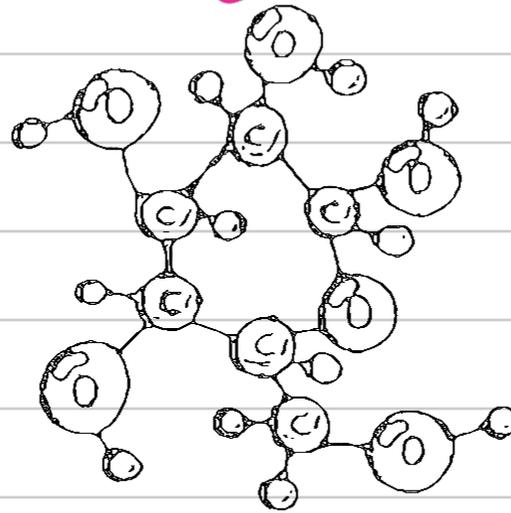
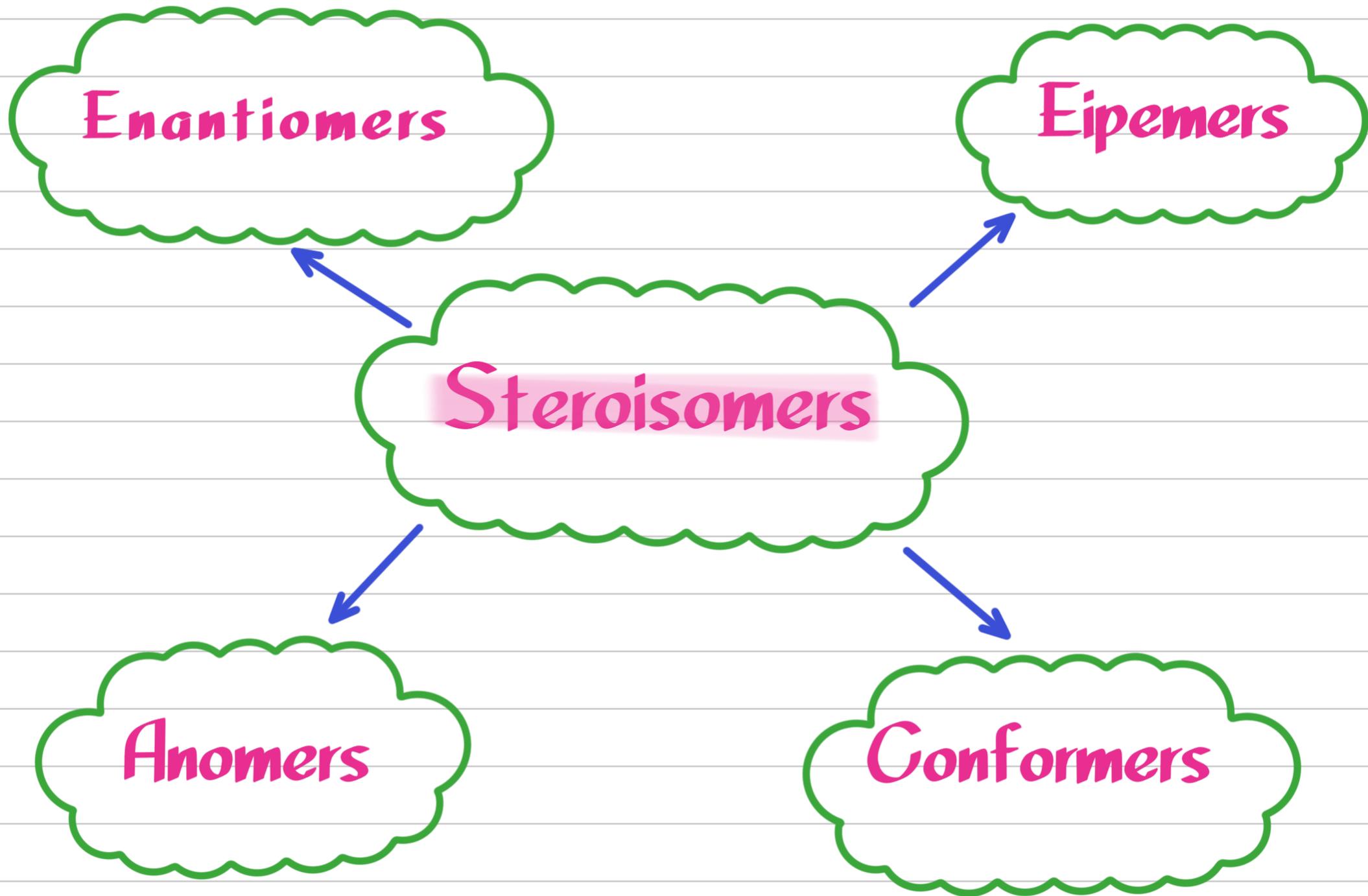


Carbohydrates 2



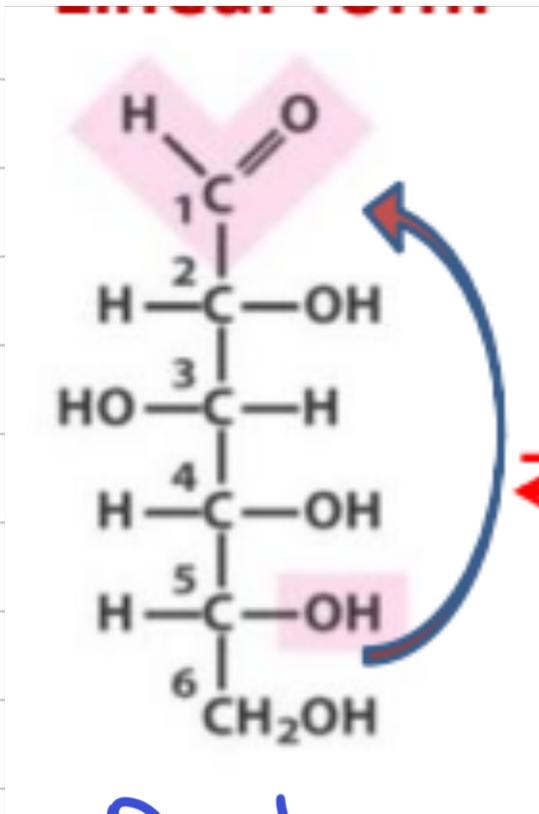
CARBOHYDRATE

— vector illustration —

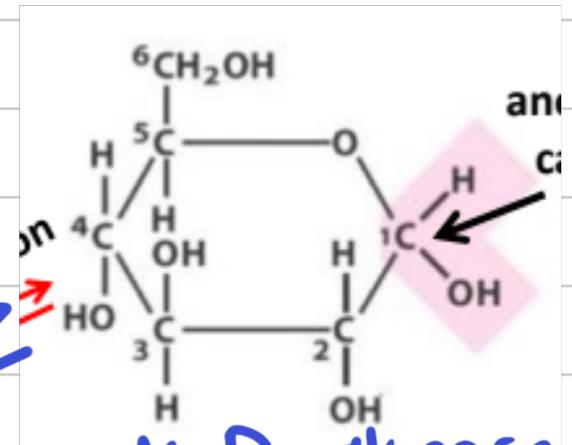
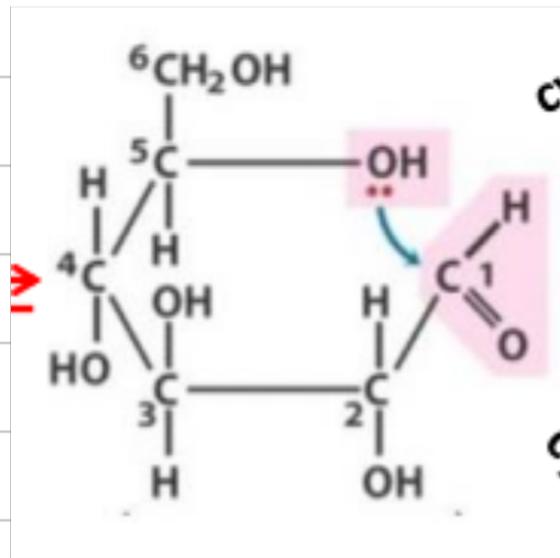


« Anomers »

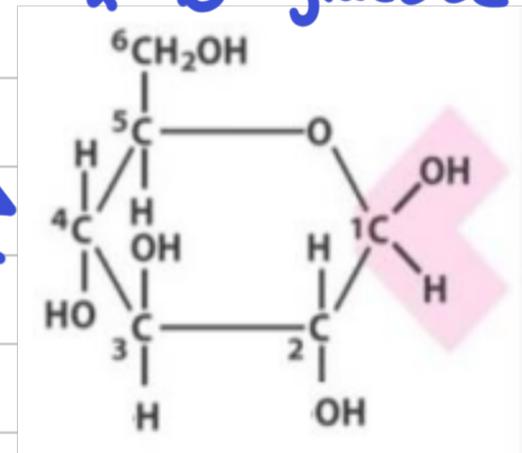
— are pair of stereoisomers that differ in spatial arrangement of atoms at the anomeric carbon.



D-glucose.



α -D-glucose



β -D-glucose.

— In cyclic sugars, the carbonyl carbon becomes chiral center (asymmetric carbon) with two possible configurations: α and β .
this new carbon is called \rightarrow anomeric carbon.

— In α -anomer \rightarrow the OH group of the anomeric carbon is projecting down the plane of the ring and on the opposite side of the terminal CH₂OH group and vice versa in β -anomer.

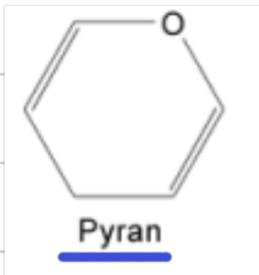
— D-glucose \rightarrow is a mixture of β -anomer (63.6%) α -anomer (36.4%) and extremely tiny amounts of the straight chain.

« pyranoses, Furanoses »



Sugars with six-membered rings are known as **pyranoses**.

— **glucopyranose**



Sugars with five-membered rings are known as **furanoses**.

— **fructofuranose**



Hexose, **pentose** can exist in pyranose and furanose forms (the most stable rings)

- D-Glucose \rightarrow β -D-glucopyranose.
 \rightarrow β -D-glucofuranose.

- D-Fructose \rightarrow α -D-Fructofuranose.
 \rightarrow α -D-Fructopyranose.

- D-ribose \rightarrow α -D-Ribopyranose.
 \rightarrow α -D-Ribofuranose.

- glucose and fructose \rightarrow mostly pyranoses.
ribose \rightarrow mostly furanose.

« Howorth Projection »

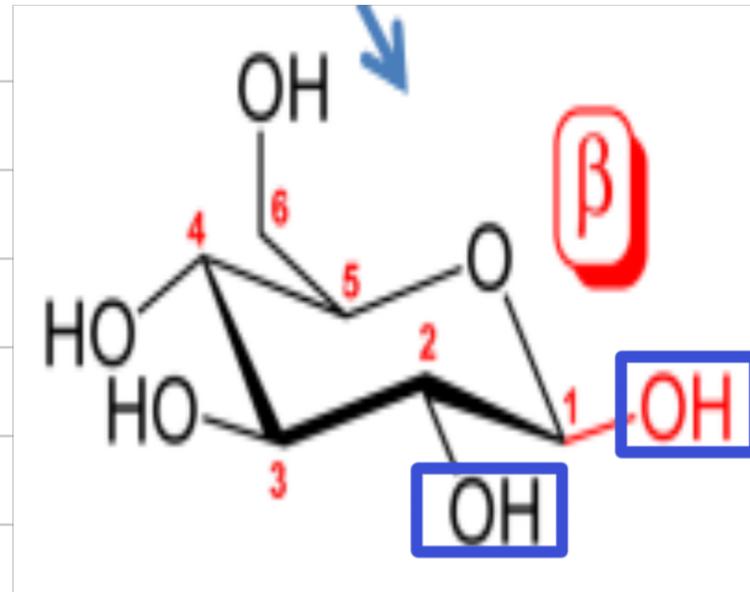
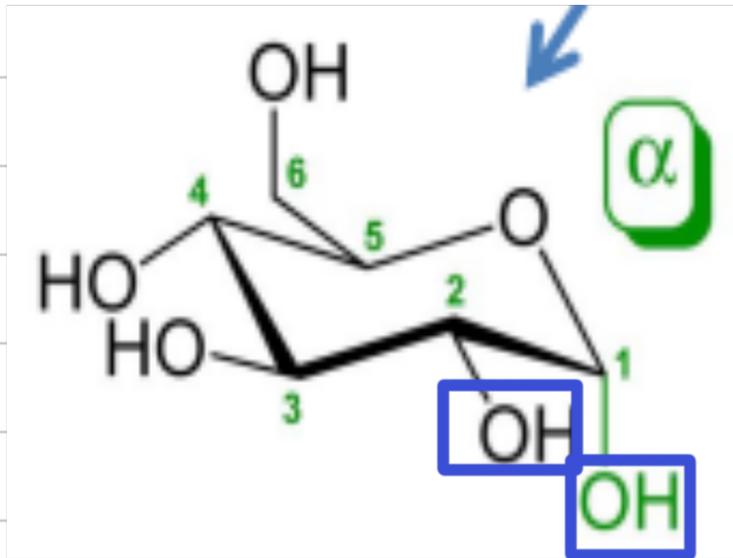
— is a simple 3D way to represent the cyclic monosaccharides.

« Conformers »

— The geometry of the carbon atoms of monosaccharide ring is tetrahedral
bond angles are close to 109.5° .
so sugar rings are not actually planer.

ex:- pyranoses take on either chair or Boat conformations.

- Conformers are stereoisomers with different rotations about single bonds.
- α is less stable than β due to steric repulsion.



« sugar Modification »

Aldonic acids	oxidation of aldehyde C1 to carboxylic acid. D-gluconic acid.
Uronic acids	oxidation of OH at C6 to carboxylic acid. D-glucuronic acid.
Alditols	reduction of carbonyl group to alcohol D-ribitol, D-glycerol, D-sorbitol.

<p>Deoxy sugars</p>	<p>OH group is replaced by H. β-D-2-deoxyribose.</p>
<p>Amino sugars</p>	<p>one or more OH groups are replaced by amino group which is often acetylated.</p> <ul style="list-style-type: none"> - α-D-glucosamine. - α-D-N-acetylglucosamine. <p style="text-align: right;">] both are derivatives of α-D-glucose.</p>

* α -D-glucosamine (rebuild cartilage in osteoarthritis and osteoporosis).