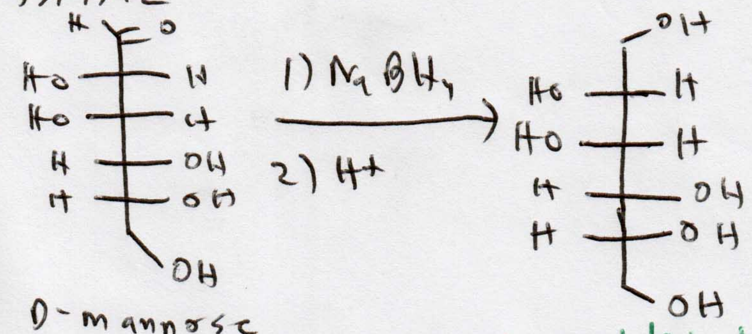
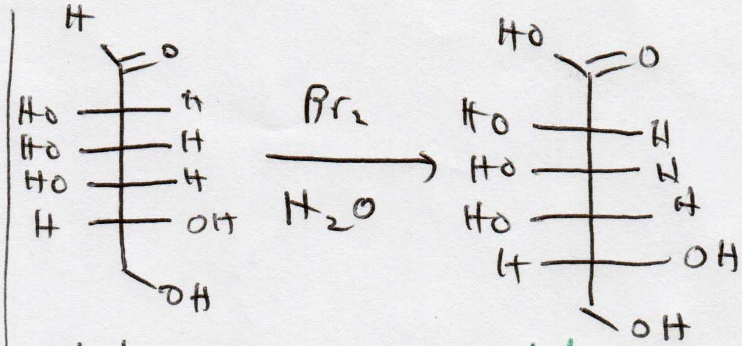
5/17/12



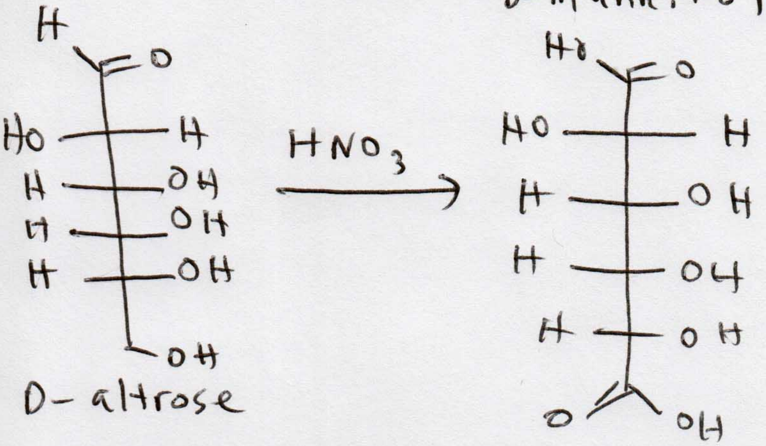
D-mannose

an alditol
D-mannitol



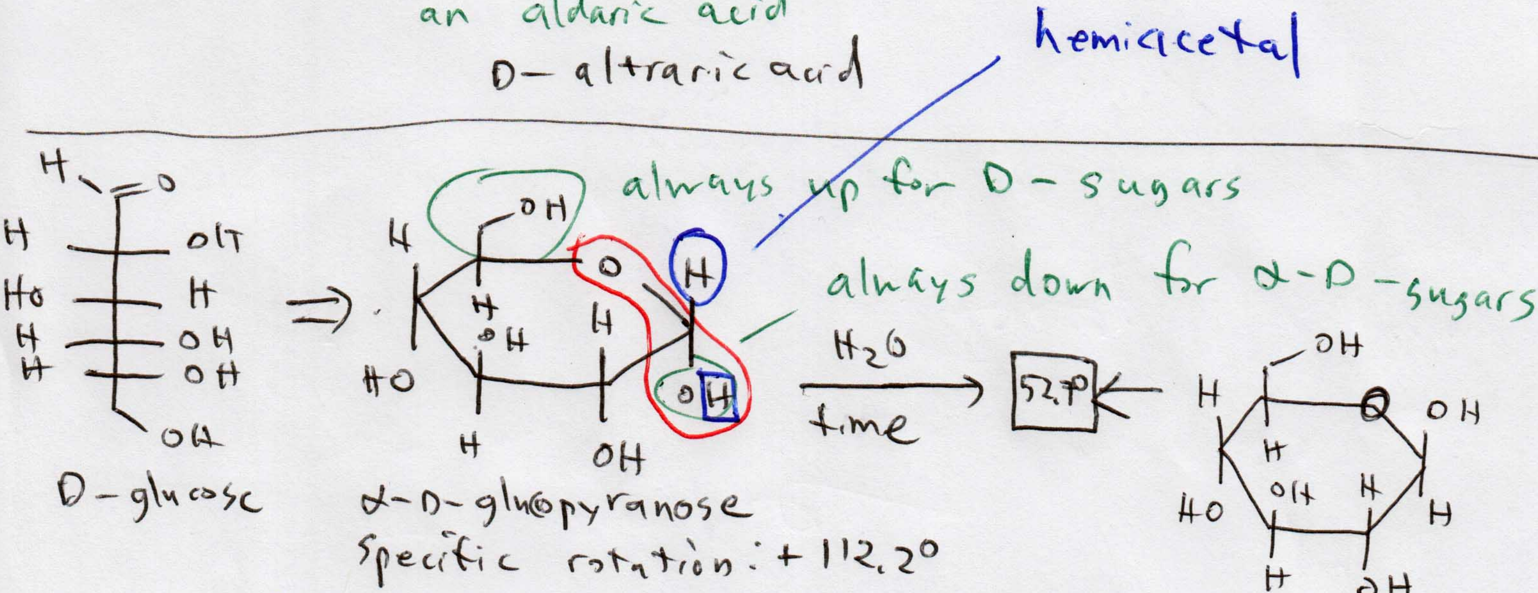
D-talose

an aldonic acid
D-talonic acid



D-altrose

an aldaric acid
D-altraric acid



D-glucose

α-D-glucopyranose
Specific rotation: +112.2°

β-D-glucopyranose.
Specific rotation: ???
(+18.7°)

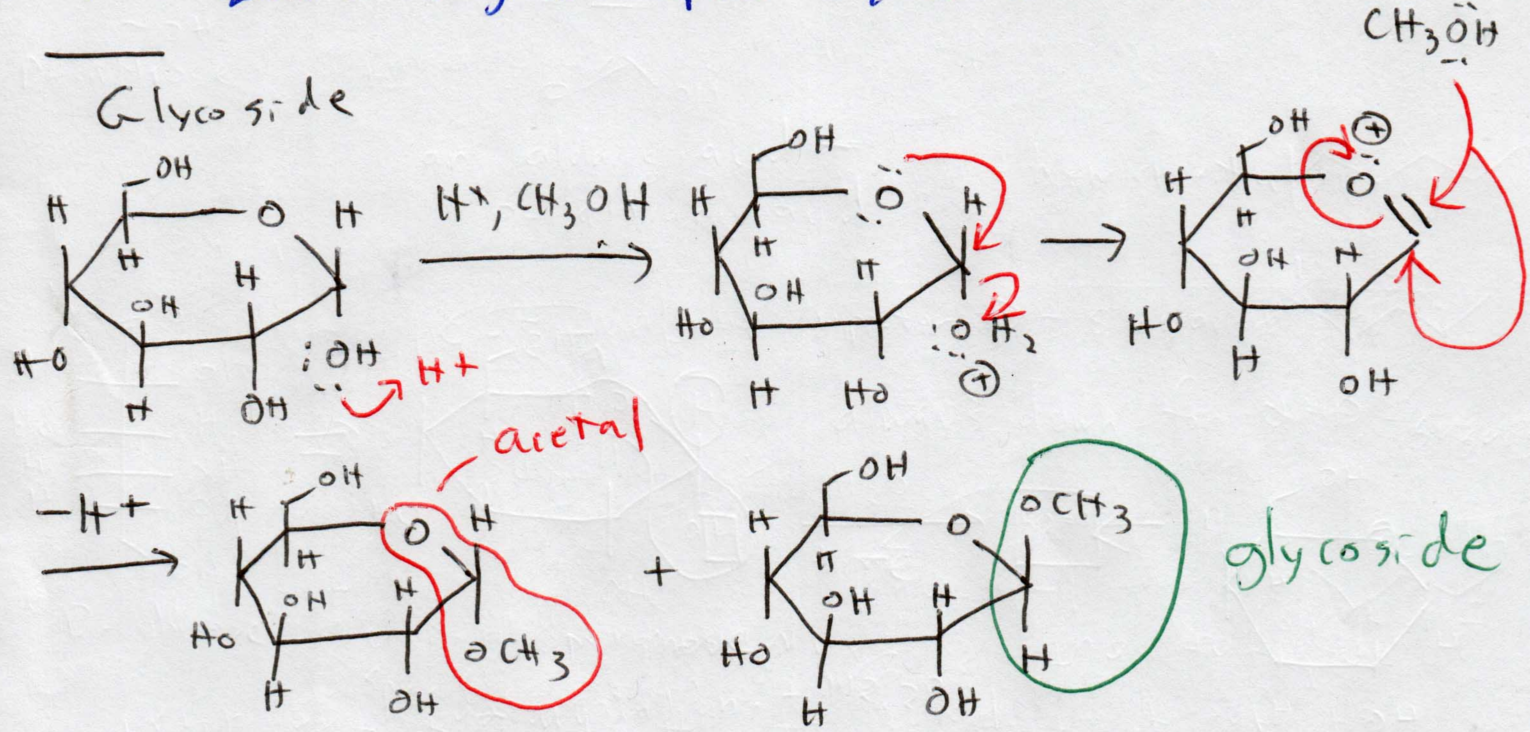
Knowing the optical rotation of the α anomer does not allow us to Predict the optical rotation of the β anomer since the two compounds are epimers — not enantiomers — so there is no connection between their optical rotations.

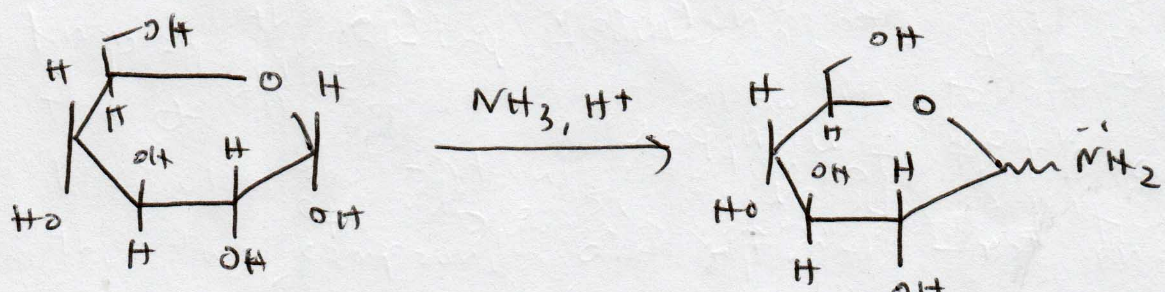
Mutarotation – Whenever a pure sample of one anomer of an ~~aldose~~ cyclic sugar is placed in solution, that anomer will interconvert with its opposite form until an equilibrium between the two forms is established, resulting in an equilibrium optical rotation.

$$\text{D-glucose} \xrightarrow{H^+, H_2O} \alpha\text{-D-glucofuranose} + \beta\text{-D-glucofuranose}$$
$$\alpha\text{-D-glucopyranose} + \beta\text{-D-glucopyranose.}$$

The exact proportions of the cyclic forms of a sugar that will be present in solution will depend on the unique intramolecular interactions that occur for that particular sugar upon cyclization.

Glycoside





α-D-glucopyranose

an N-glycoside

glucosamine

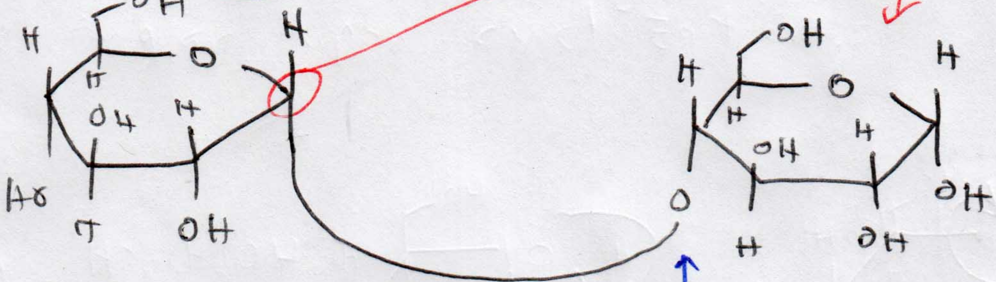
Complex sugars

Monosaccharide - "one sugar unit"
- no glycosidic linkages (only one "C=O")

Disaccharide - a complex sugar formed by joining two monosaccharides through a glycosidic link
ex: maltose, lactose, sucrose, cellubiose

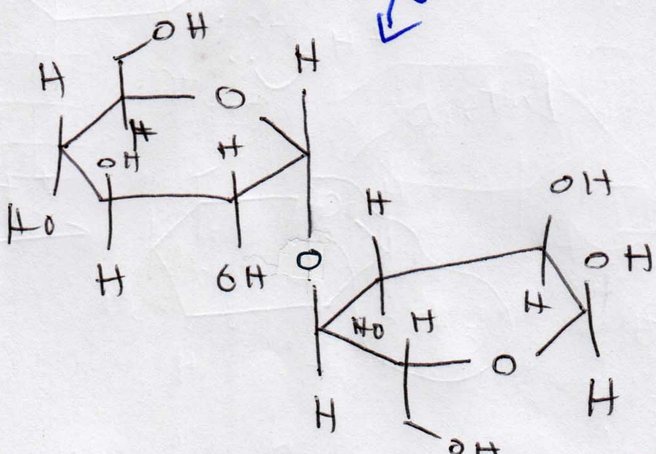
Oligo - "few" Poly - "many"

α- Maltose: 4-O-(α-D-glucopyranosyl)-α-D-glucopyranose

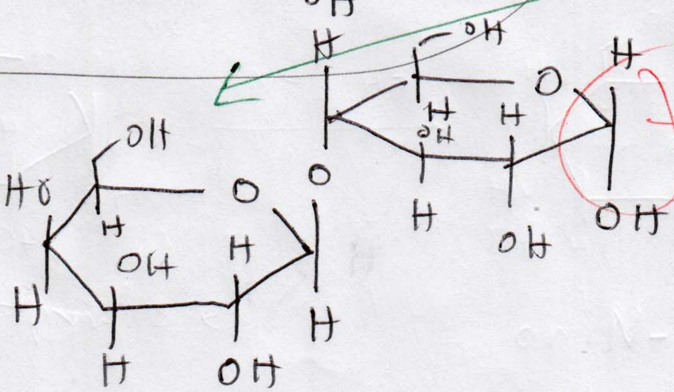


4-O-position

β



lactose:
4-O-(β-D-galactopyranosyl)-D-glucopyranose



α-lactose