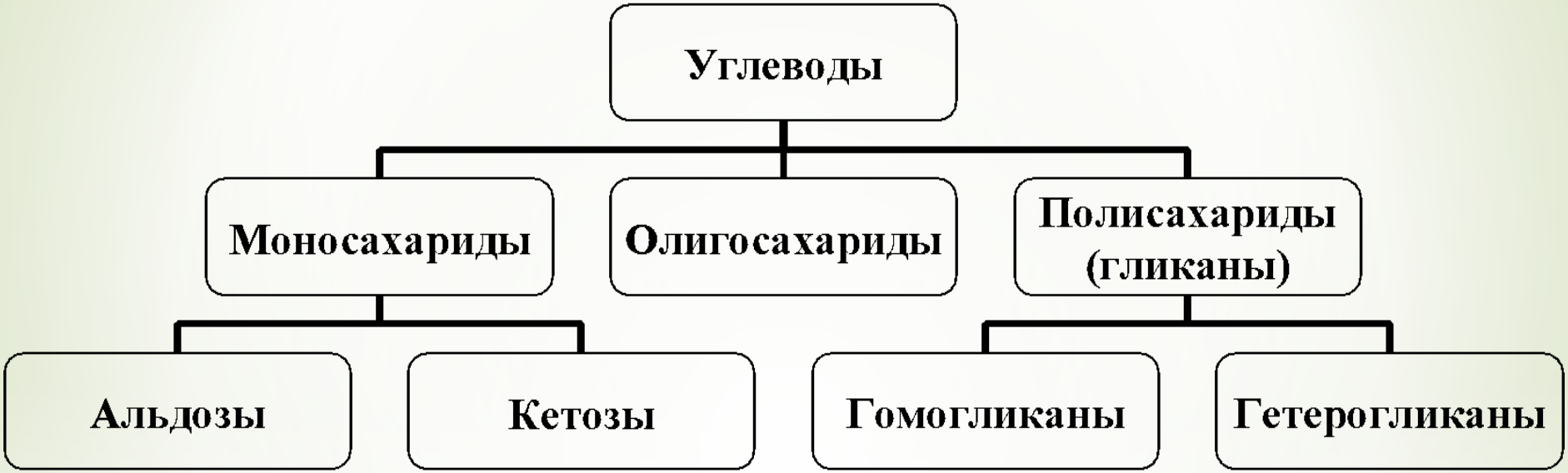
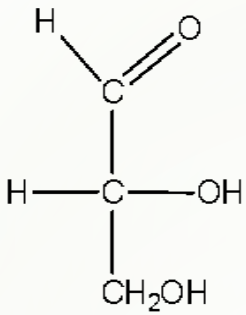
# УГЛЕВОДЫ: МОНОСАХАРИДЫ, ОЛИГО- И ПОЛИСАХАРИДЫ

# Классификация углеводов

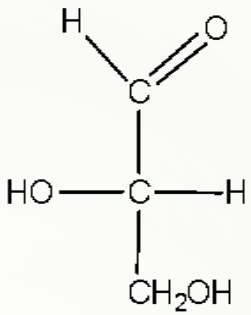


# Структура и изомерия сахаров

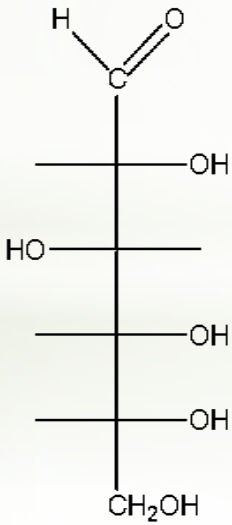
**Стереоизомерия**



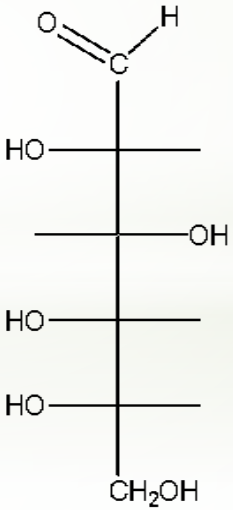

*D-глицериновый альдегид*




*L-глицериновый альдегид*

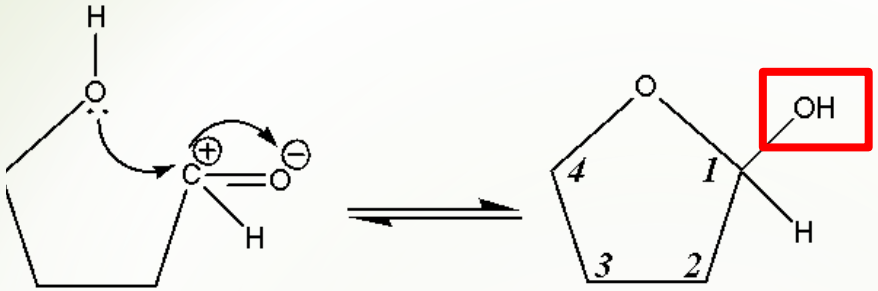



*D-глюкоза*

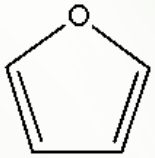



*L-глюкоза*

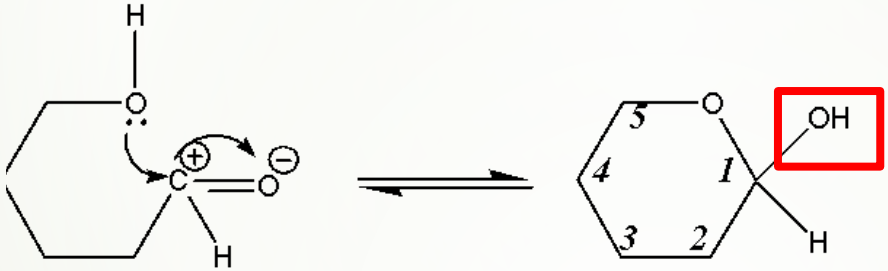
# Циклические формы сахаров



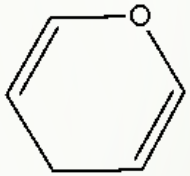

*фуранозная структура*



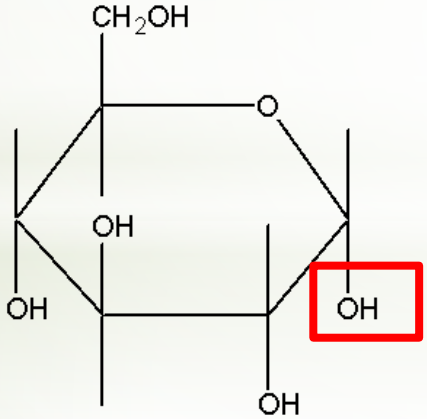

*фуран*



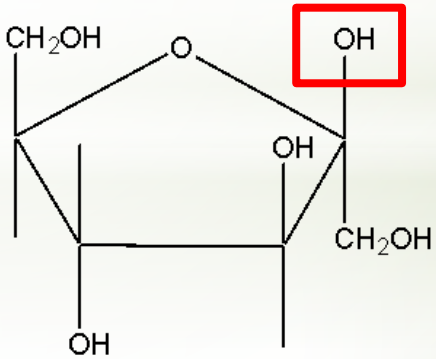

*пиранозная структура*




*пиран*




*α-D-глюкопираноза*




*β-D-фруктофураноза*

## Изомерные формы сахаров

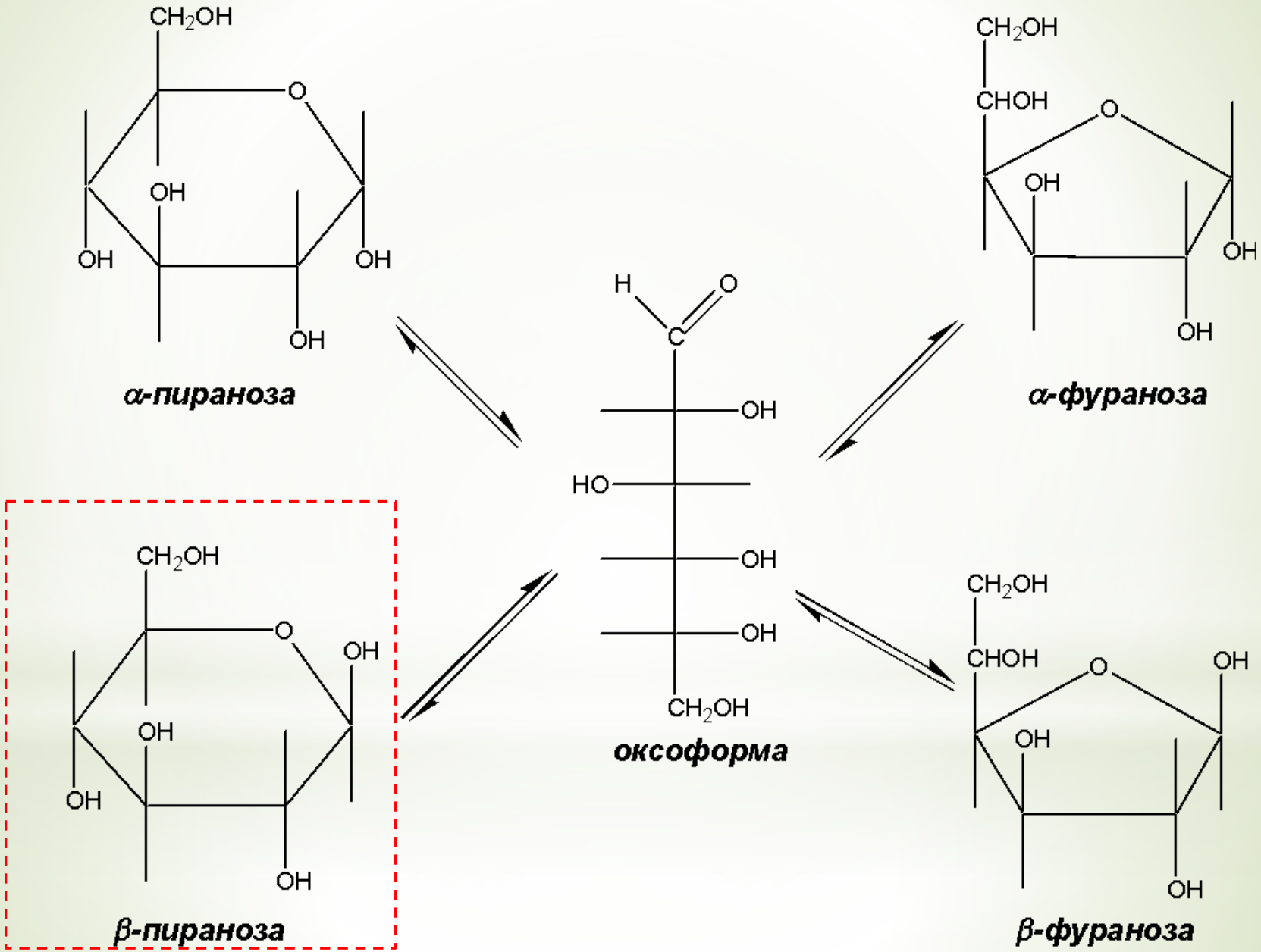
**Энантиомеры** – D и L ряды – D-глюкоза и L-глюкоза.

**Эпимеры** – отличаются по конфигурации одного хирального атома.

**Аномеры** – эпимеры по С1 углеродному атому (у альдоз) и по С2 (у кетоз) в циклической форме.

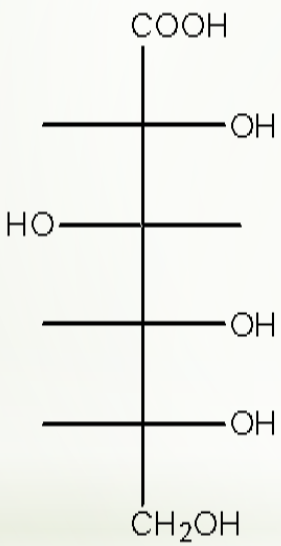
| | ***Энантио-меры*** | ***Эпимеры*** | ***Аномеры*** |
|---|---|---|---|
| D-глюкоза | L-глюкоза | D-манноза по С2<br><br>D-галактоза по С4 | |
| α-D-глюко-пираноза | | | β-D-глюко-пираноза |

# Таутомерные формы D-глюкозы

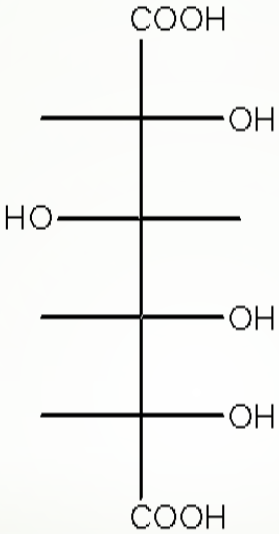


# Химические свойства моносахаридов

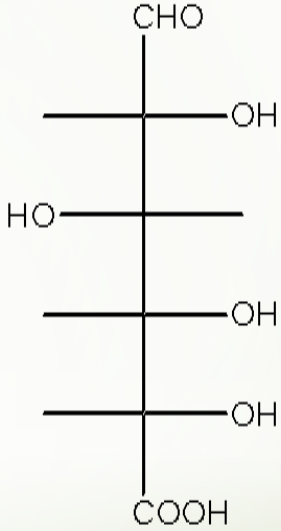
***Окисление моносахаридов с образованием кислот***




***D-глюконовая***

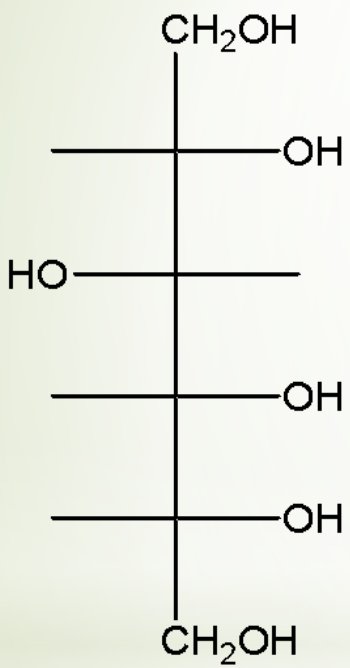



***D-глюкаровая (сахарная)***

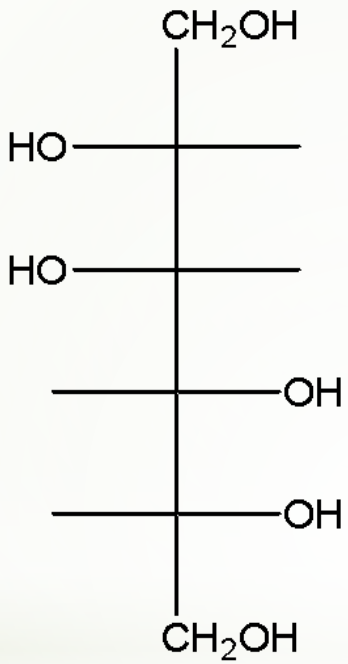



***D-глюкуроновая***

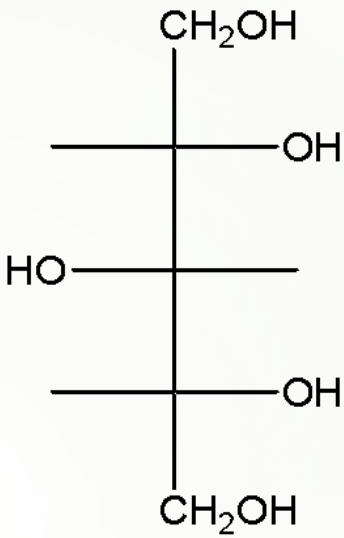
## *Восстановление моносахаридов до сахароспиртов*



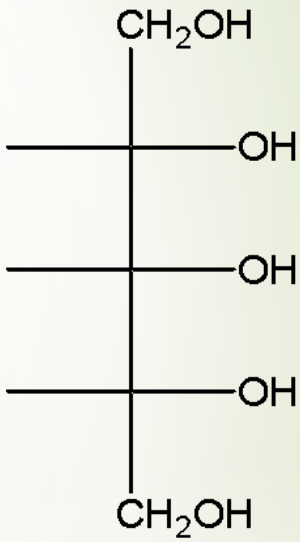

***D-сорбитол***




***D-маннитол***

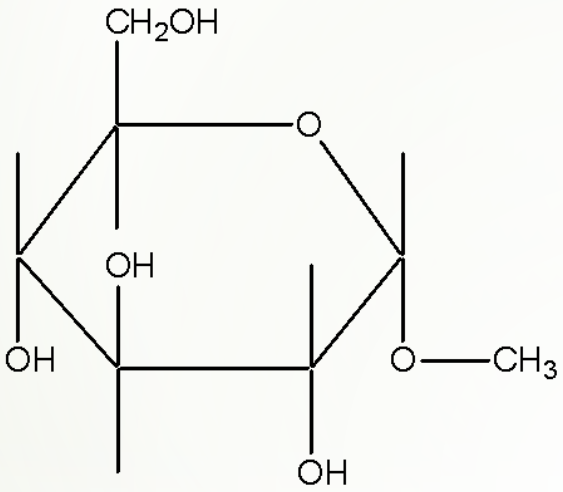



***D-ксилитол***

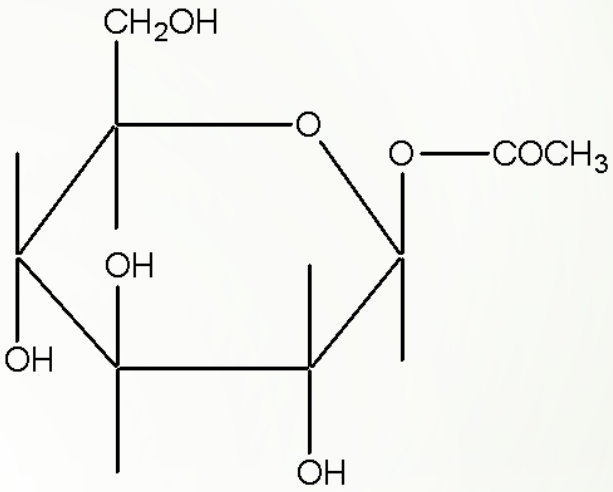



***D-рибитол***

# О-гликозиды

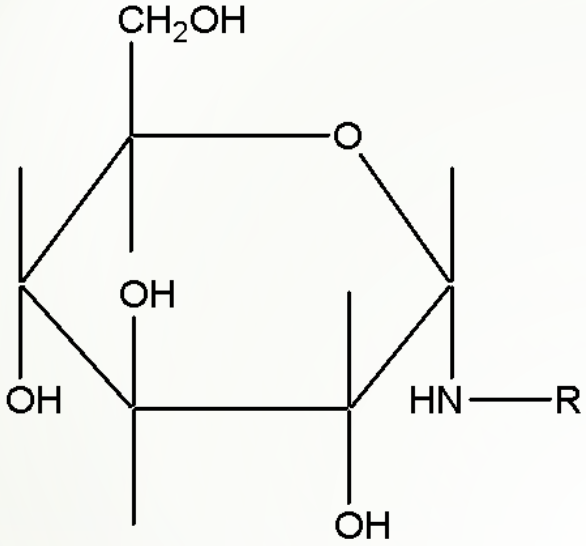



*α-метил-D-глюкопиранозид*

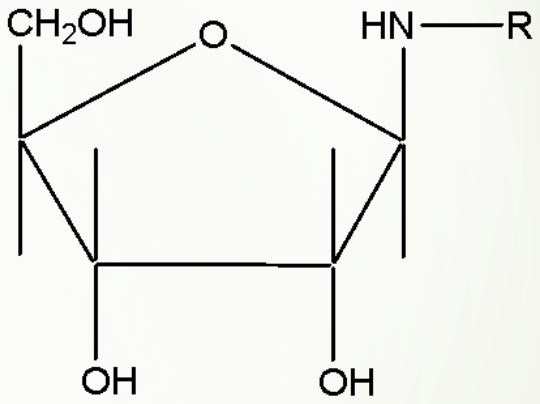



*β-ацетил-D-глюкопиранозид*

# N-гликозиды

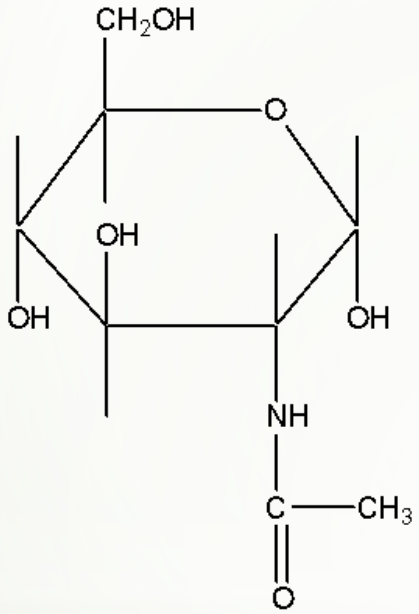



*α-N-глюкопиранозид*

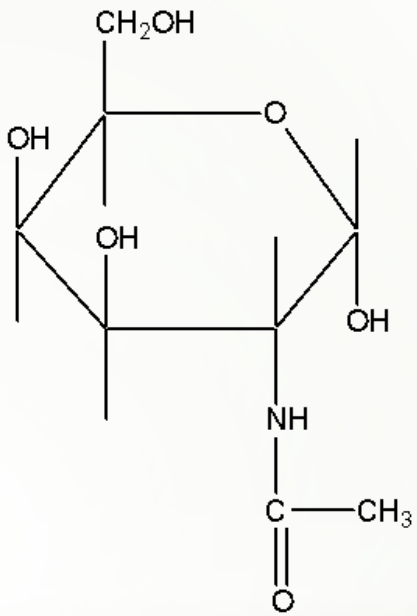



*β-N-рибофуранозид*

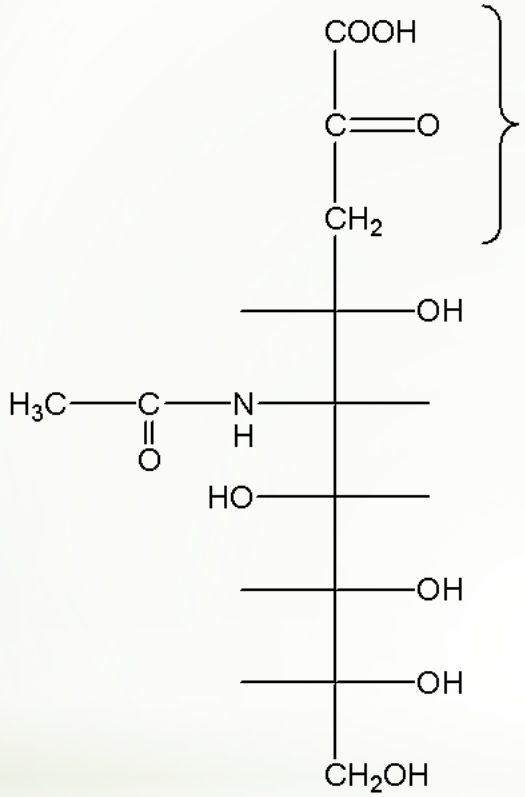
# Аминосахара




***N*-ацетил-α-*D*-глюкозамин**



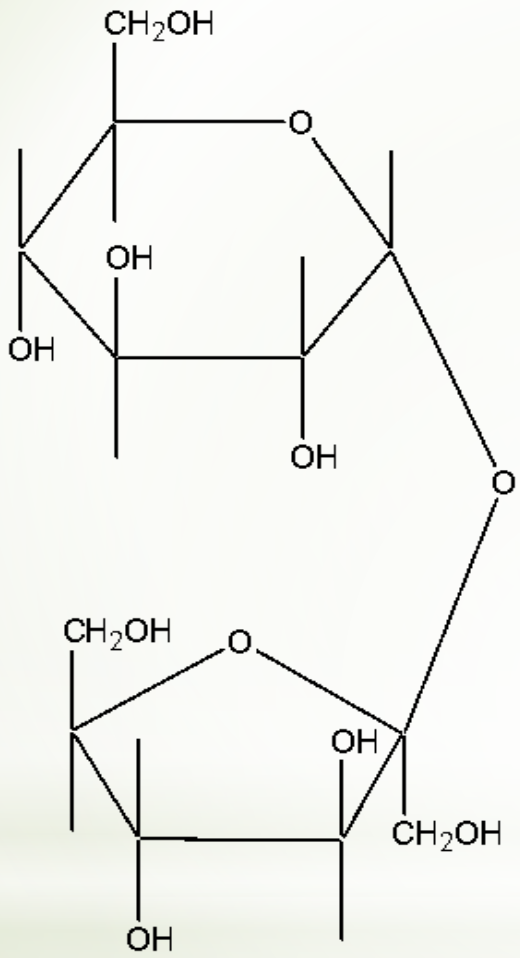

***N*-ацетил-α-*D*-галактозамин**

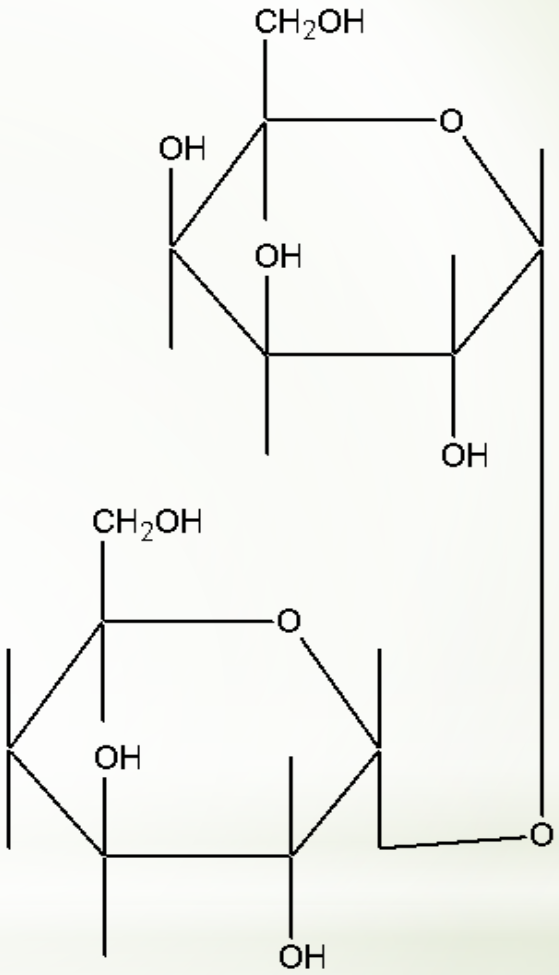



***пировиноградная кислота***

***N-ацетилнейраминовая кислота,***
***или сиаловая кислота***

# Невосстанавливающие дисахариды



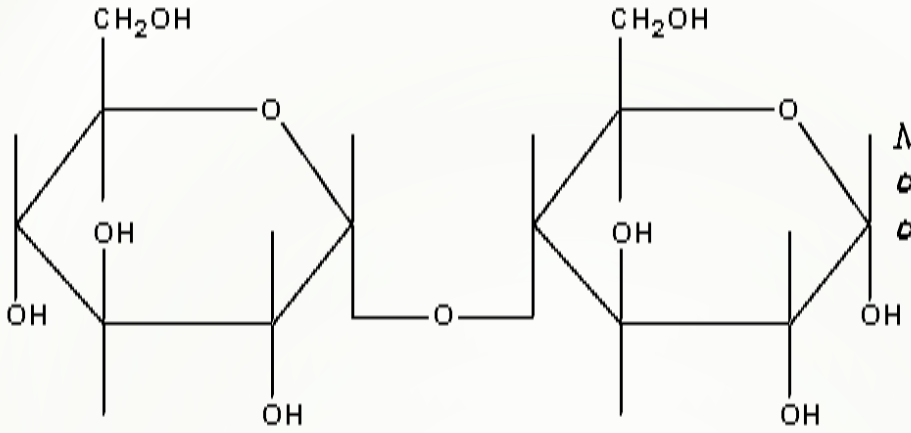

***САХАРОЗА***

***α-глюкопиранозил-(1→2)-β-фруктофуранозид***

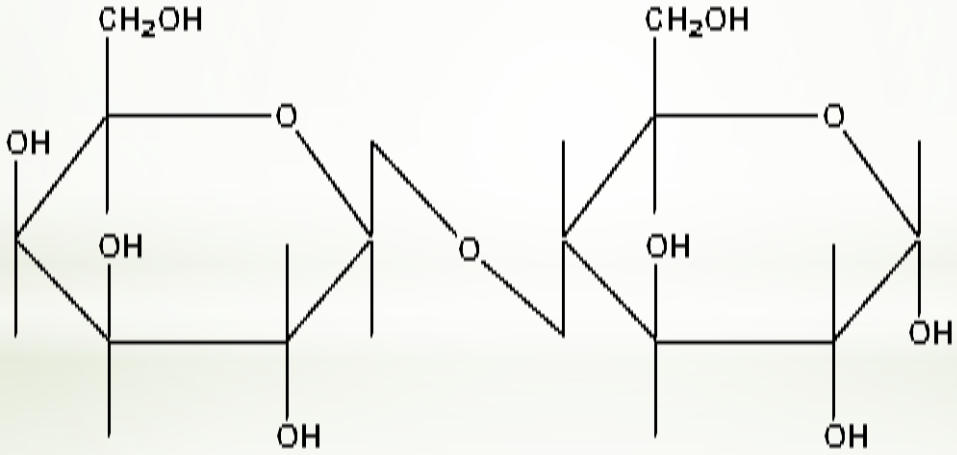
***ТРЕГАЛОЗА***

***α-глюкопиранозил-(1→1)-α-глюкопиранозид***

## Восстанавливающие дисахариды

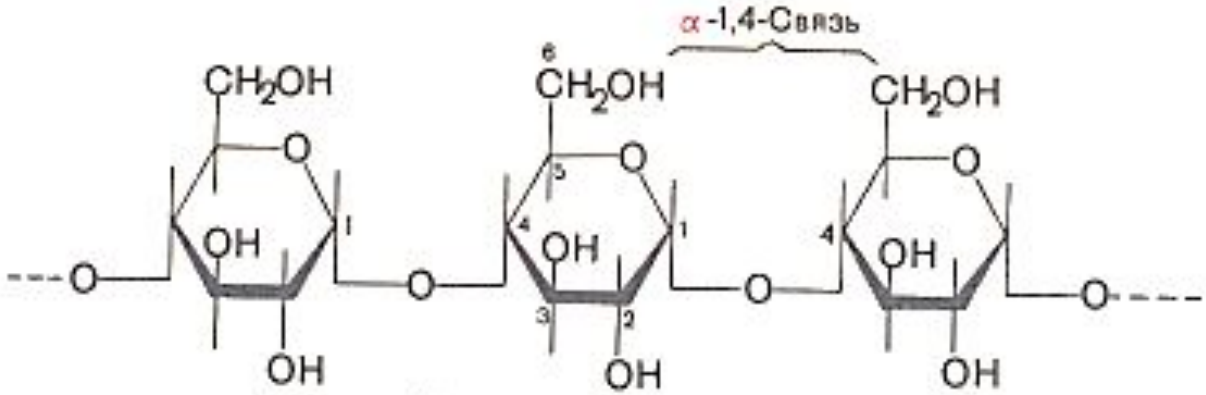



*МАЛЬТОЗА*
*α-глюкопиранозил-(1→4)-*
*α-глюкопиранозид*

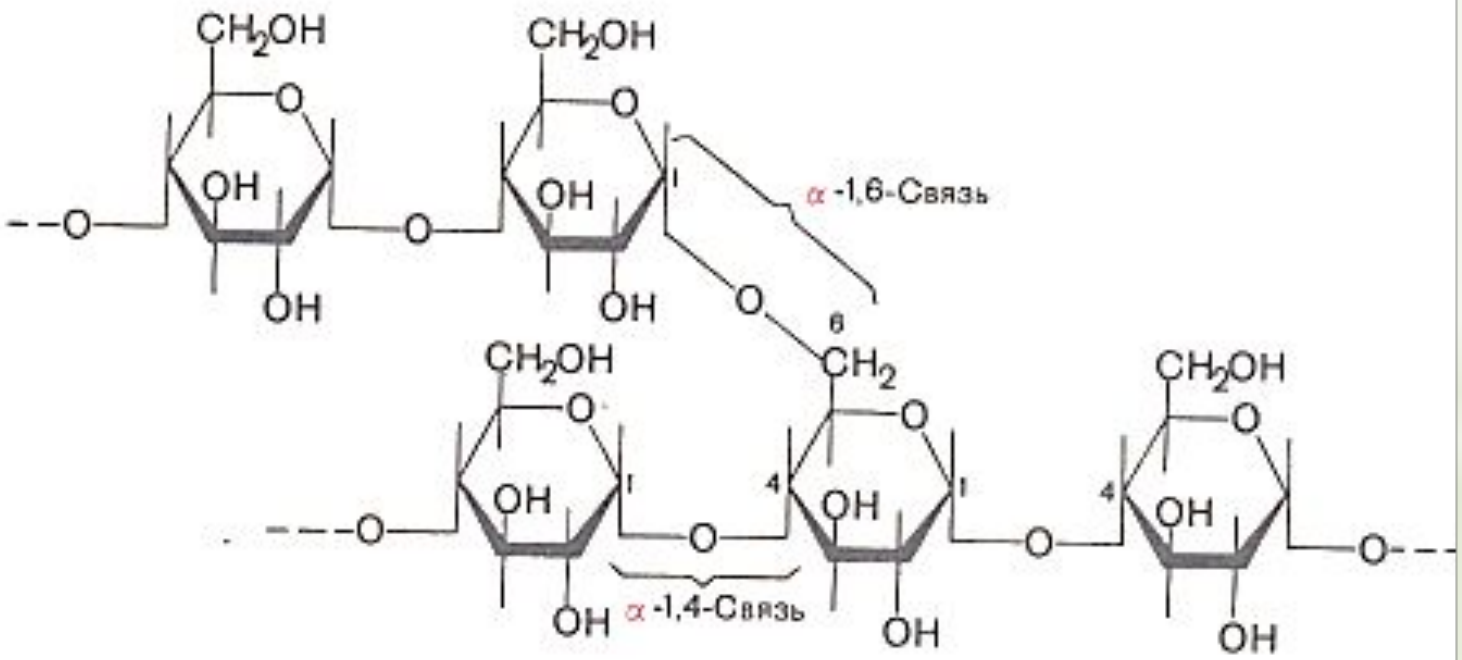



*ЛАКТОЗА*
*β-галактопиранозил-(1→*
*α-глюкопиранозид*

# Гомогликаны



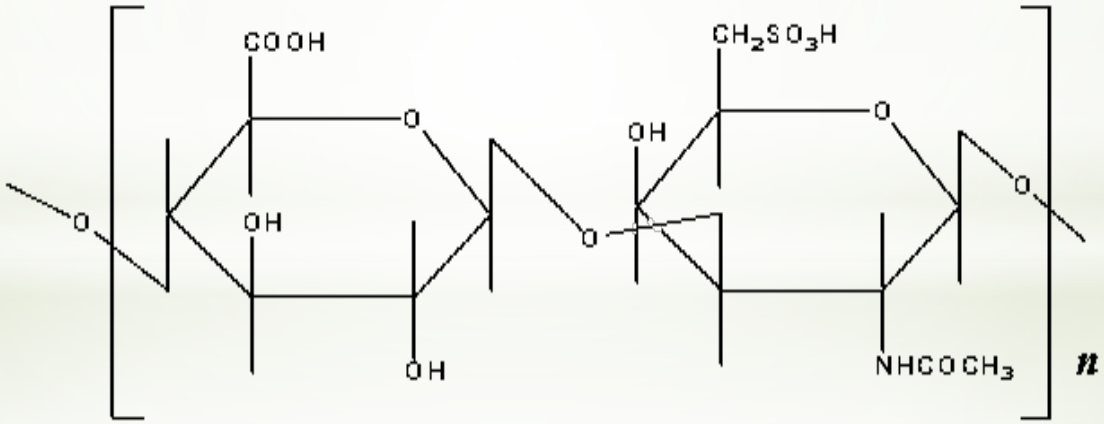

Участок молекулы амилозы




Участок молекулы амилопектина

# Гетерогликаны

*гиалуроновая кислота*




*хондроитин-6-сульфат (хондроитинсульфат С)*