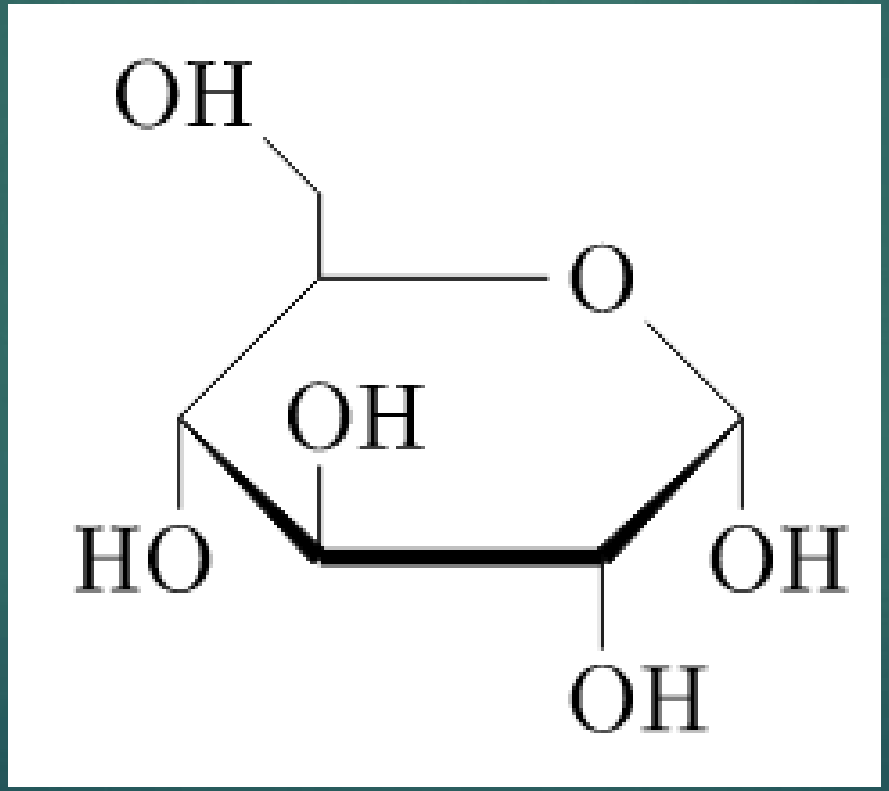
Carbohydrates



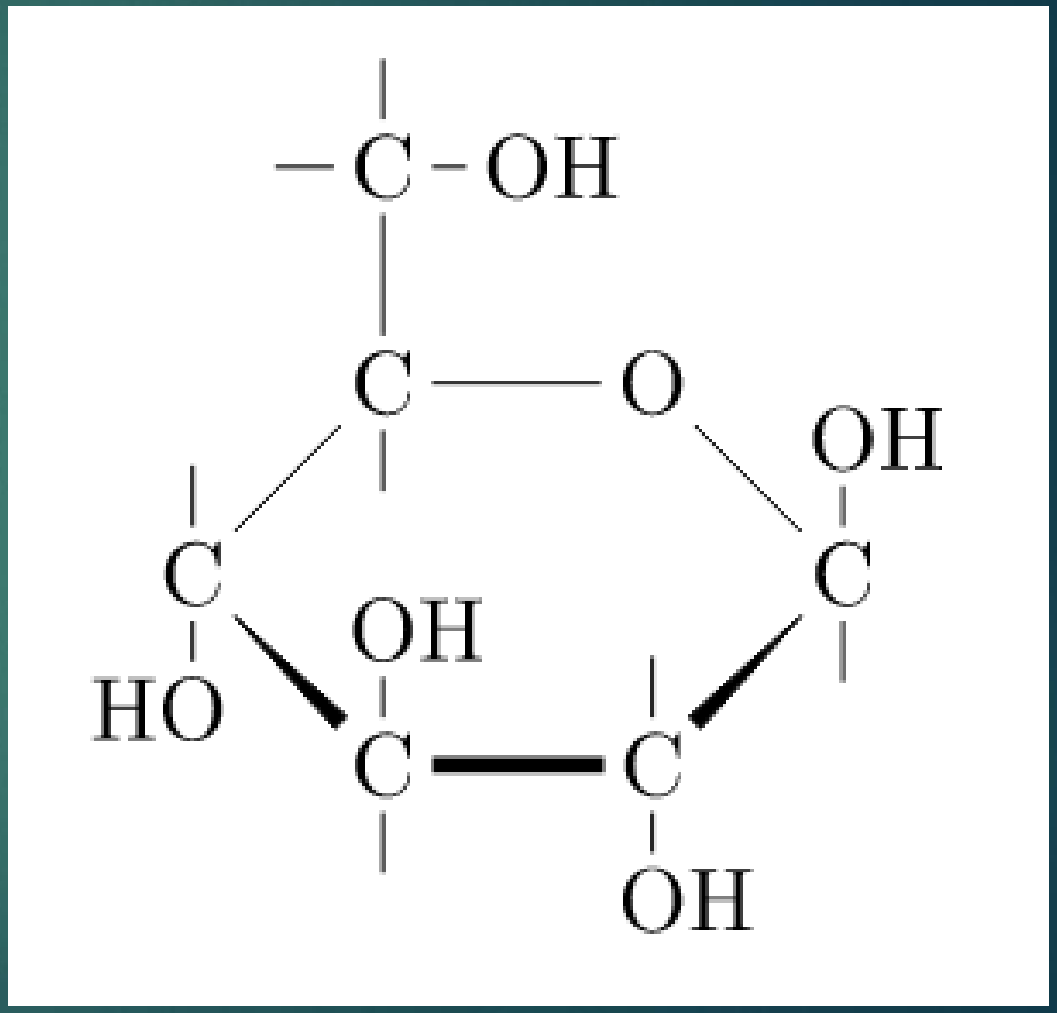
Carb Functions in Cells

- Burn for short term energy (4 Cal/g)
  - Brain burns glucose
- Can be converted to fat

(Not required for building cells)

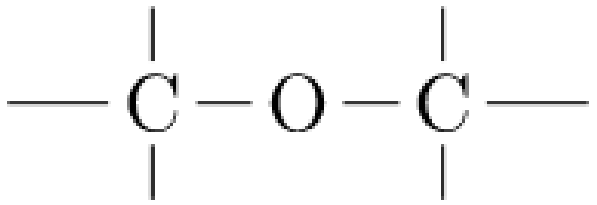
Glucose

- Ring
- Ether group
- Alcohol groups

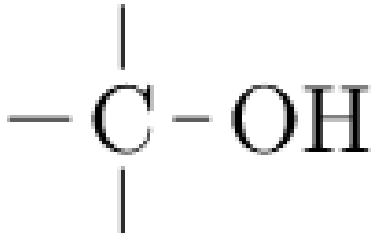


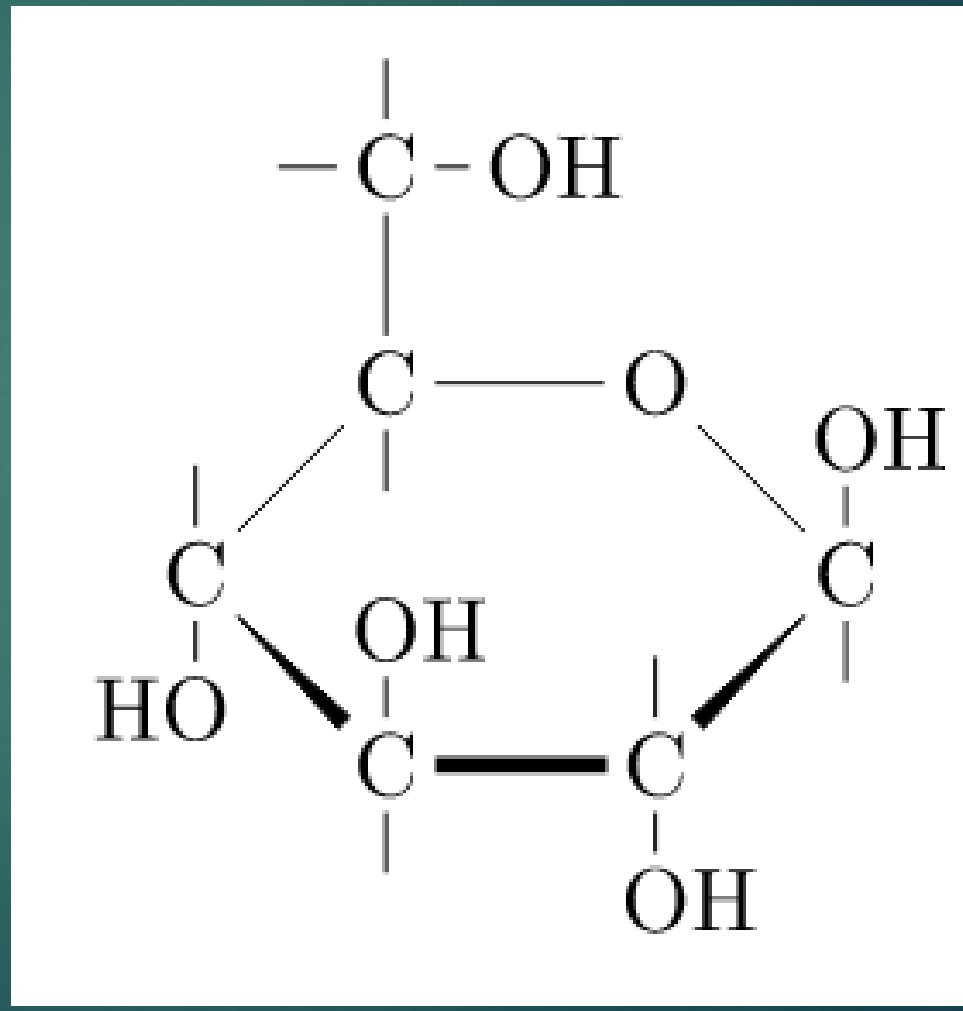
Carbohydrate Functional Groups

Ether

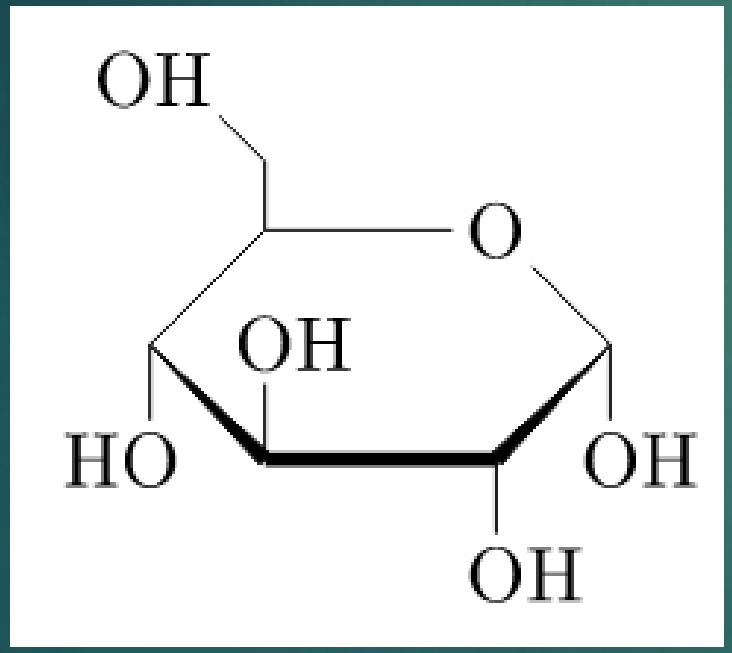


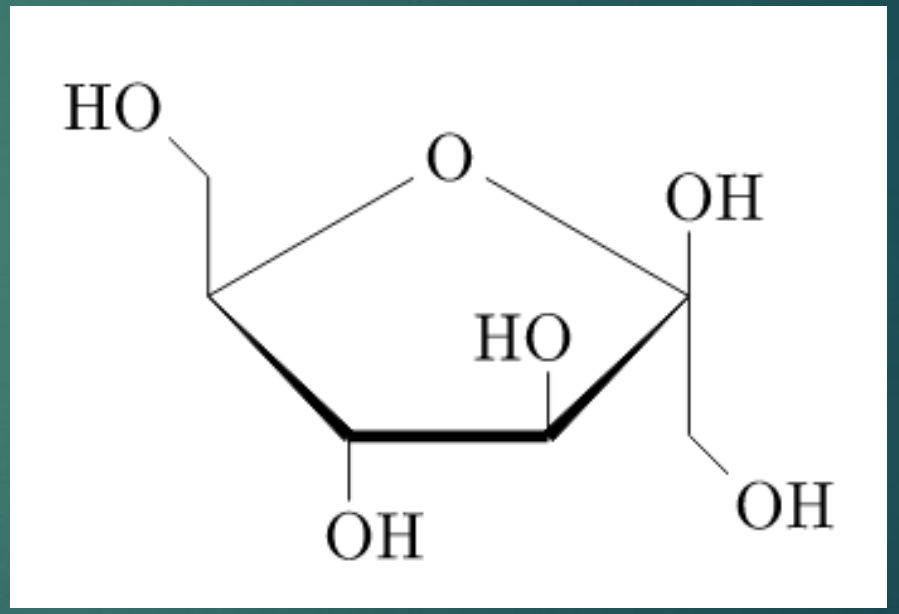
Alcohol





Glucose vs Fructose





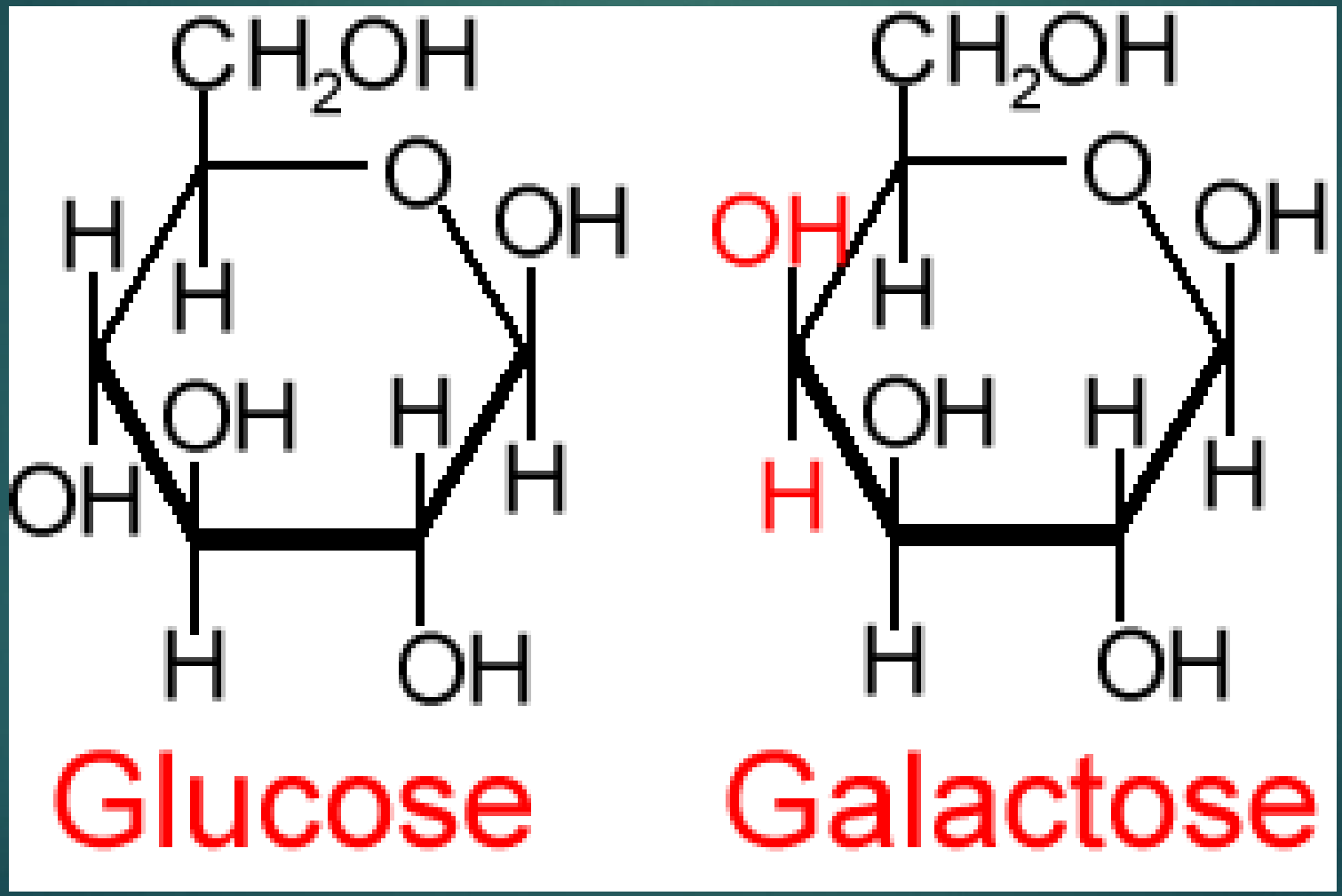
Sugar Isomers

- Same formula
- Different structure

Results:

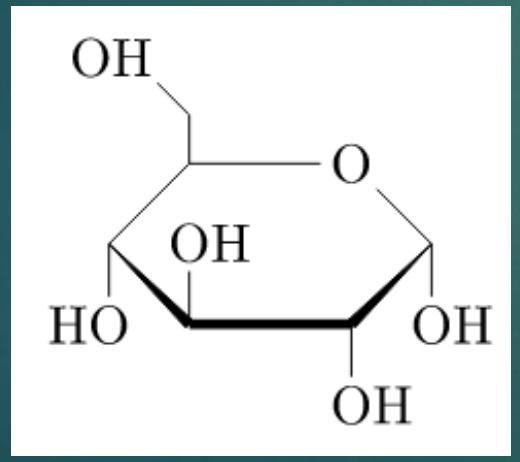
- Different taste
- Different Metabolism

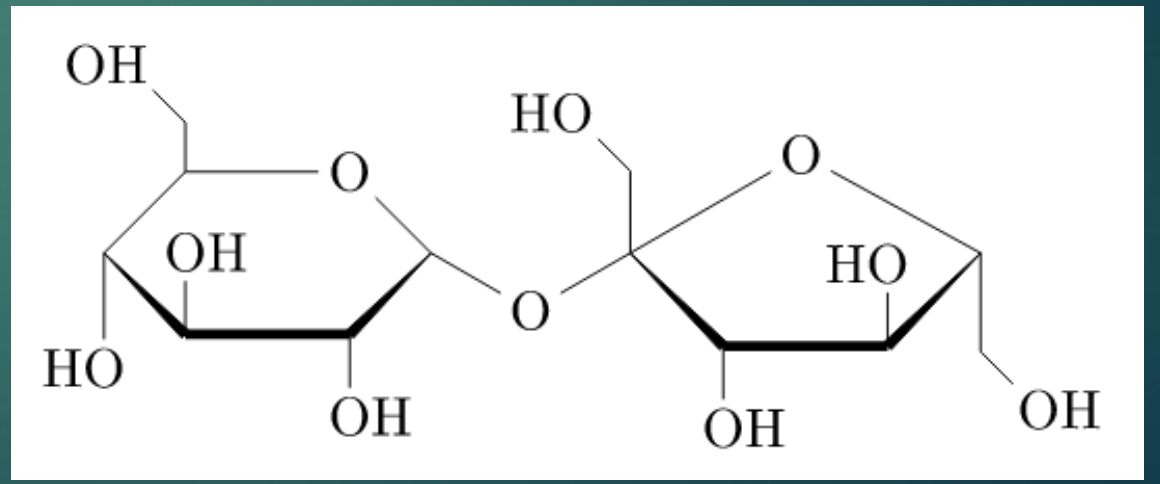
Sugar Isomers – notice -OH positions



Monosaccharides
Disaccharides

- Single Ring vs Double Ring
- $C_6H_{12}O_6$ $C_{12}H_{22}O_{11}$



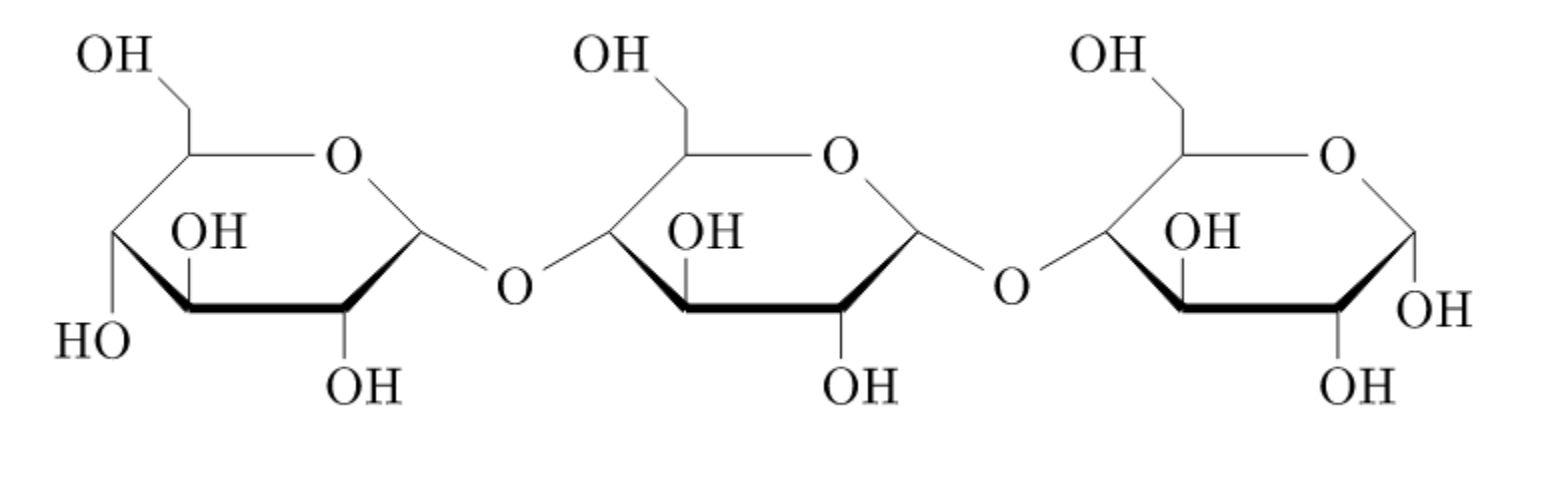


Monosaccharides
Disaccharides

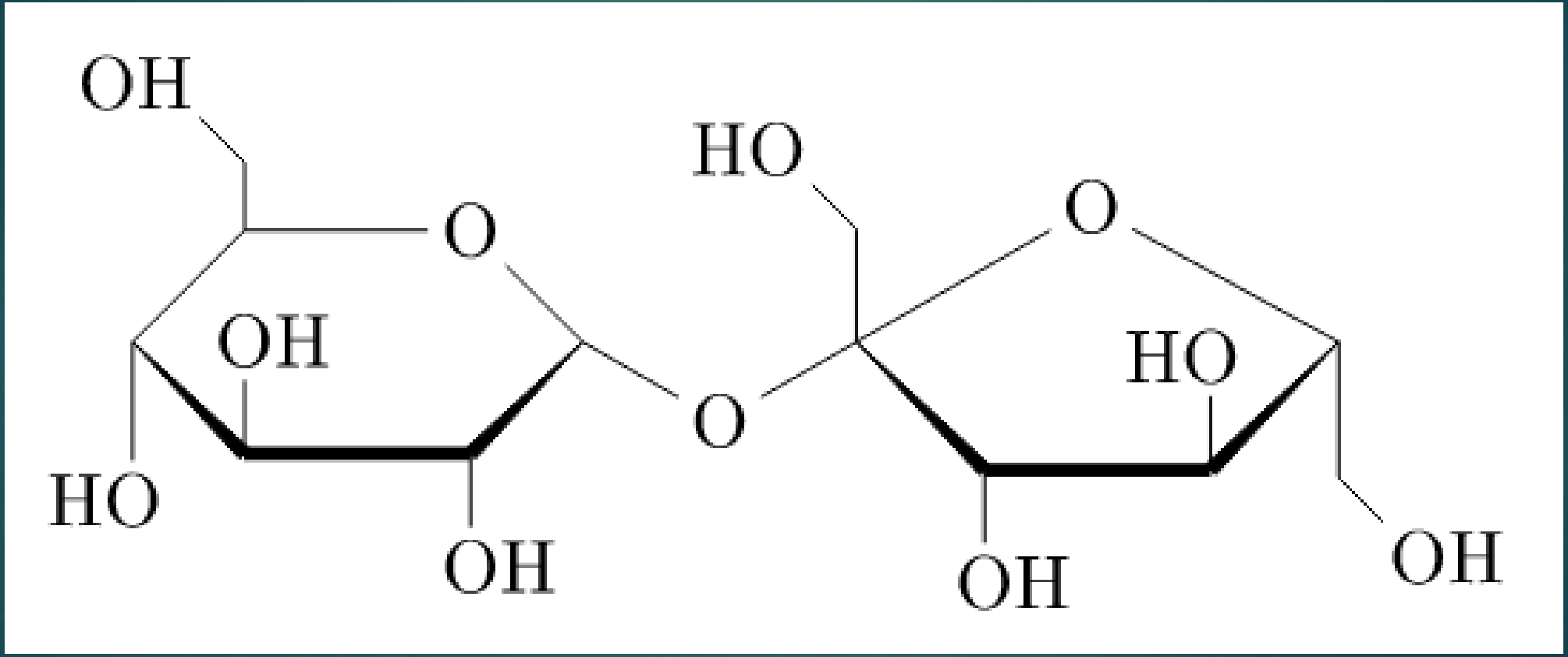
- Simple sugars
  - Includes glucose and fructose

Polysaccharides

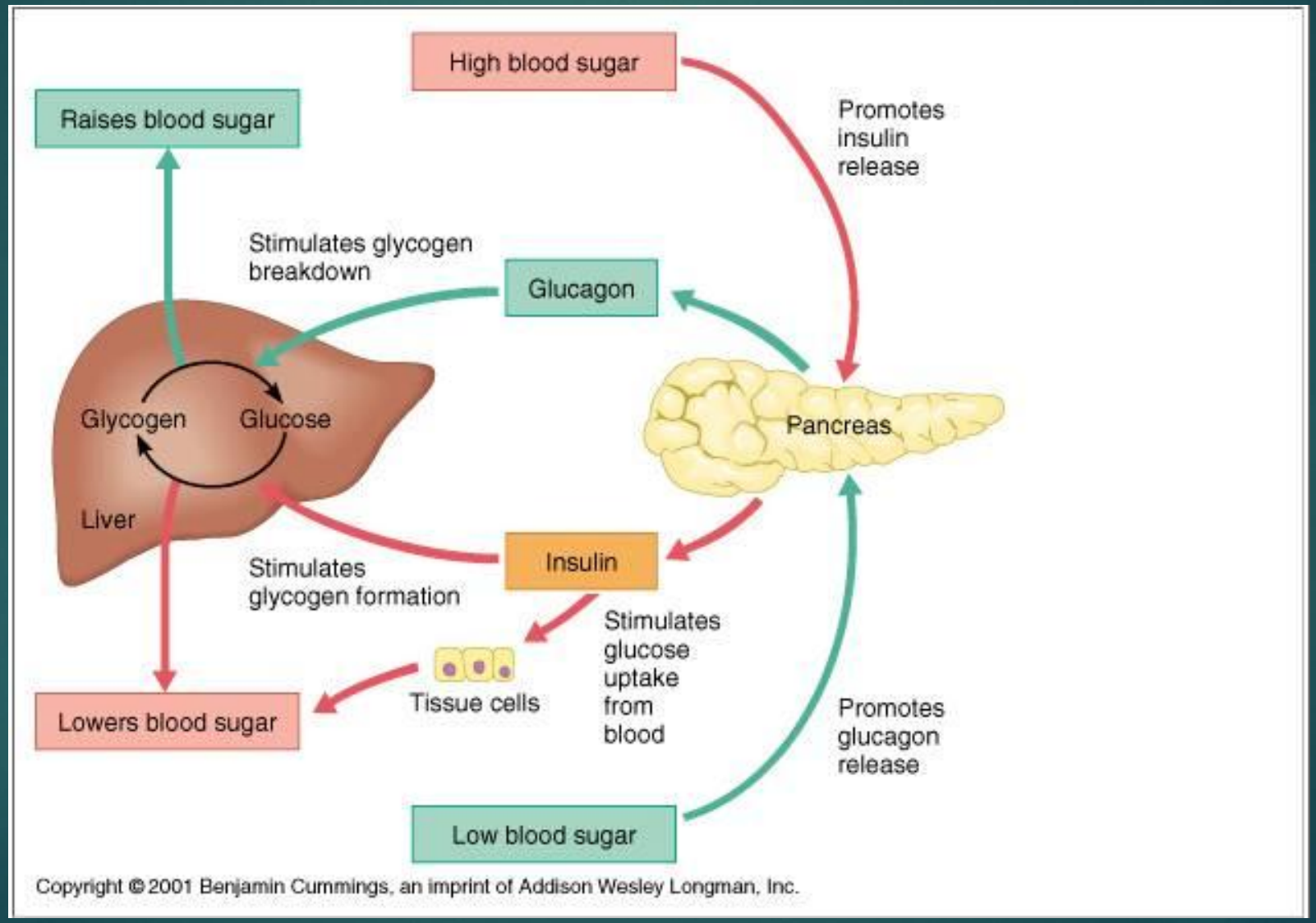
- Long chains of many sugar rings
- Starch / complex carboyhydrates



Glucose + Fructose = Sucrose



Glucose Metabolism / Regulation



Fructose / Sucrose health effects

- Does not trigger insulin
- Metabolized in liver
- Liver sugar overload → Fatty liver → very bad
  - Insulin Resistance (pre-diabetes)
  - Leptin Resistance (body can't feel full)
  - Liver Inflammation
  - Bad cholesterol

Sucrose vs High Fructose Corn Syrup

- Chemically the same:
- ~Half glucose
- ~Half sucrose

Added Sugar

Loads of sugar in:

- processed foods
- soda
- fruit juice

Fructose in Fruit

- Fruit has intact fiber
- Causes slower sugar digestion

This is why fruit is healthy in spite of its high fructose content.

Lactose in Milk

- Lactose is converted to glucose
- No fructose in white milk (healthy)
- Lots of fructose in flavored milk (unhealthy)