

## 8. Sacharidy

### Monosacharidy

Definice monosacharidů – polyhydroxyaldehydy (ketony)

- funkční skupiny (alkoholické, karbonylové – na C1 nebo C2)
- počet uhlíků (nejvýznamnější 5 a 6)



### D - glyceraldehyddihydroxy

*Základní sloučeniny monosacharidové řady aldosa a ketosa*



### D - glyceraldehyddihydroxy

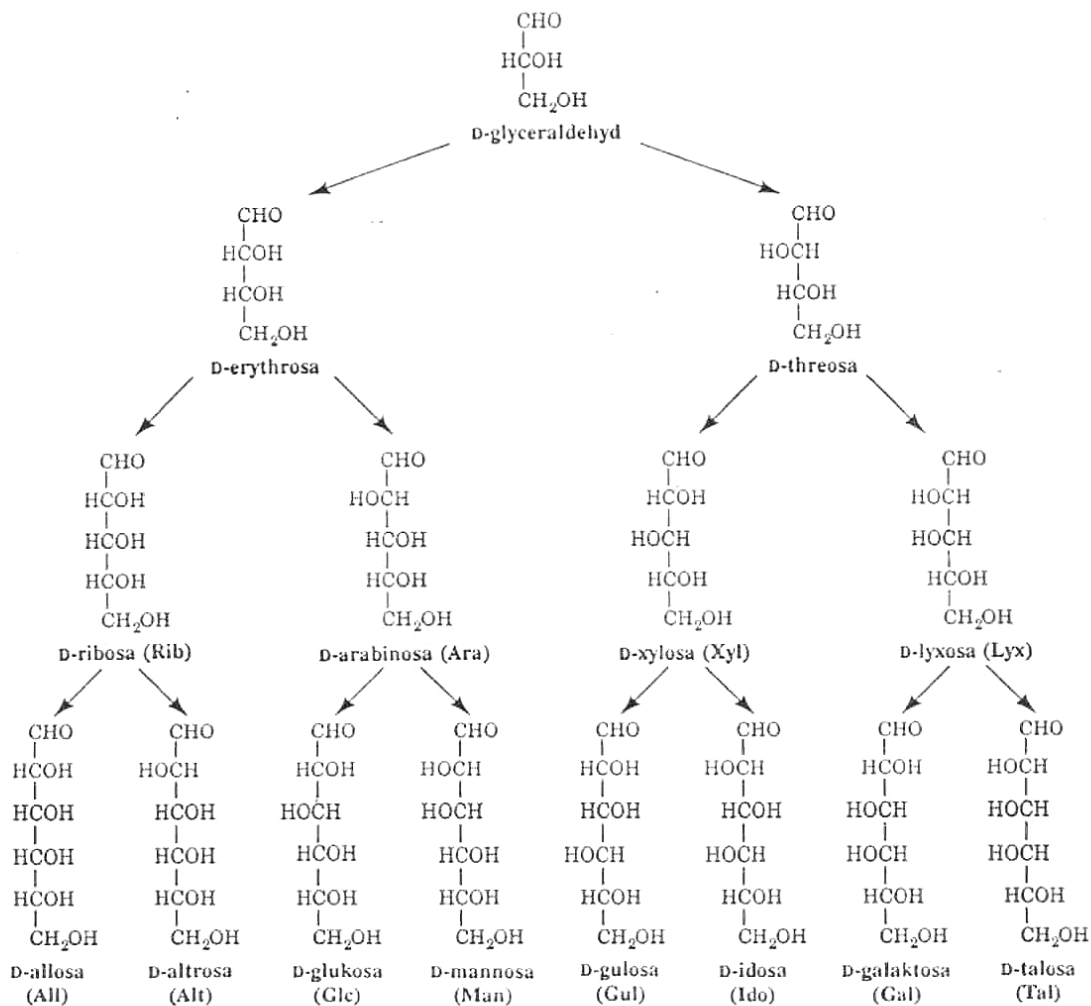
**počet stereoizomerů =  $2^x$  - počet**

**aldosy -  $x = n - 2$**

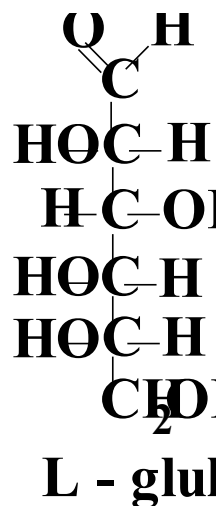
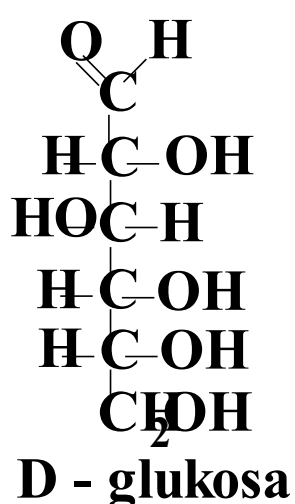
**$n =$  počet C atomů**

*Asymetrická centra aldosa a ketosa*

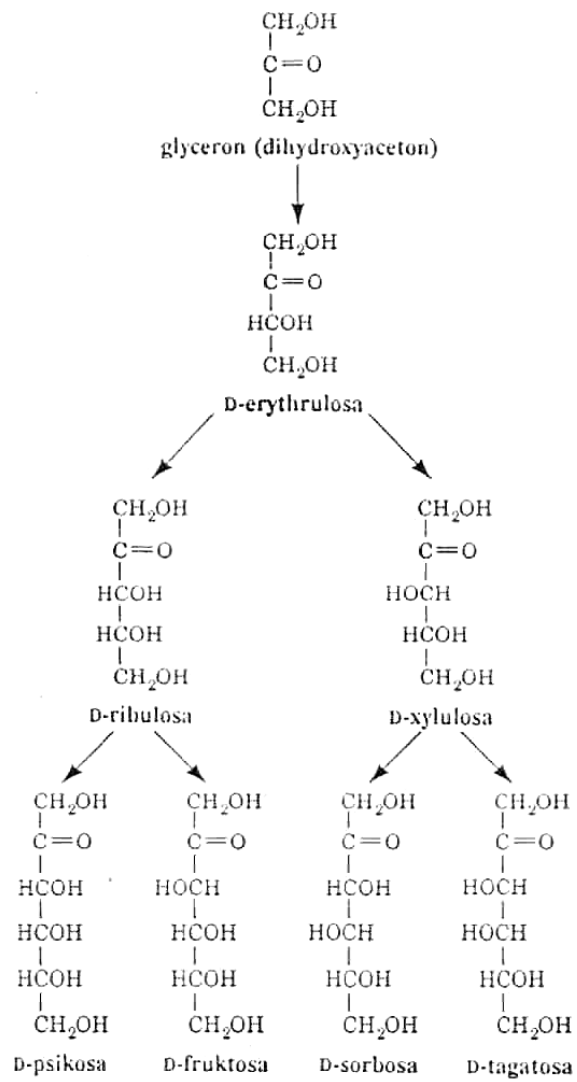
# ALDOSY



## Přehled D-aldos

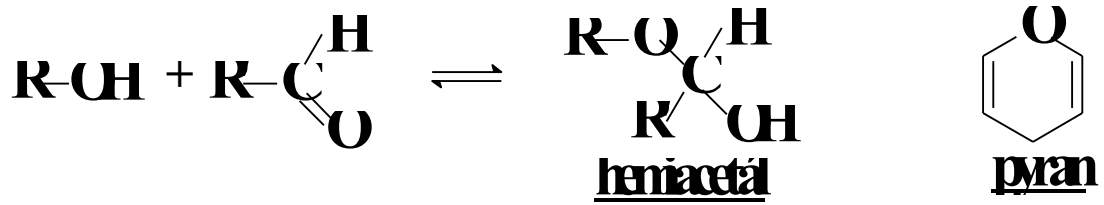


# KETOSY

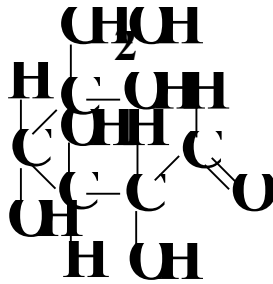
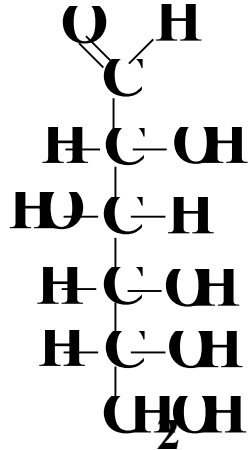


## **Biochemicky významné monosacharidy:**

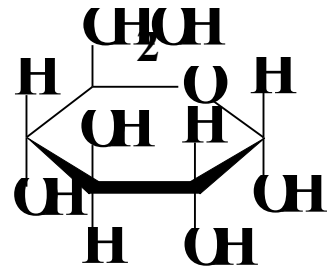
Triosy	- glyceraldehyd, dihydroxyaceton
Tetrosy	- threosa, erythrosa
Pentosy	- ribosa, deoxyribosa
Hexosy	- glukosa, manosa, galaktosa, fruktosa
Heptosa	- sedoheptulosa



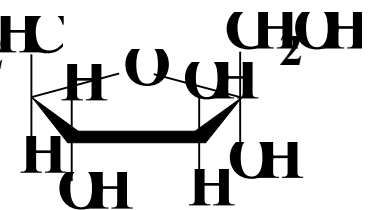
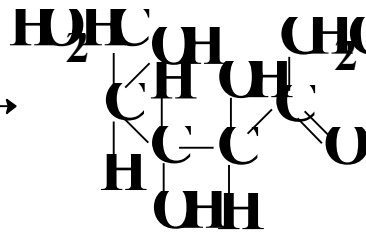
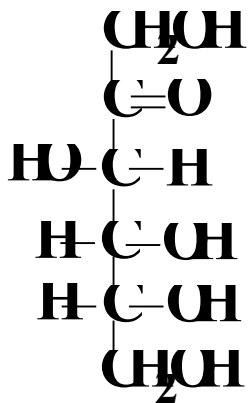
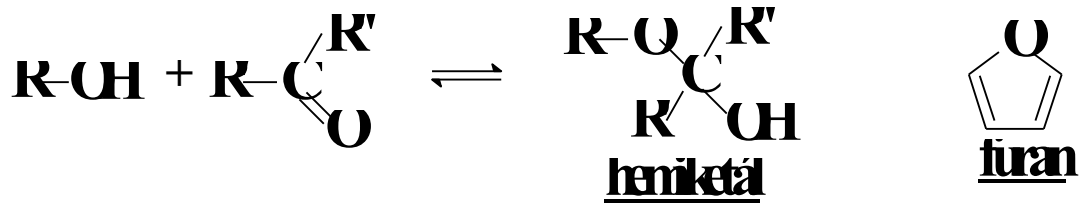
*Fischerov vzorec*



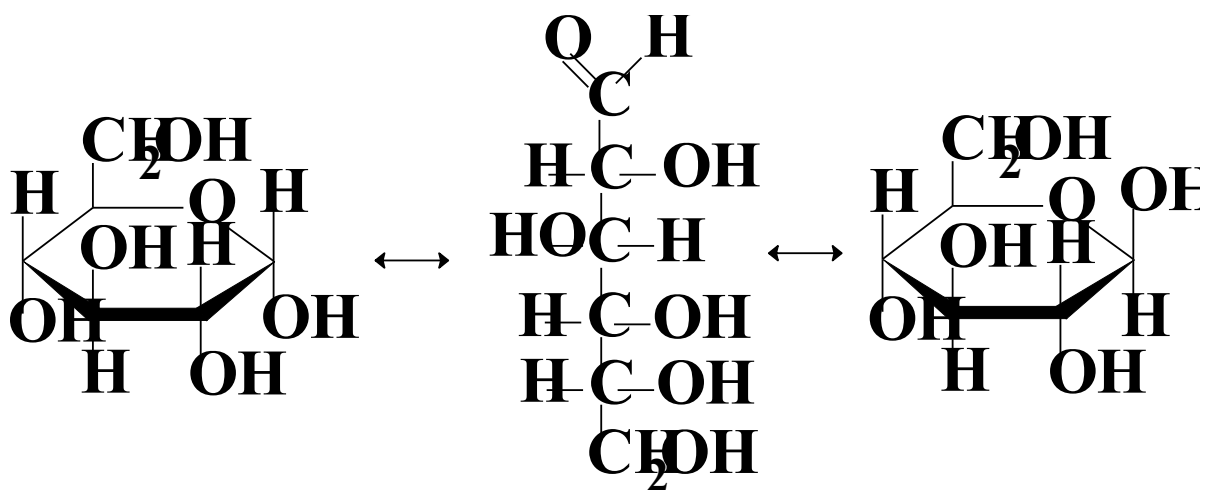
*Hawthov vzorec*



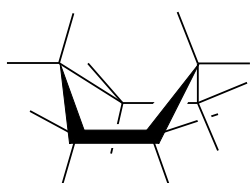
Dglukopyramsa



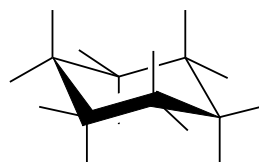
Dfrukturamsa



$\alpha$ -anom(63 %) → MUTAROTACE →  $\beta$ -anom(36 %)



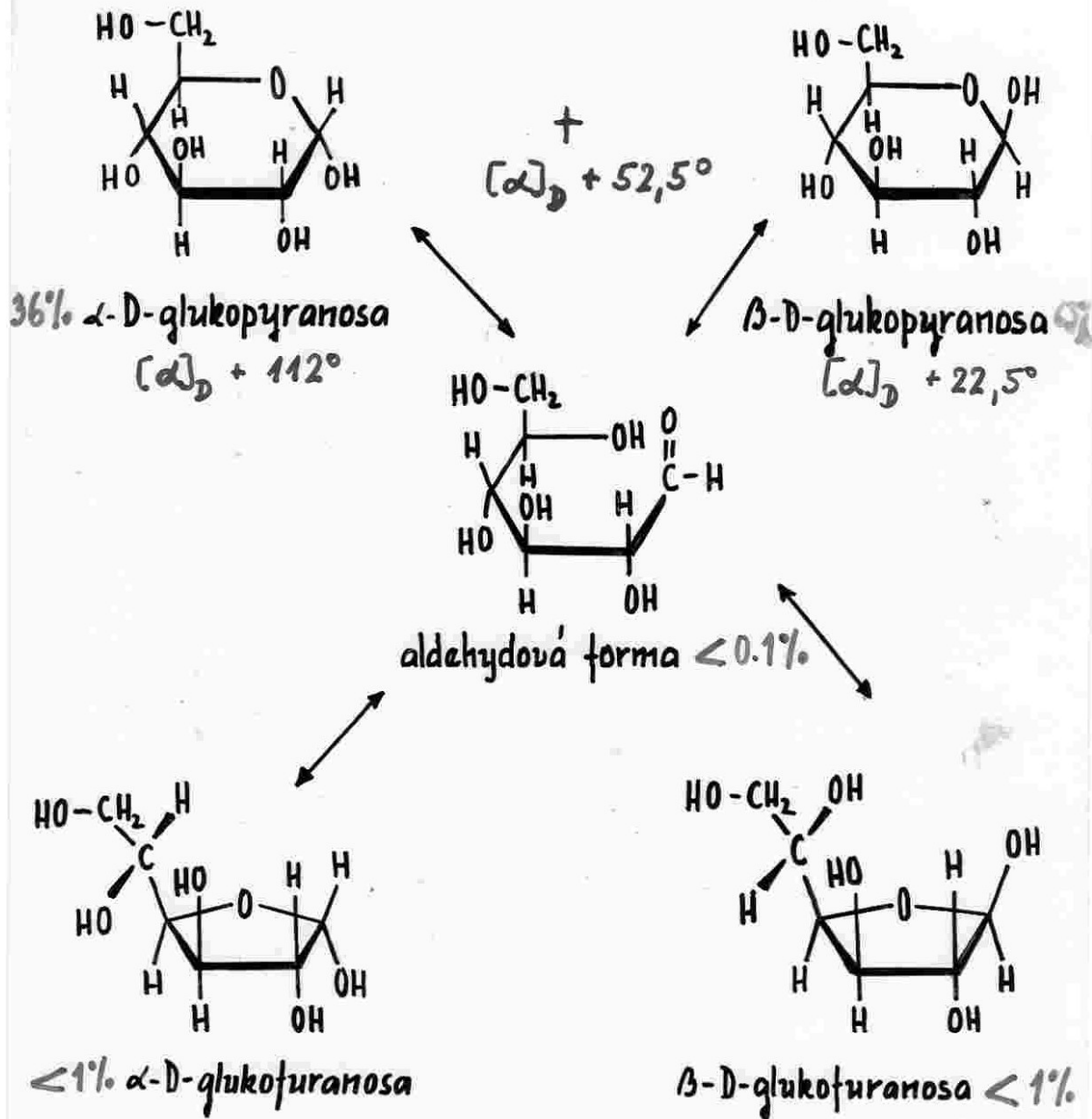
vačková



židličková

KONFORMACE

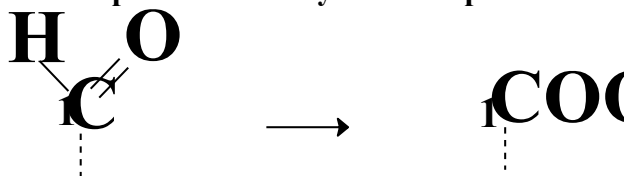
# Rovnovážné formy glukosy



## Deriváty monosacharidů

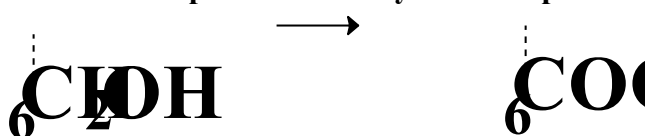
### Oxidace:

A. Mírná ⇒ aldehydická skupina → karboxylovou skupinu



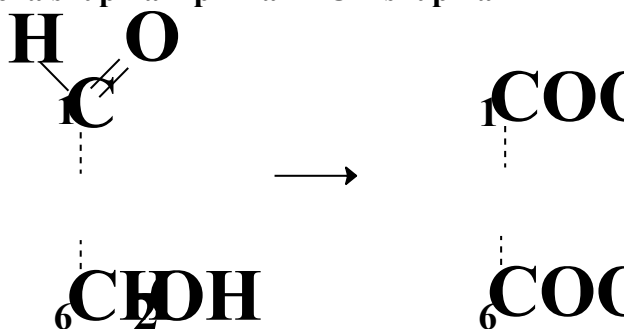
ALDONOVÉ KYSELINY - glukosa → k. glukonová

B. Specifická ⇒ primární OH skupina → karboxylovou skupinu



URONOVÉ KYSELINY - glukosa → k. glukuronová

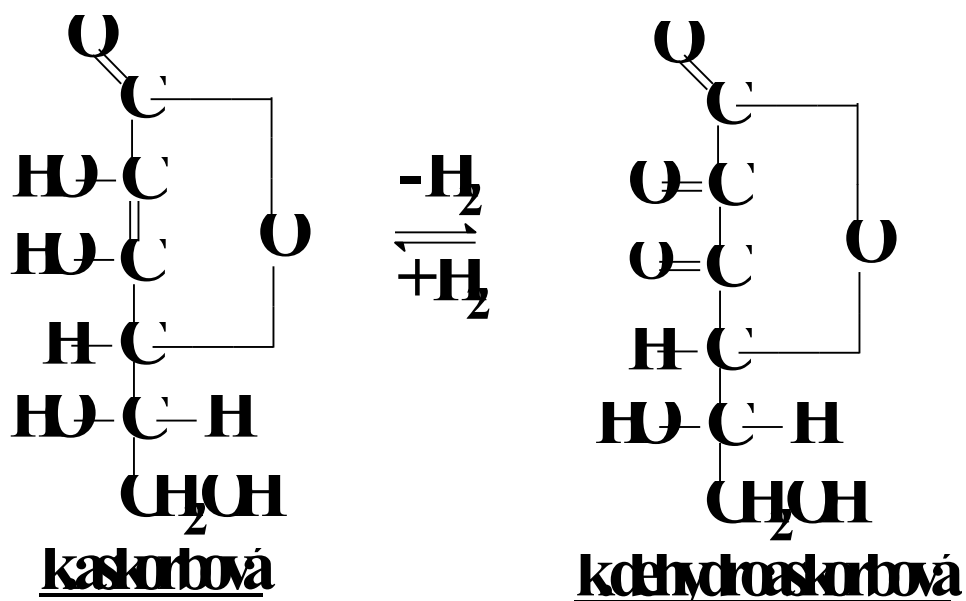
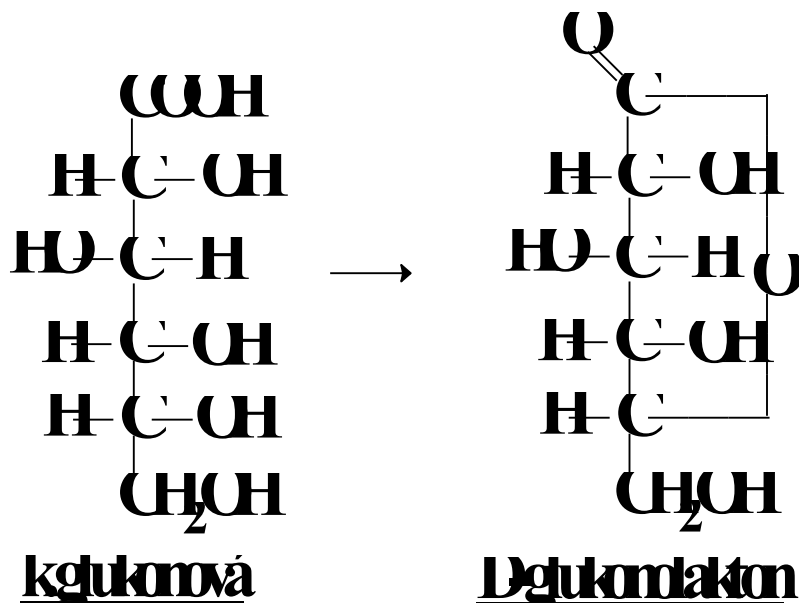
C. Silná ⇒ aldehydická skupina + primární OH skupina



ALDAROVÉ KYSELINY - glukosa → k. glukarová

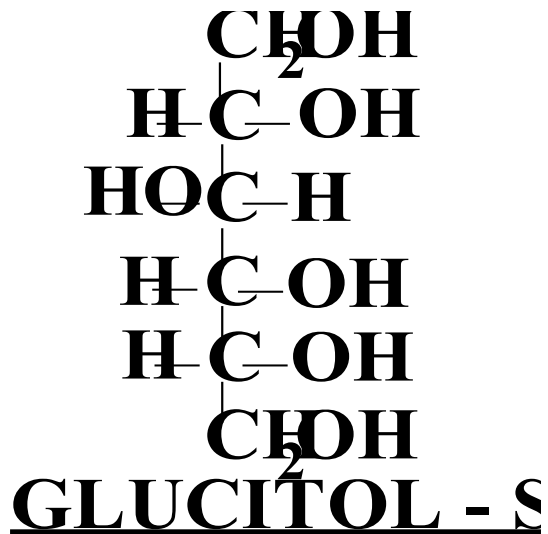


Tvorba laktonů u aldonových a uronových kyselin

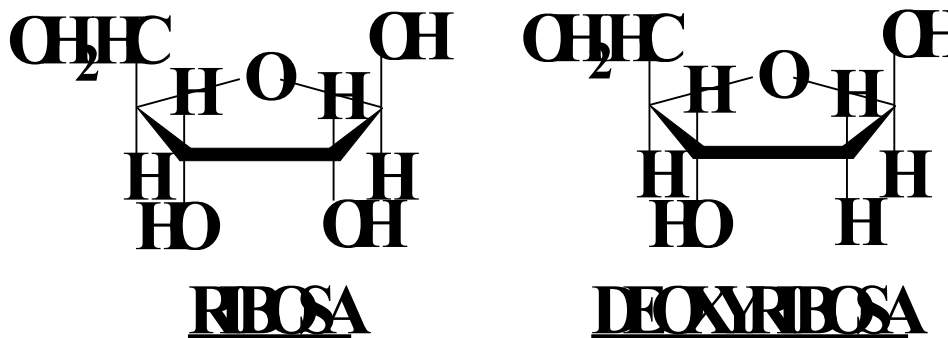


Redukce :

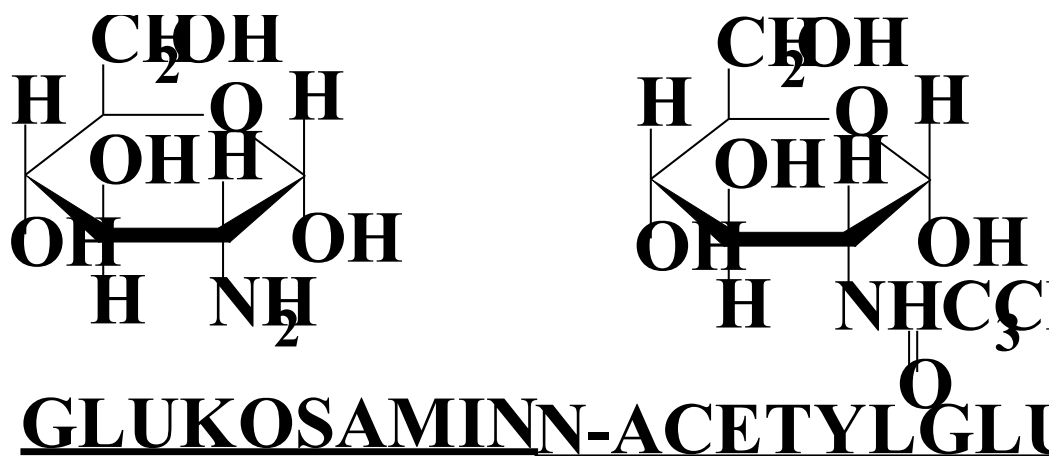
mírná  $\Rightarrow$  karbonylová skupina  $\rightarrow$  hydroxy skupinu  
POLYHYDROXYALKOHOLY - ALDITOLY -itol



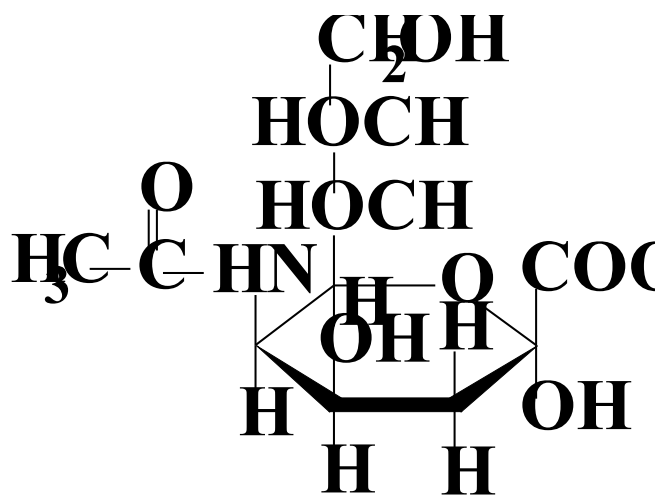
Deoxycukry - OH skupina nahrazena H



Aminocukry - OH skupina nahrazena NH<sub>2</sub> skupinou

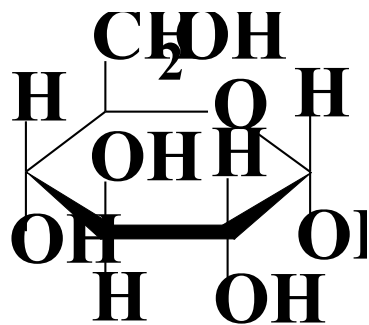


Sialové kyselina - kondenzace N-acetylmanosaminu + pyruvátu



K. SIALOVÁ

Glykosidy :

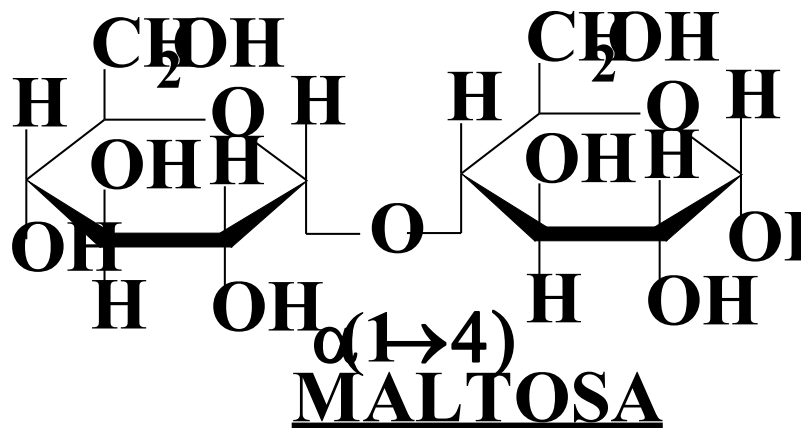


O-glukos

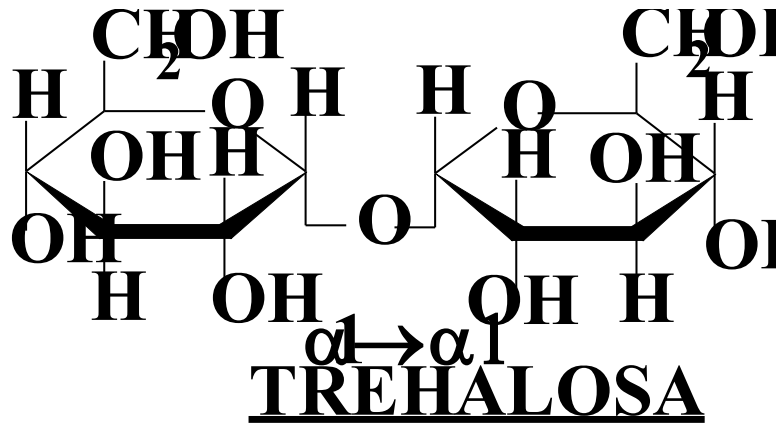
glykosidická vazba - OR, SR, NR - specificky štěpí glykosidasy

Homoglykosidy – sacharid + sacharid - di-, tri-,..., oligo-, polysacharidy

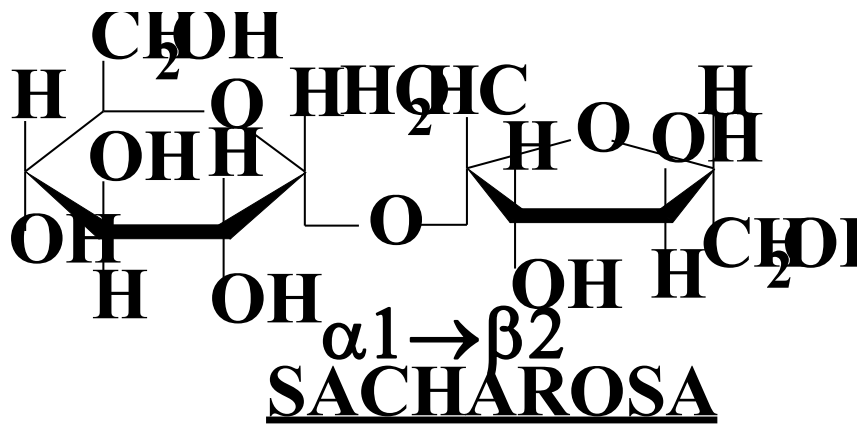
Heteroglykosidy – sacharid + aglykon



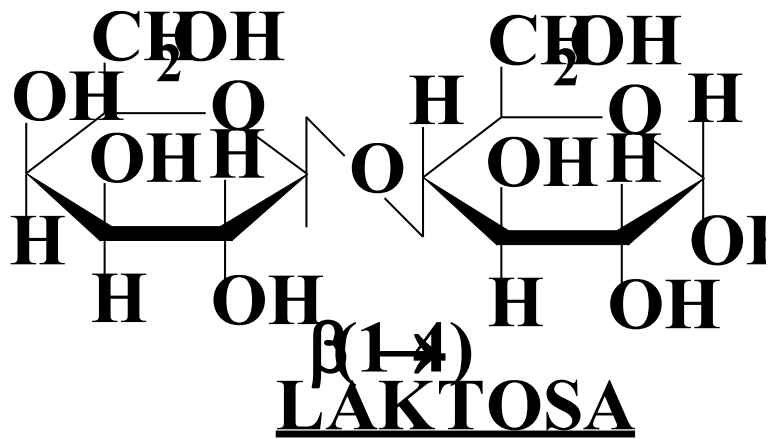
O -  $\alpha$  -D - glukopyranosyl (1 $\rightarrow$ 4) -  $\alpha$  -D - glukopyranosa



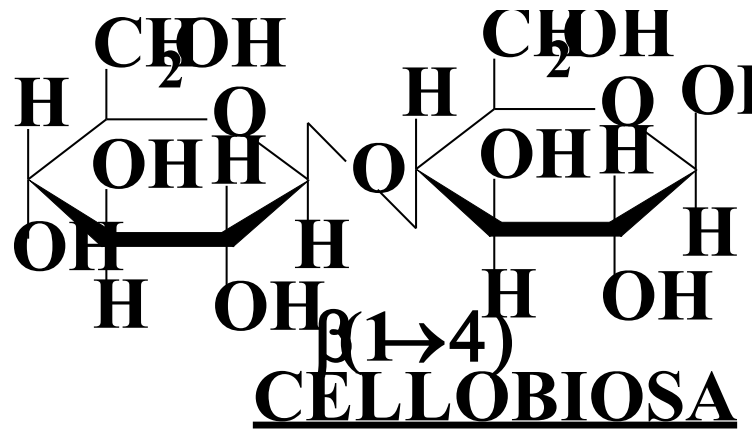
O -  $\alpha$  -D - glukopyranosyl (1 $\rightarrow$ 1) -  $\alpha$  -D - glukopyranosid



O -  $\alpha$  -D - glukopyranosyl (1 $\rightarrow$ 2) -  $\beta$  -D - fruktofuranosid



O -  $\beta$  -D - galaktopyranosyl (1 $\rightarrow$ 4) -  $\beta$  -D - glukopyranosa



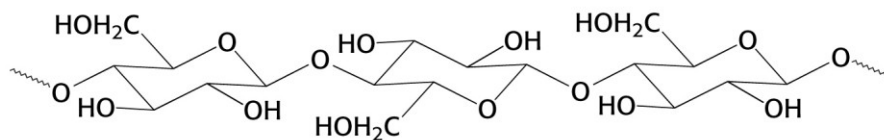
O -  $\beta$  - D - glukopyranosyl (1 $\rightarrow$ 4) -  $\beta$  - D - glukopyranosa

## Polysacharidy

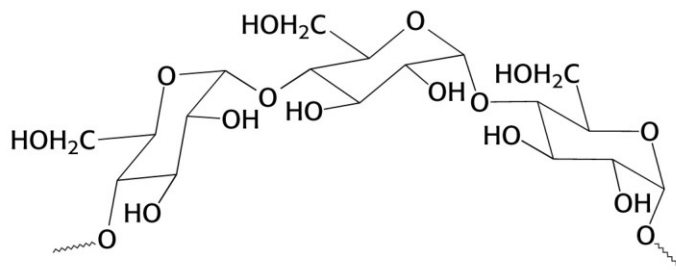
Jednoduché x složené

Zásobní x strukturní

Jednoduché – (poly)glukany

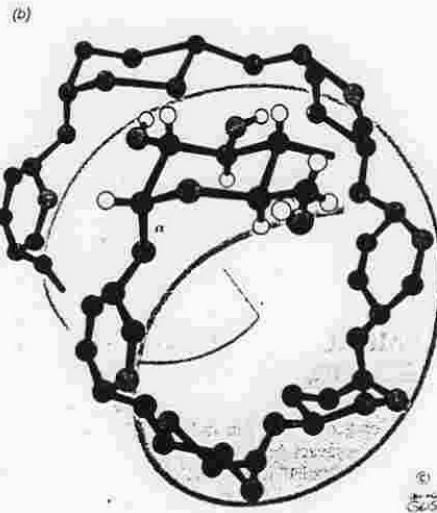
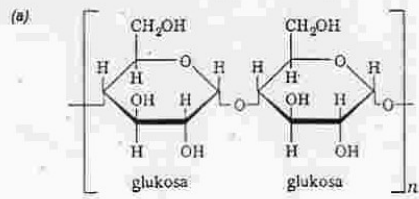


**Cellulose**  
( $\beta$ -1,4 linkages)

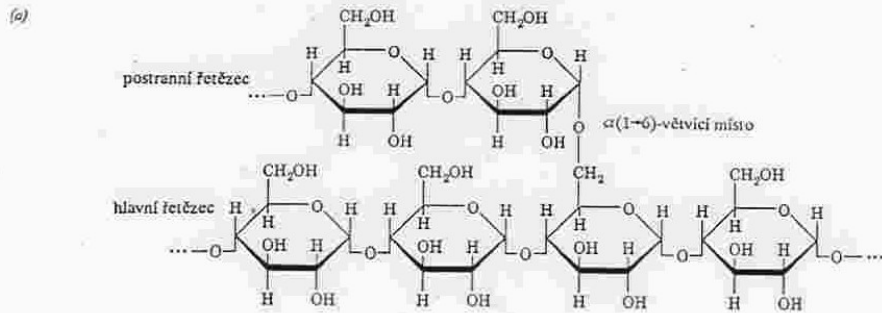


**Starch and Glycogen**  
( $\alpha$ -1,4 linkages)

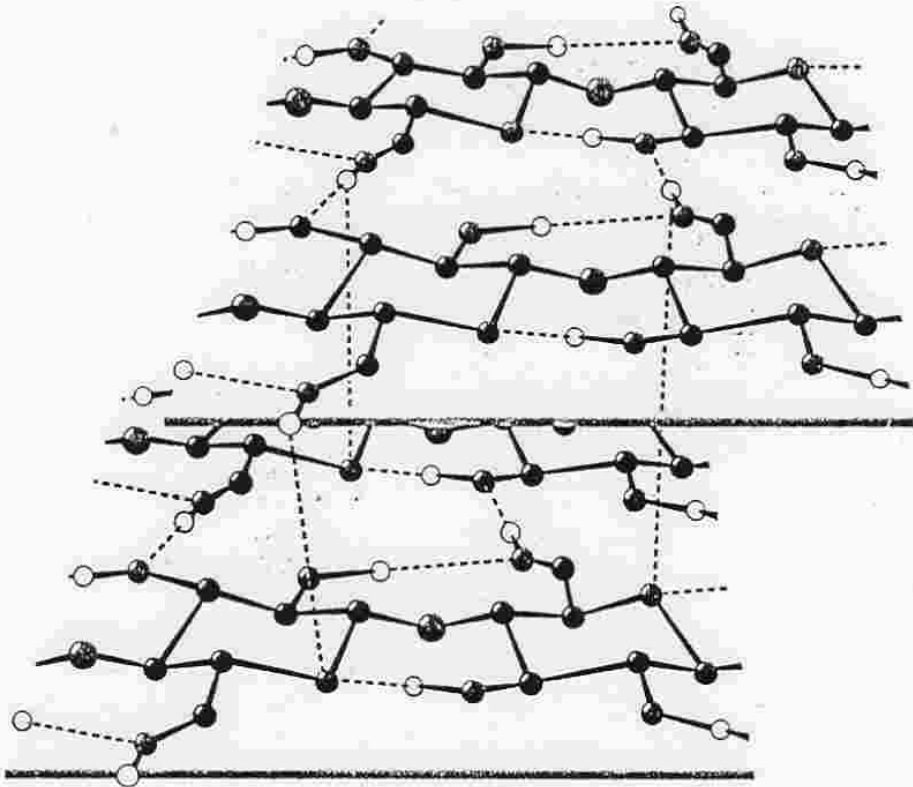
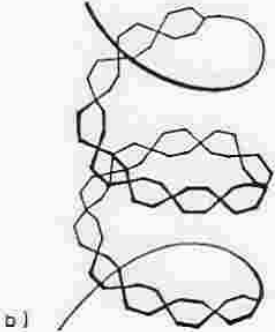
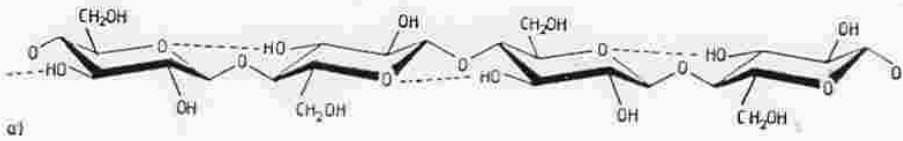
# AMYLOSA



# AMYLOPEKTIN



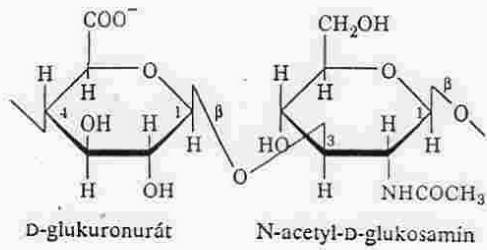
**Celulosa**



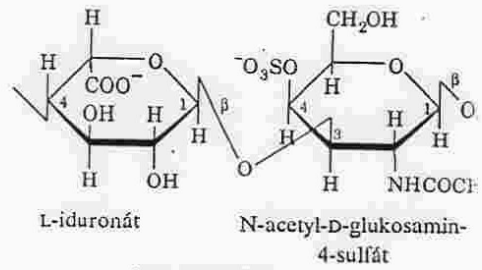
**CELULOSA**



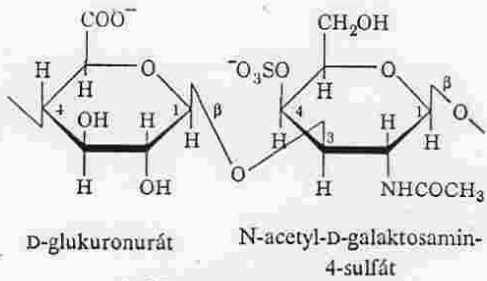
## HETEROPOLYSACHARIDY - glykosaminoglykany



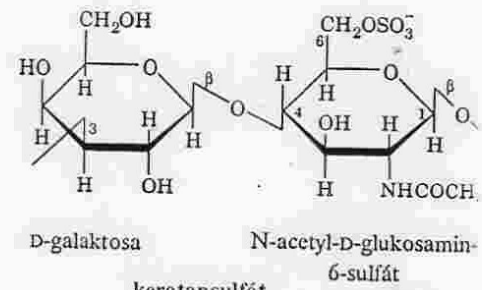
hyaluronát



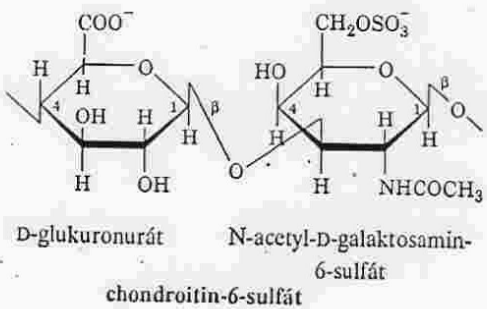
dermatansulfát



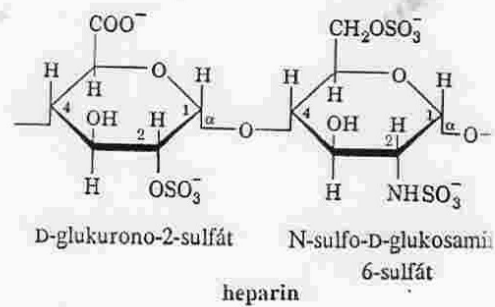
choňdroitin-4-sulfát



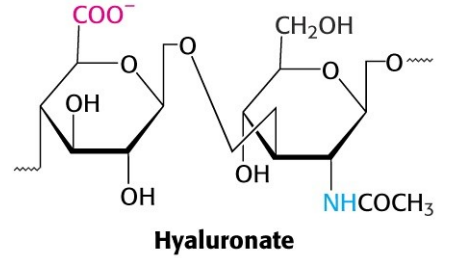
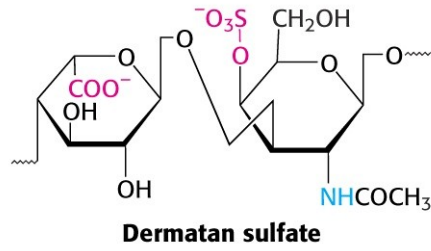
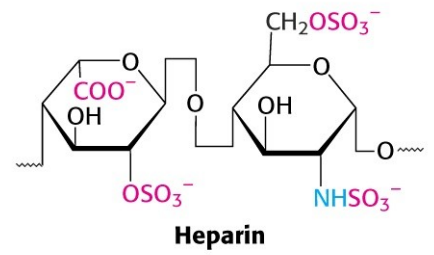
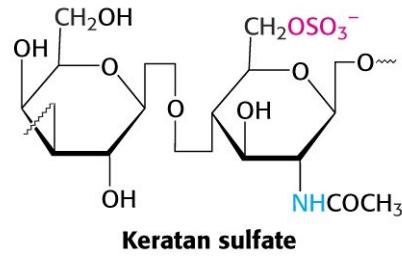
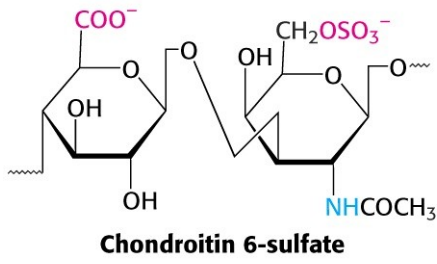
keratansulfát



choňdroitin-6-sulfát



heparin



(A)

