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Lecture title: Stereoisomers

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Summary: The compounds possessing identical molecular formula but different structures are referred to as ***isomers.*** The phenomenon of existence of isomers is called ***isomerism***

The presence of asymmetric carbon atoms in a compound gives rise to the formation of isomers of that compound. Such compounds which are identical in composition and differs only in spatial configuration are called stereoisomers.

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Asymmetric carbon: carbon atom which attached to four (4)different groups.

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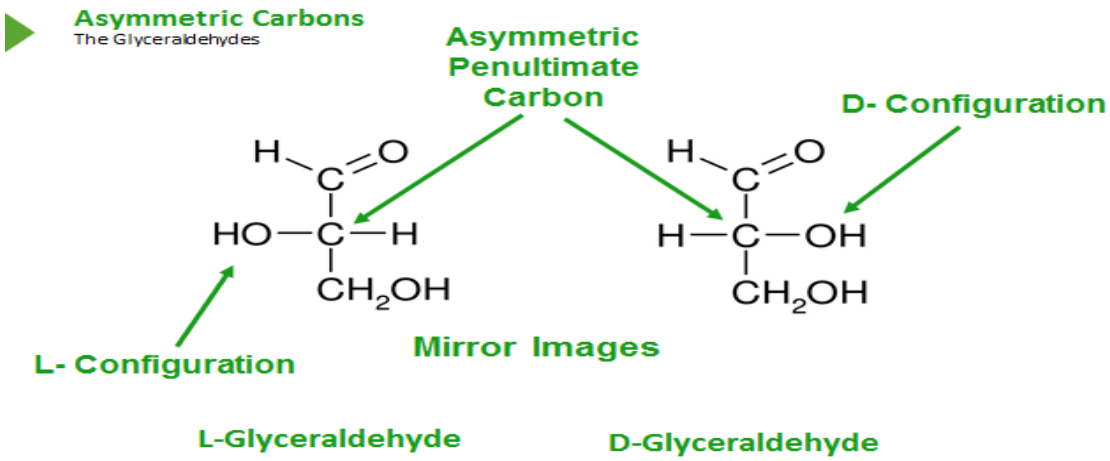

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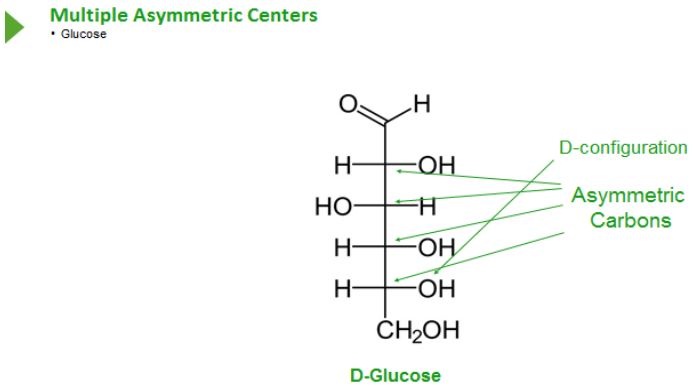
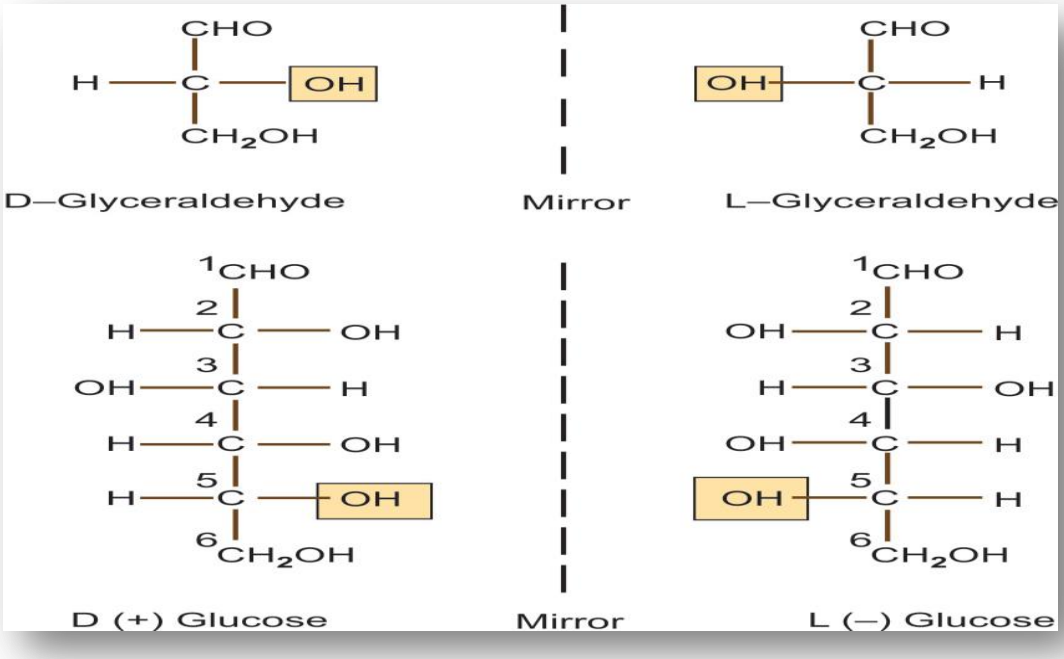


Two isomers of glucose:- **D-Glucose** and **L-Glucose** are mirror image of each

Other

D-Series and L-Series:

The orientation of the H and OH groups around the carbon atom just adjacent to the terminal primary alcohol carbon, e.g. C-atom 5 in glucose determines the series. When the – OH group on this carbon is on the **right**, it belongs to **D-series**, when the – OH group is on the **left**, it is a member of **L-series** .Most of the monosaccharides occurring in mammals are **D-sugars**.



α and β Anomerism

The predominant form of glucose and fructose in a solution are not an open chain. Rather, the open chain form of these sugars in solution cyclize into rings.

An additional **asymmetric center** is created when glucose cyclizes. Carbon-1 of glucose in the open chain form, becomes an **asymmetric carbon** in the ring form and two ring structures can be formed. These are:

• α-D-glucose. **α** means that the hydroxyl group attached to C-1 is **below** the plane of the ring

• β-D-glucose. **β** means that the hydroxyl group attached to C-1 **above** the plane of the ring.

The C-1 carbon is called the **anomeric** carbon atom and, α and β forms are **anomers**.