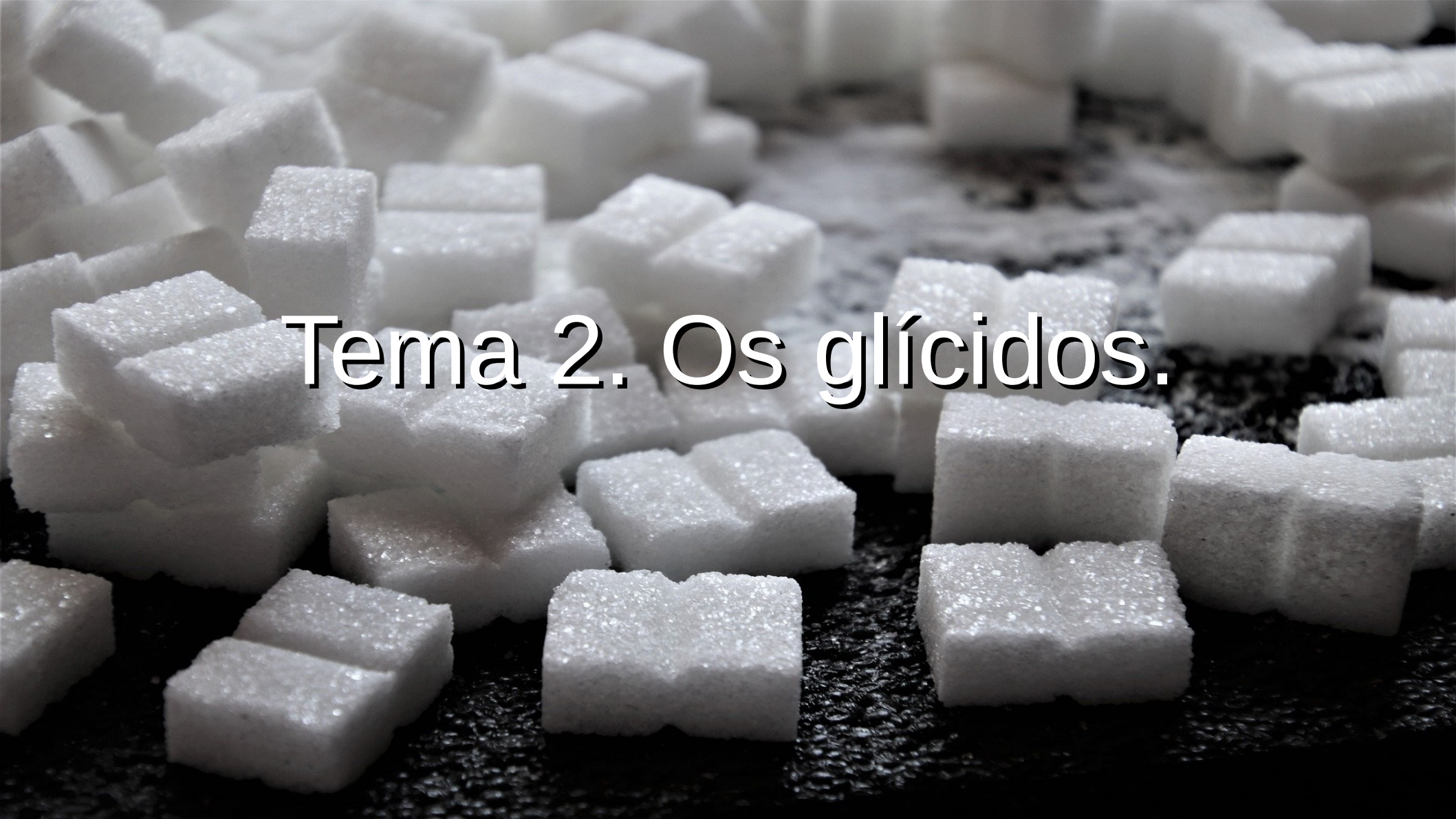
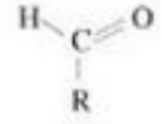


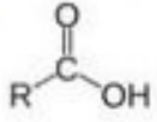
Tema 2. Os glícidos.

Monosacáridos

Detección de azúcares reductores (REACCIÓN DE FEHLING)

Azúcar reductor + Cu^{2+} $\xrightarrow[\text{pH BÁSICO}]{\text{CALOR}}$ Azúcar oxidado + Cu_2O ↓

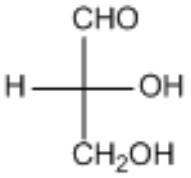




se ha reducido a Cu^{+}

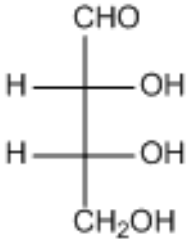
PRECIPITADO

ROJO LADRILLO



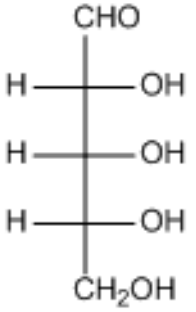
Aldosa de 3 carbonos

(aldotriosa)



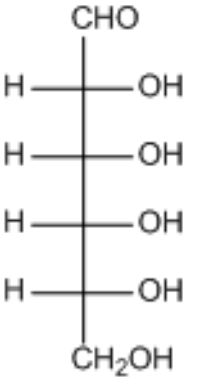
Aldosa de 4 carbonos

(aldotetrosa)



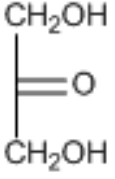
Aldosa de 5 carbonos

(aldopentosa)



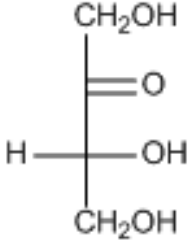
Aldosa de 6 carbonos

(Aldohexosa)



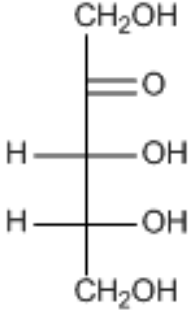
Cetosa de 3 carbonos

(cetotriosa)



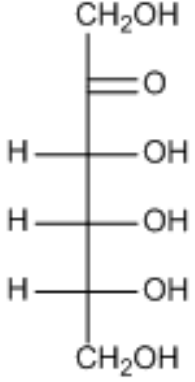
Cetosa de 4 carbonos

(cetotetrosa)



Cetosa de 5 carbonos

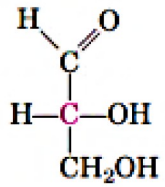
(cetopentosa)



Cetosa de 6 carbonos

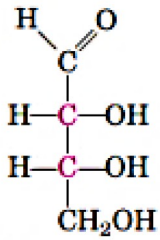
(cetohexosa)

Três carbonos

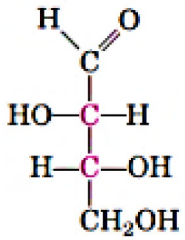


D-Gliceraldeído

Quatro carbonos

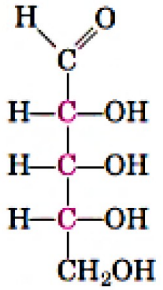


D-Eritrose

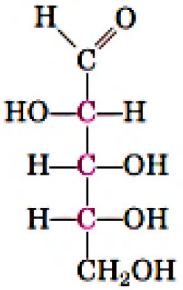


D-Treose

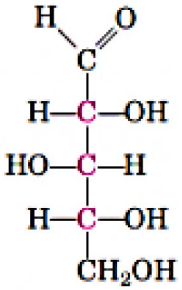
Cinco carbonos



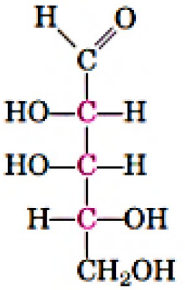
D-Ribose



D-Arabinose

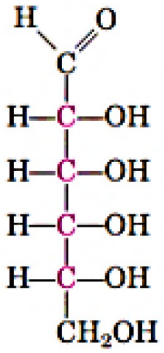


D-Xilose



D-Lixose

Seis carbonos



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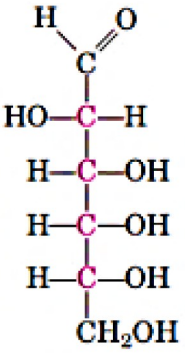
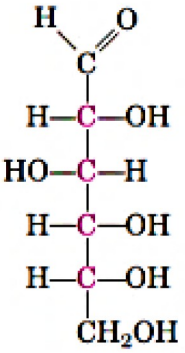
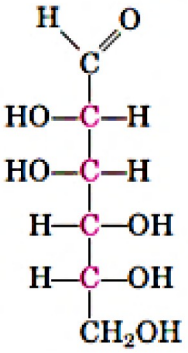


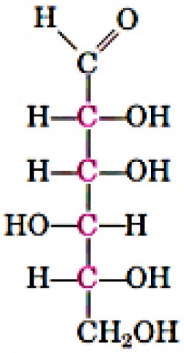
D-Altrose



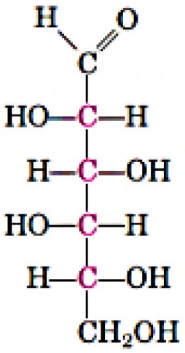
D-Glicose



D-Manose



D-Gulose



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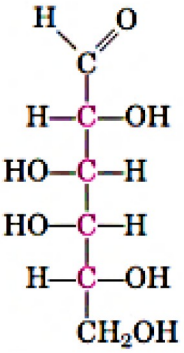

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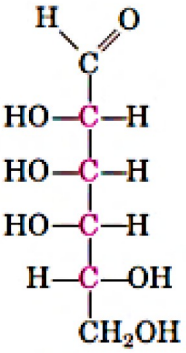
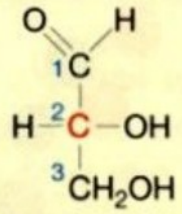
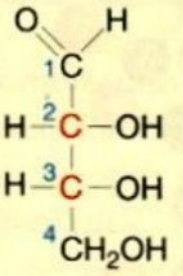
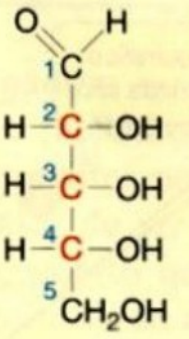
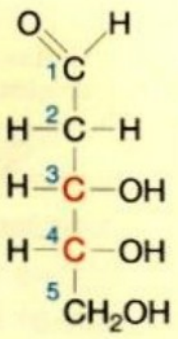
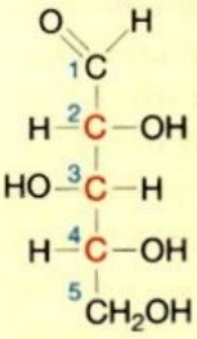
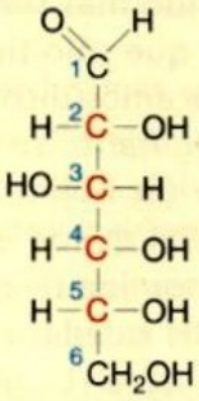
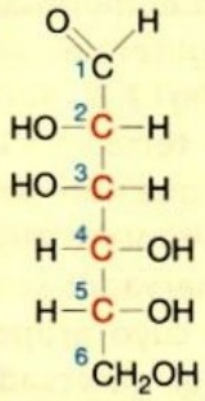
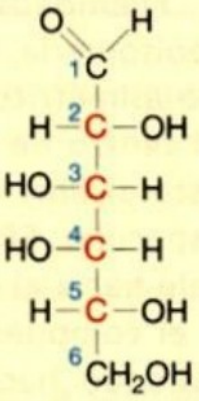
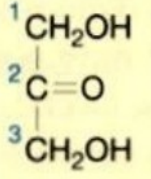
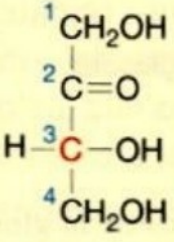
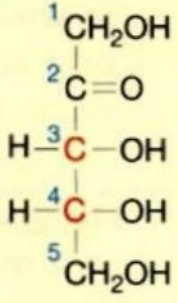
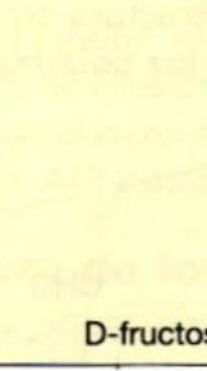
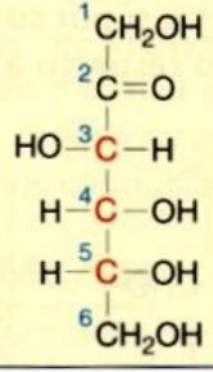


D-Talose

	Triosas	Tetrosas	Pentosas			Hexosas		
ALDOSAS	 D-gliceraldehído	 D-eritrosa	 D-ribosa	 desoxirribosa	 D-xilosa	 D-glucosa	 D-manosa	 D-galactosa
CETOSAS	 Dihidroxicetona	 D-eritrulosa	 D-ribulosa			 D-fructosa		

Isomería de función

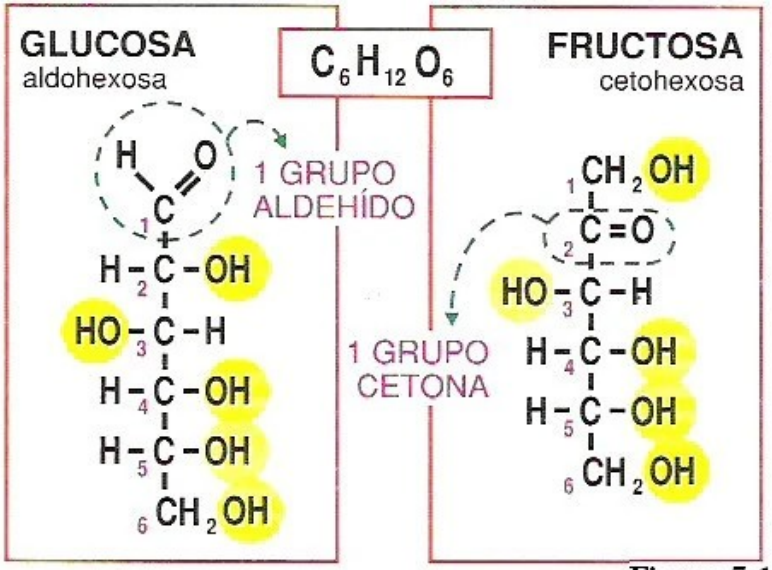
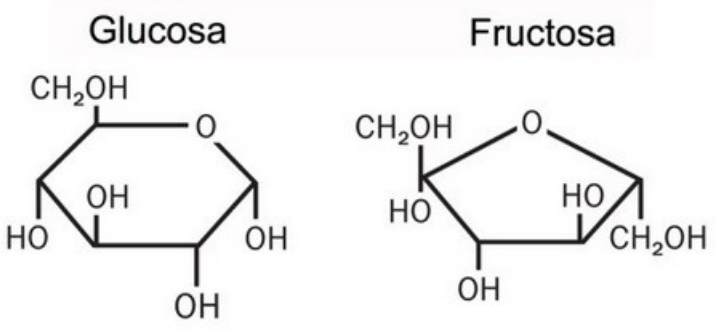
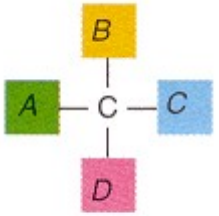


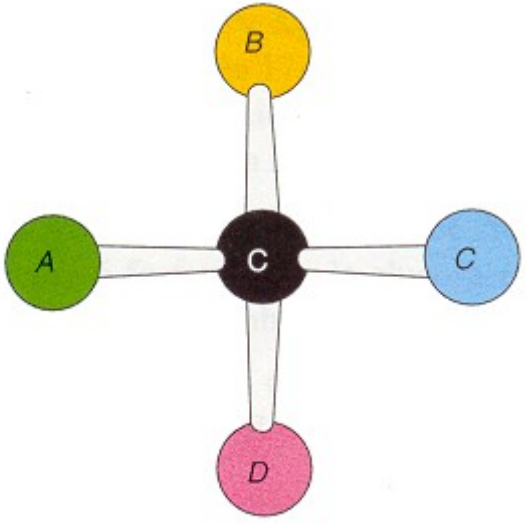
Figura 7.1



Proxección de Haworth

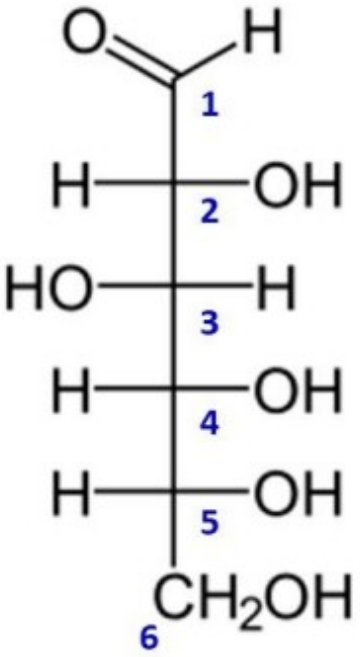
Proxección de Fischer



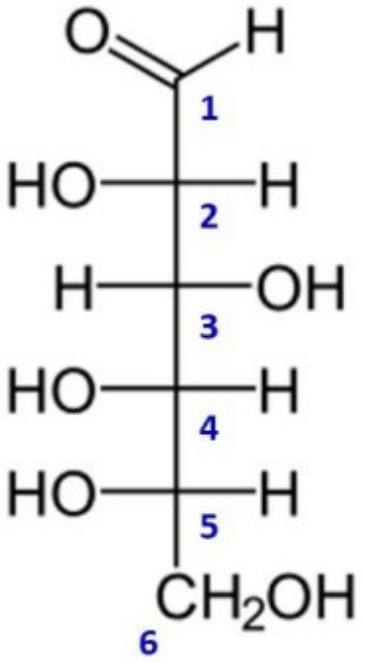


Estereoisomería: serie D e serie L.

Enantiómeros D e L da glicosa.



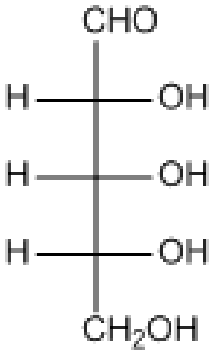
D-Glucosa



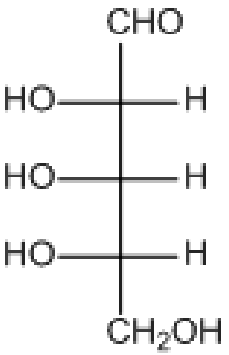
L-Glucosa

Estereoisomería: serie D e serie L.

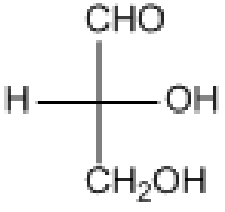
Enantiómeros D e L da ribosa e do gliceraldehído.



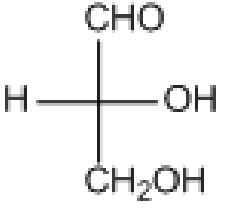
D-Ribosa



L-Ribosa



D-Gliceraldehído



L-Gliceraldehído

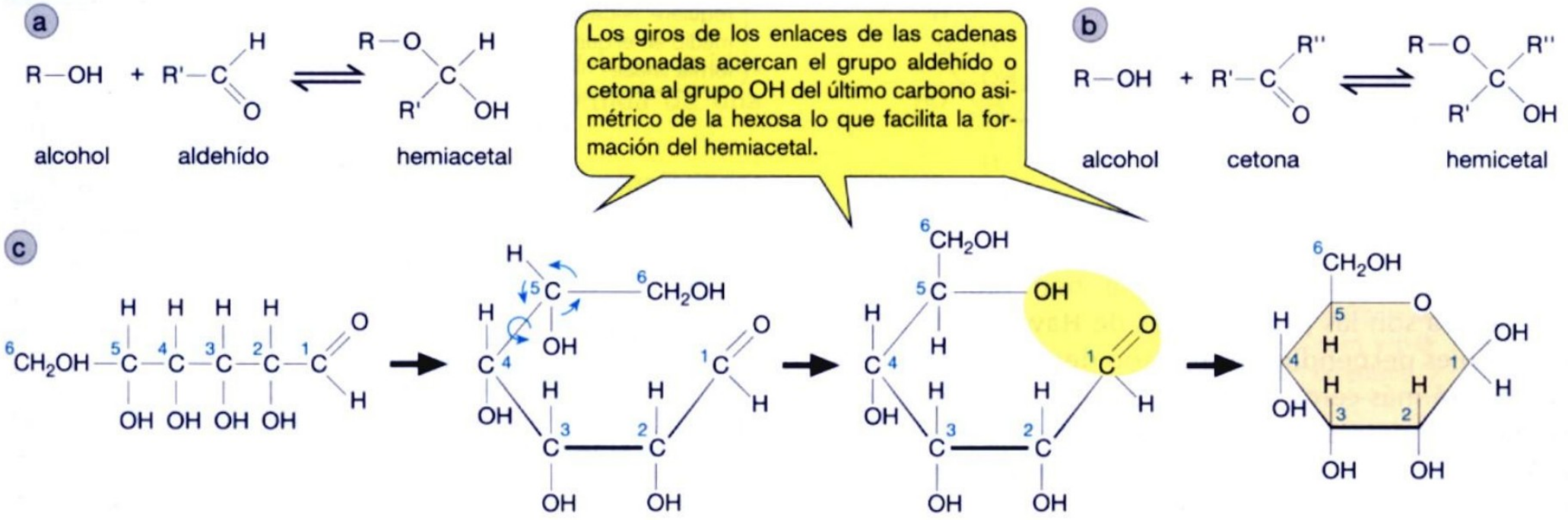
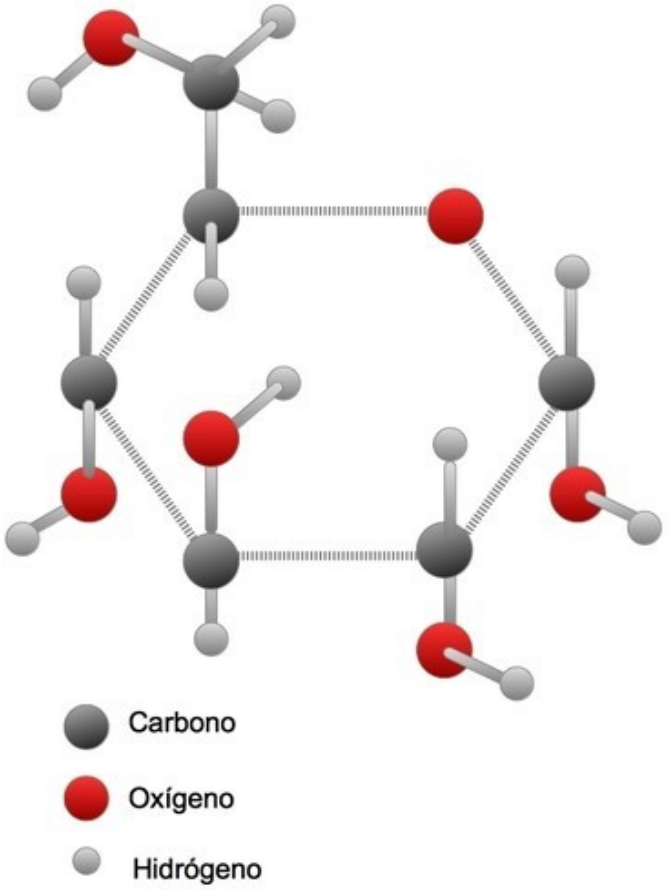
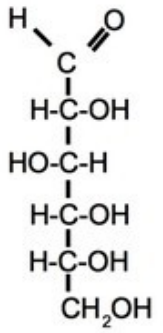
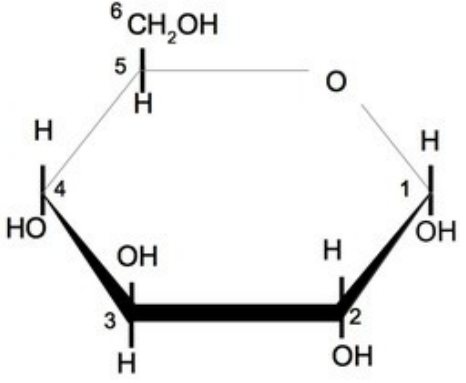


Fig. 2.6. a) Formación de un hemiacetal; b) Formación de un hemicetal; c) Ciclado de una hexosa por formación de un hemiacetal.

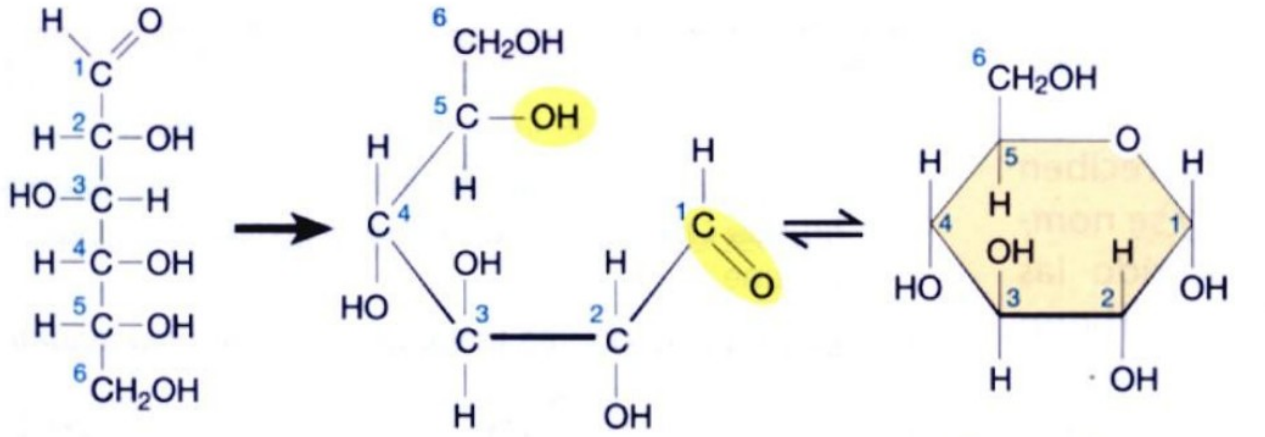




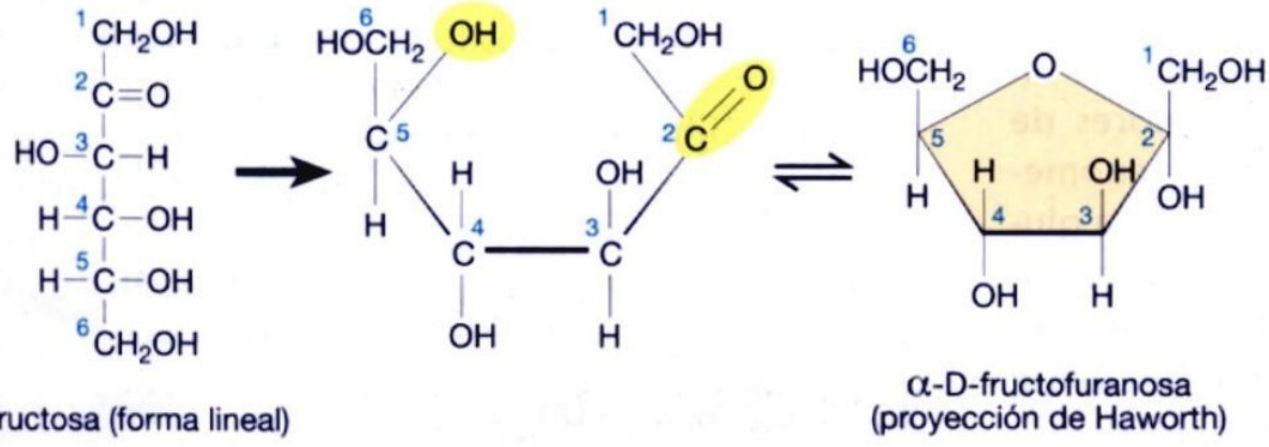
Forma lineal



Forma cíclica



La formación de un hemi**acetal** en la glucosa produce una molécula hexagonal (piranosa).



La formación de un hemi**cetal** en la fructosa produce una molécula pentagonal (furanosa).

Fig. 2.7. Formación de las estructuras cíclicas de la D-glucosa y la D-fructosa.

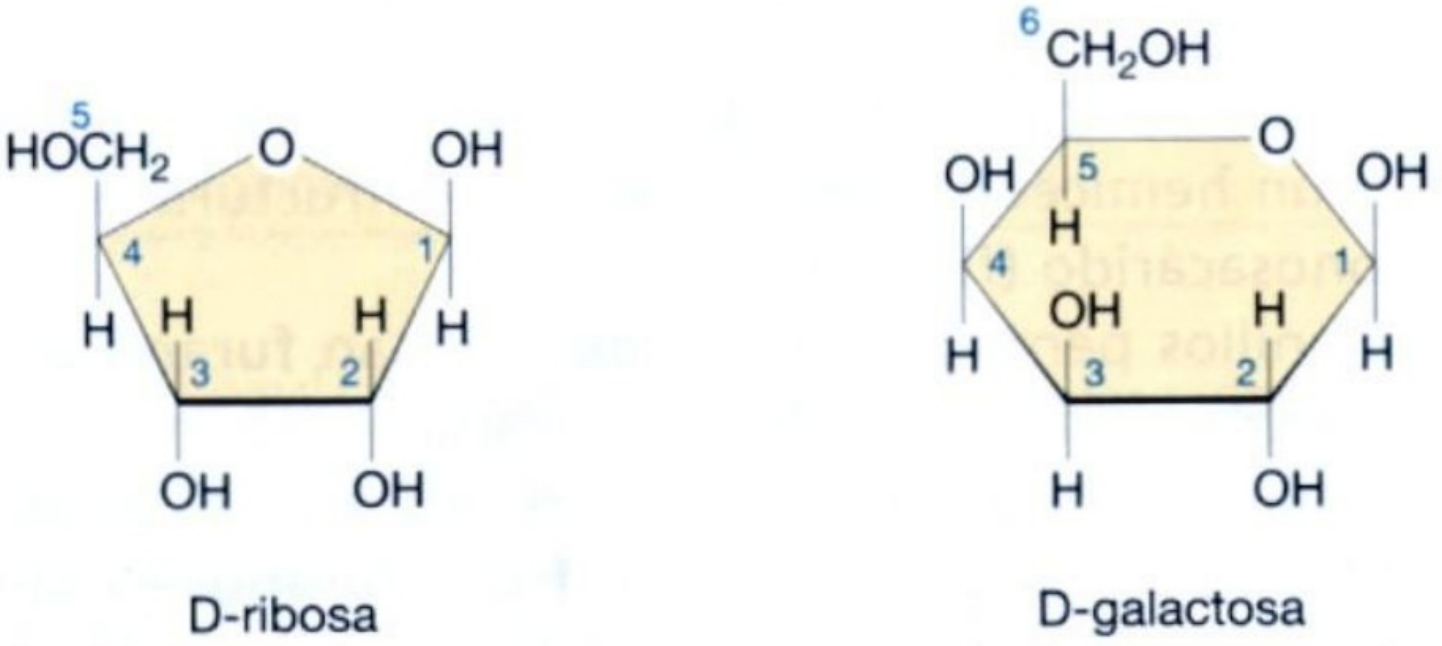
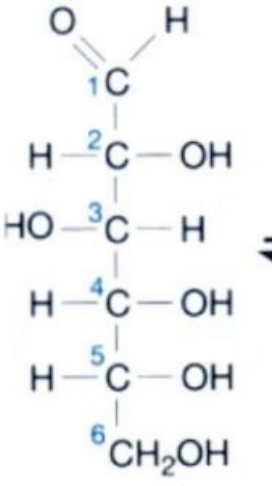
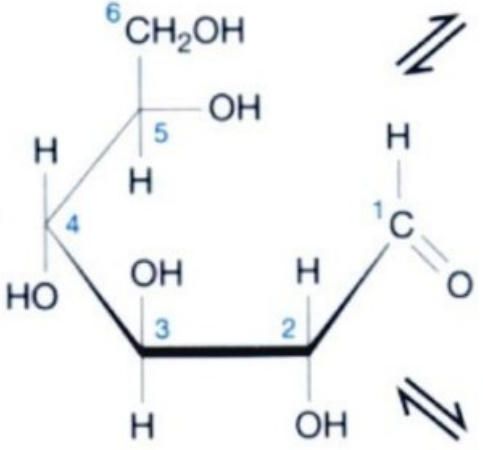


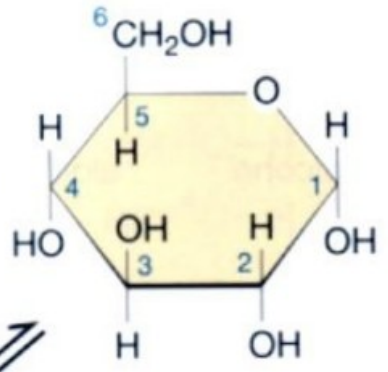
Fig. 2.9. Estructura cíclica de la D-ribosa y la D-galactosa.

La interconversión α ⇄ β (mutarrotación) requiere necesariamente un estadio intermedio en el que el glúcido se encuentra en forma lineal.

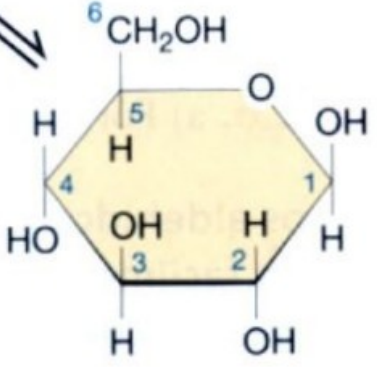


D-glucosa
(forma lineal)

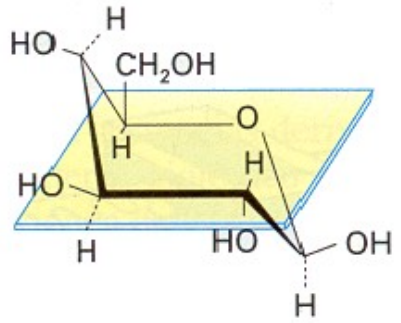




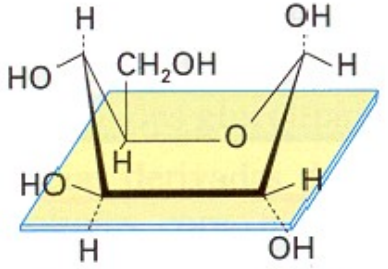
α-D-glucopiranosa



β-D-glucopiranosa



β-*D* - glucopiranosa en estructura de "silla".
Los extremos de la molécula están
en diferentes lados respecto al plano.



β-*D* - glucopiranosa en estructura de "nave".
Los extremos de la molécula están en el
mismo lado. Es una forma muy inestable.

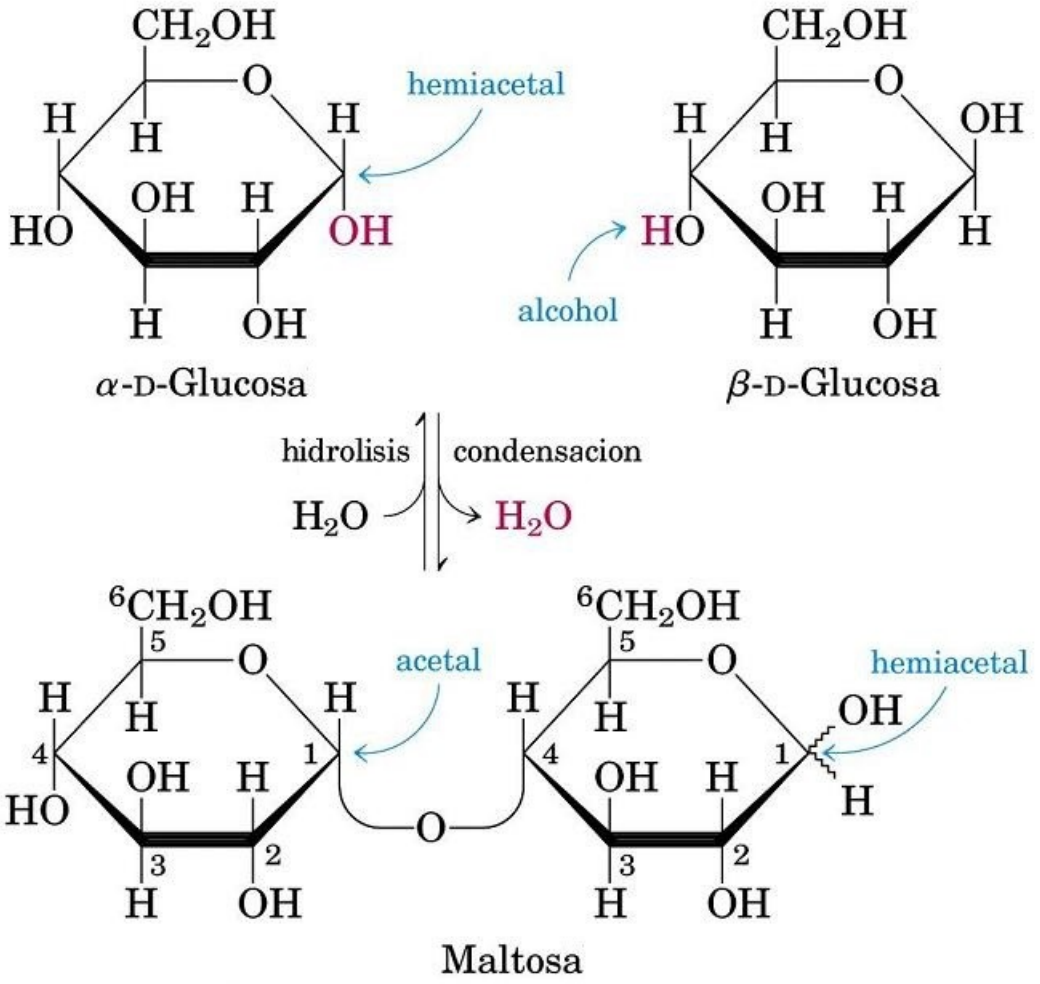

Disacáridos

Enlace o-glicosídico

Enlace o-glicosídico α (1→4):

- A primeira osa é anómero α.
- Os -OH que participan no enlace son o 1 da primeira osa e o 4 da segunda.

Enlace monocarbonícilo



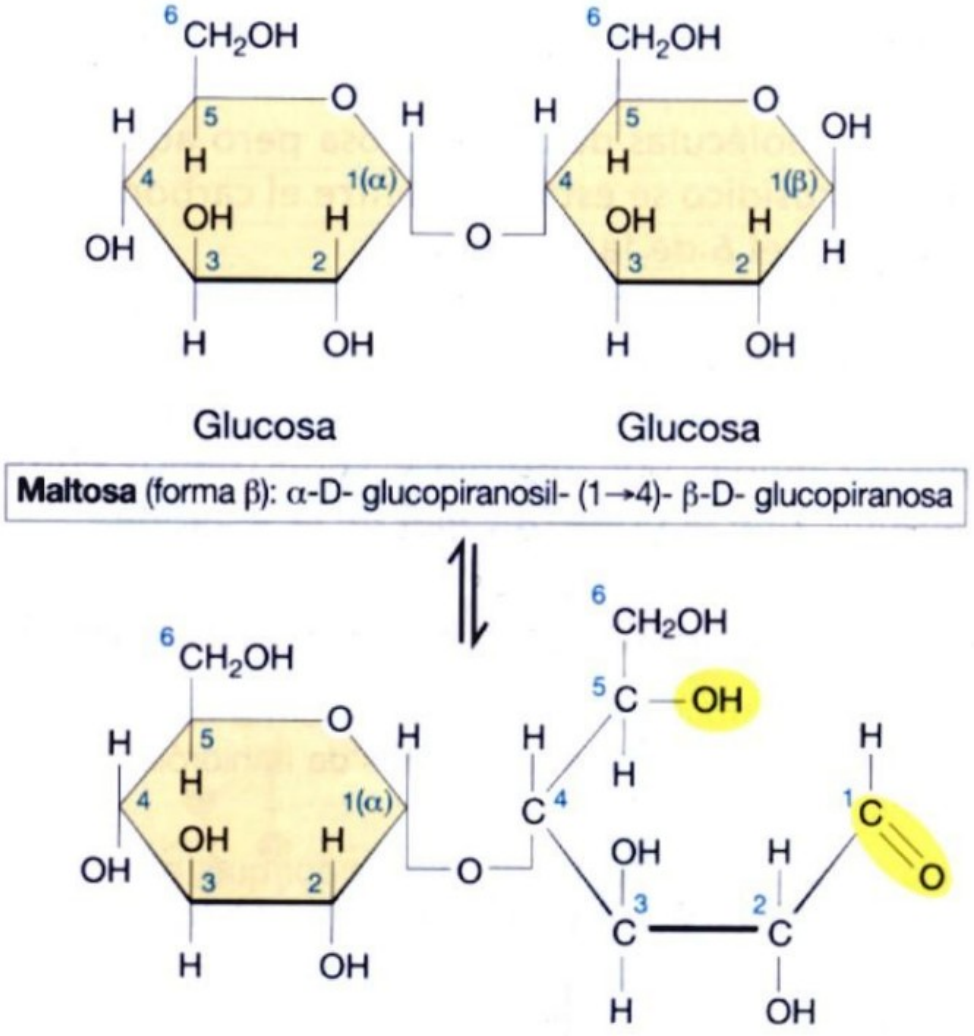


Fig. 3.2. Maltosa. a) Estructura; b) Proceso de mutarrotación.

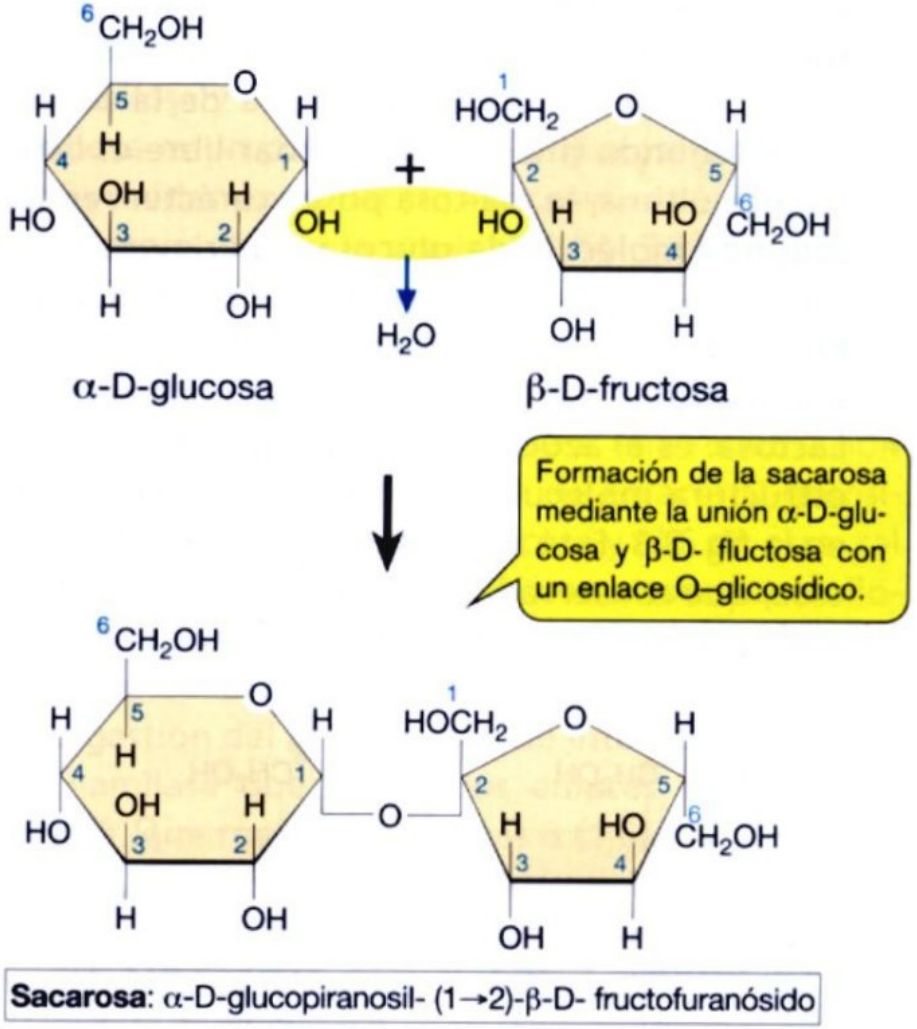
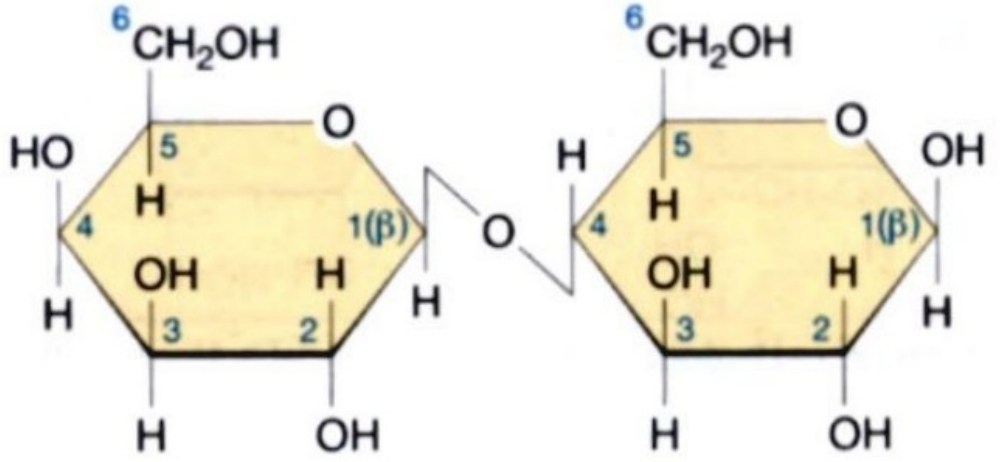


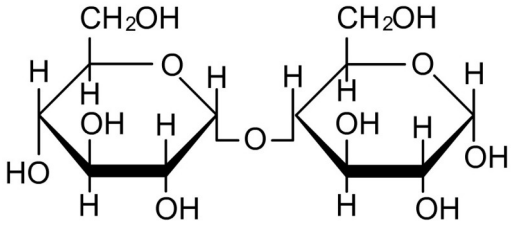
Fig. 3.1. Formación de la sacarosa mediante la unión de la α-D-glucosa y la β-D-fructosa



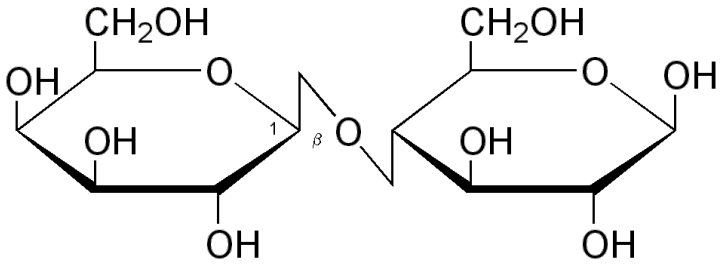
Galactosa Glucosa

Lactosa (forma β): β- D- galactopiranosil- (1→4)- β- D- glucopiranosa

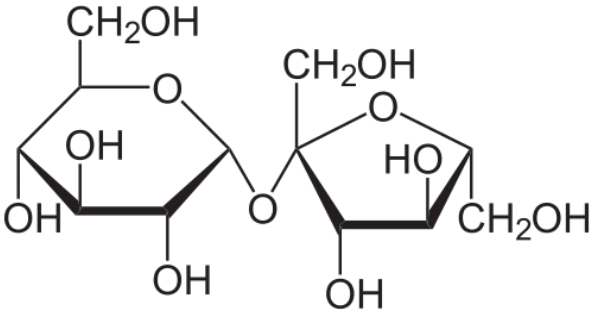
Maltosa: α – D – glicopiranosil – (1→4)- α/β – D – glicopiranosa

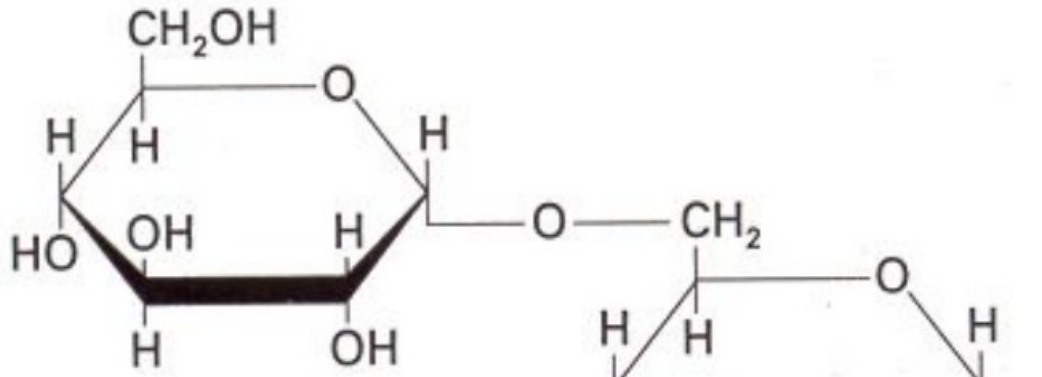


Lactosa: β – D – galactopiranosil – (1→4)- α/β – D – glicopiranosa

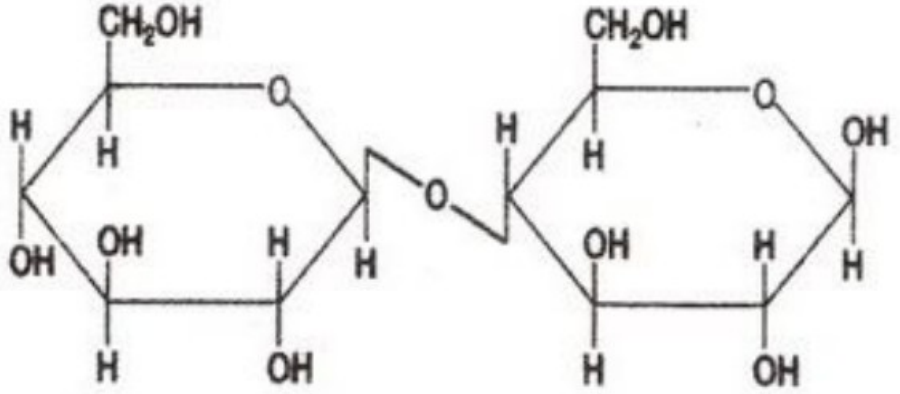


Sacarosa: α – D – glicopiranosil – (1→2)- β – D – fructofuranósido





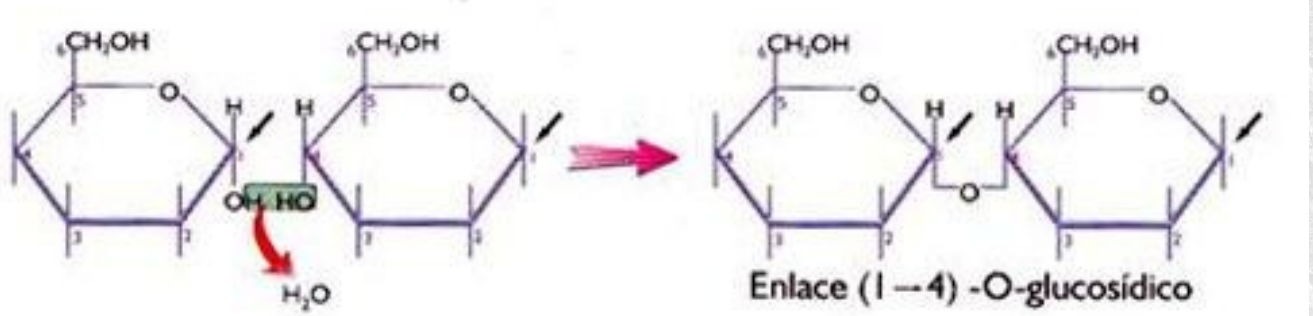
Isomaltosa

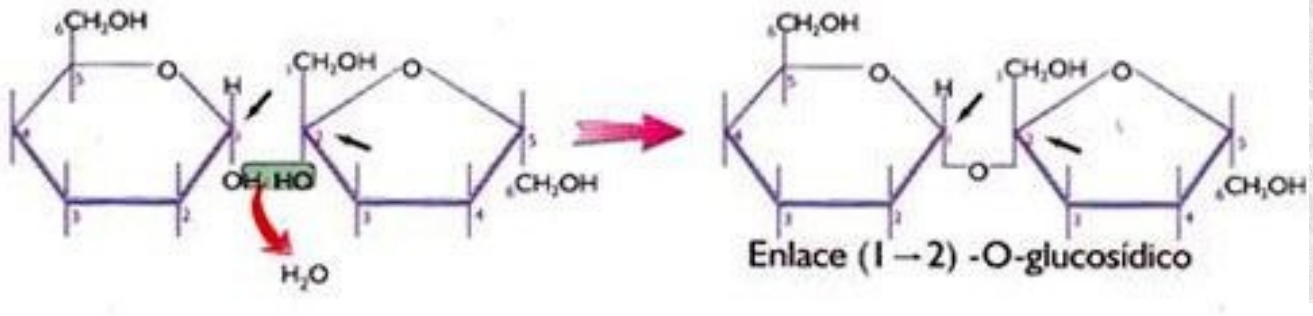


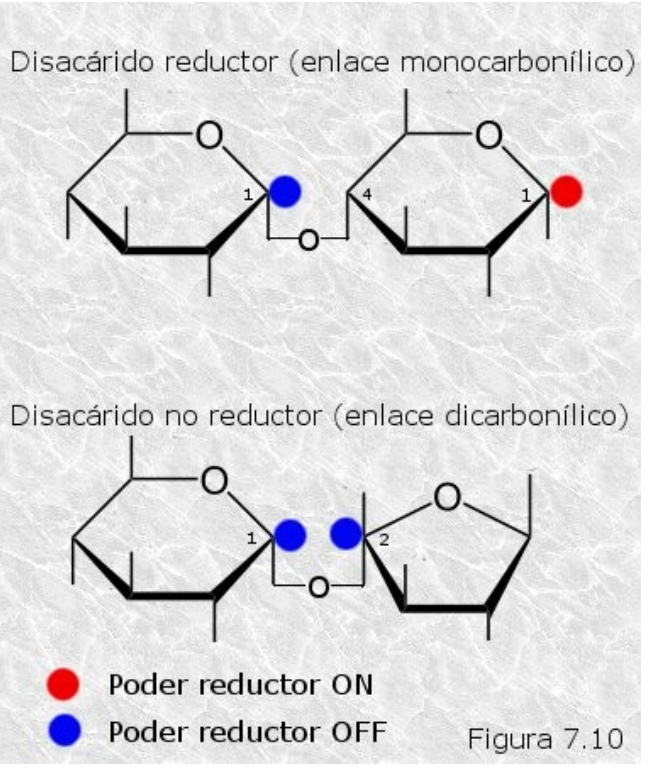
CELOBIOSA

O-β-D-glucopiranosil (1- 4)- β-D-glucopiranosa

Os disacáridos con enlace dicarbonílico perden o poder reductor e polo tanto dan negativo na proba de Fehling (o reactivo non cambia de azul a vermello)







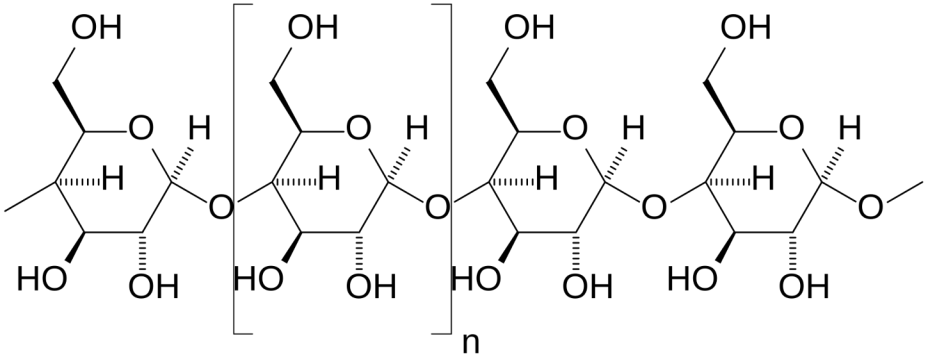

Polisacáridos

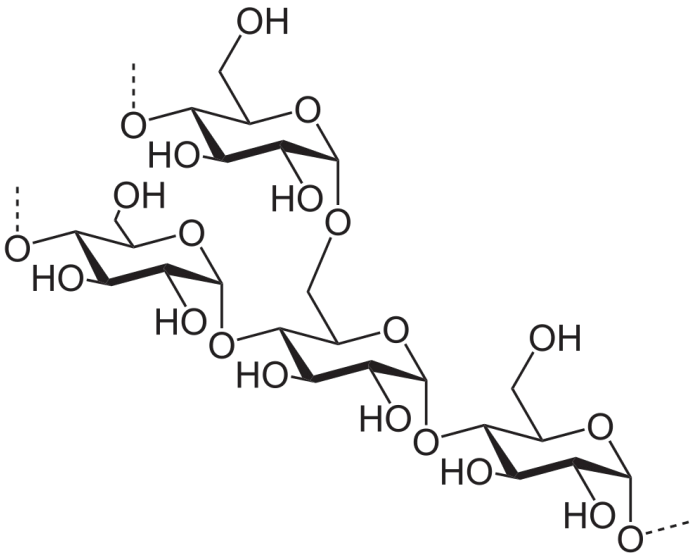
- Moitas osas (de decenas a milleiros) unidos por enlaces O-glicosídicos
- Sen poder redutor
- Non son solubles en auga, sen sabor e non son cristalizables
- Poden ser
  - Homopolisacáridos
  - Heteropolisacáridos

Homopolisacáridos de reserva

Amidón:

- Reserva das células vexetais.
- Formado por **α-D-glicosas**:
  - **Amilosa:** α(1→ 4)
  - **Amilopectina:** con ramificacións α(1→ 6)

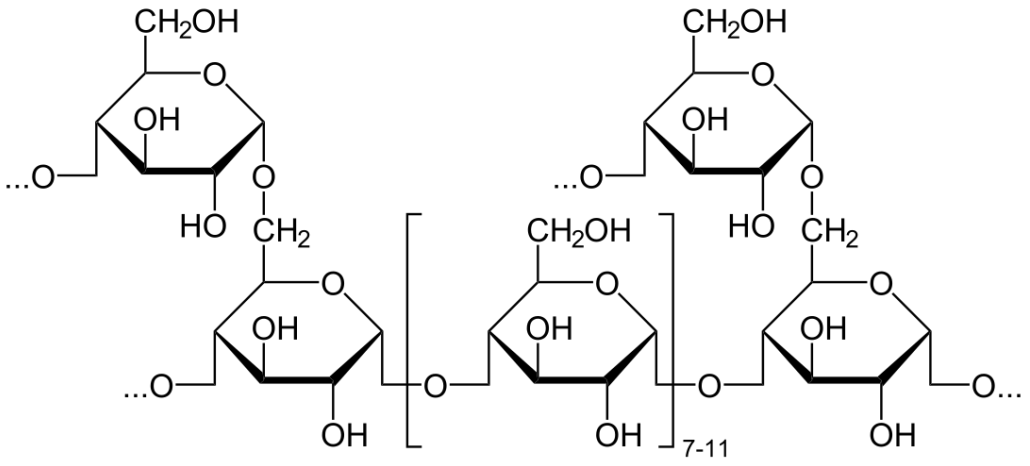




Homopolisacáridos de reserva

Glicóxeno:

- Reserva das células animais.
- Formado por **α-D-glicosas** unidas mediante enlaces α(1→ 4) con ramificacións α(1→ 6) cada 8-10 moléculas



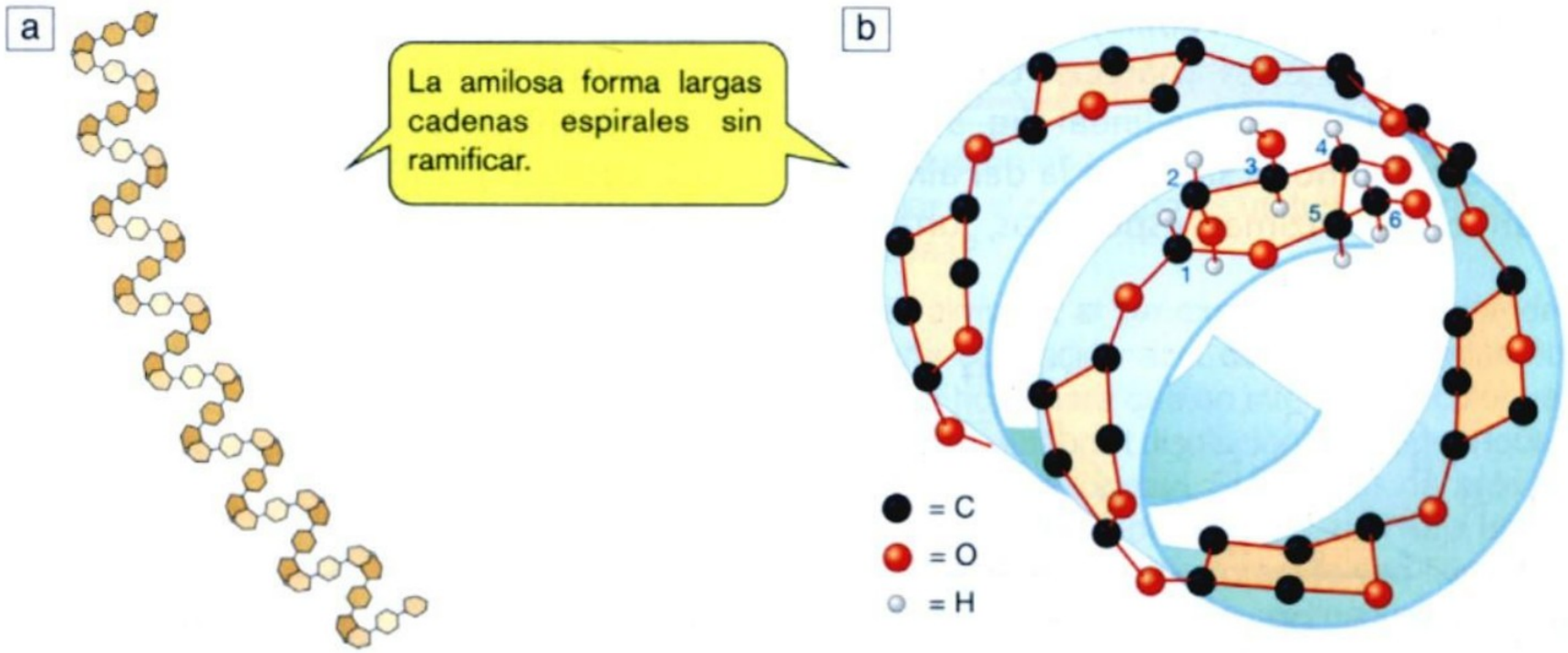
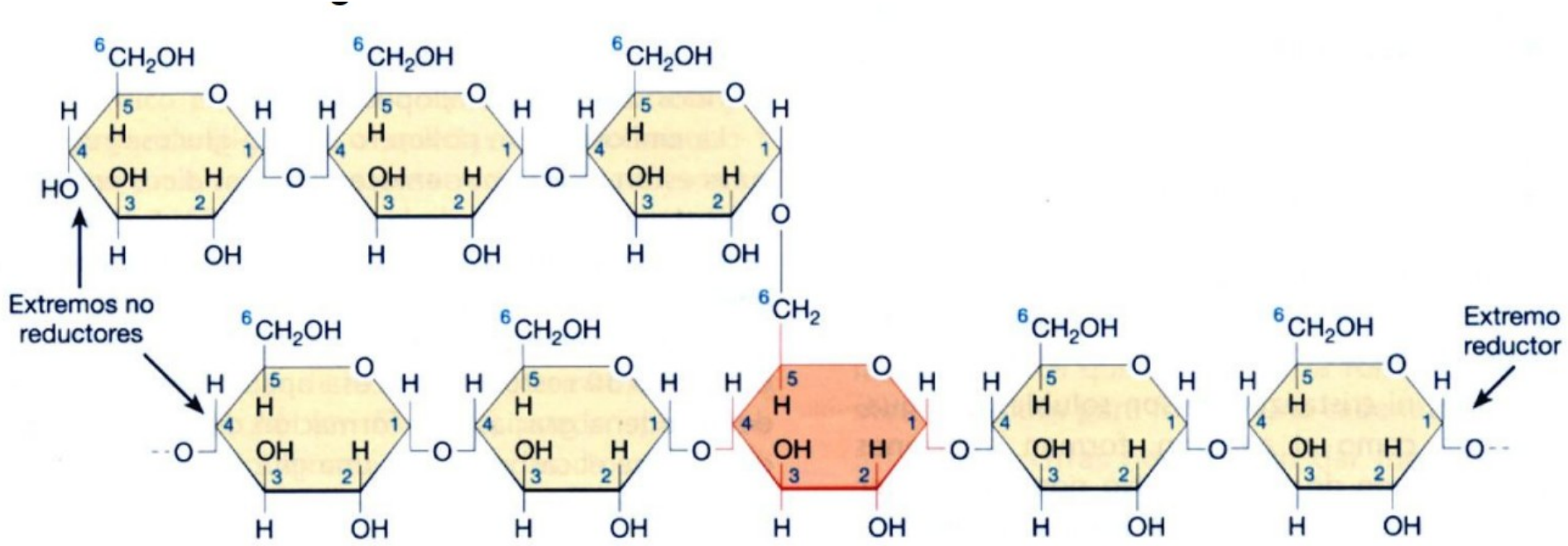


Fig. 5.2. Disposición helicoidal de la molécula de amilosa. a) aspecto general de la cadena; b) detalle de la misma.

a



Estructura ramificada común a la amilopectina y al glucógeno

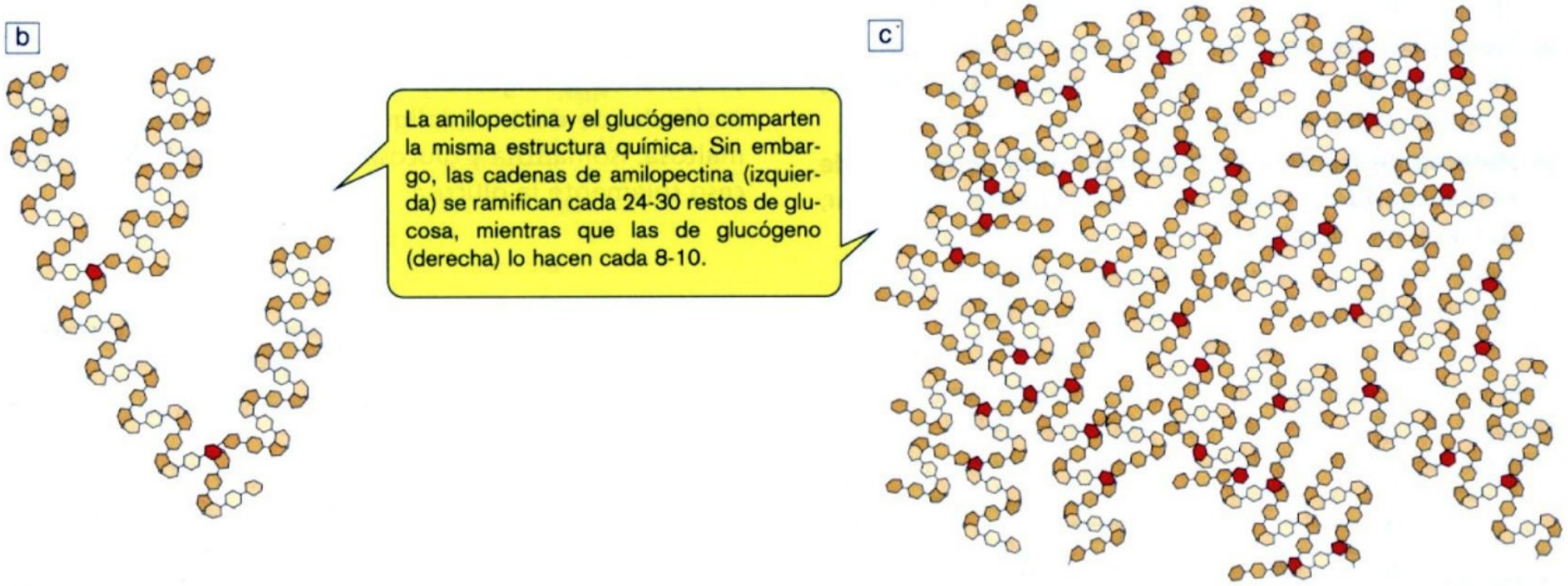
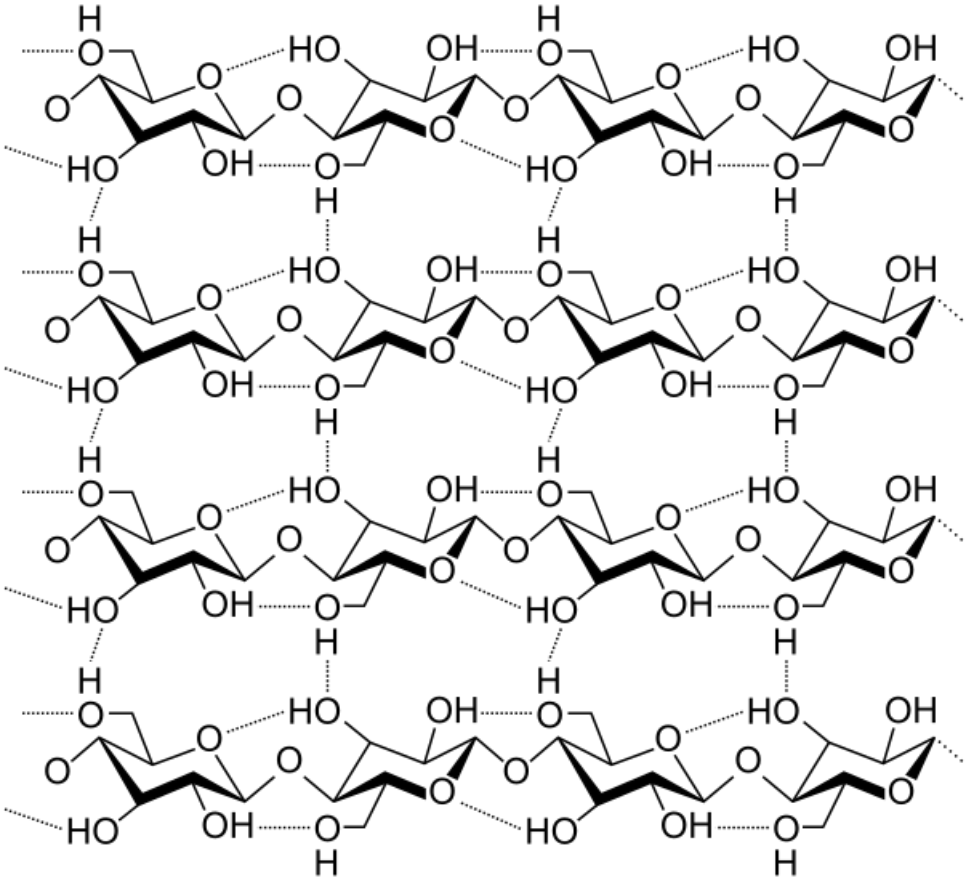


Fig. 5.4. a) Estructura ramificada común de la amilopectina y del glucógeno; b) cadena de amilopectina y c) cadena de glucógeno.

Homopolisacáridos estructurais

Celulosa:

- Paredes celulares vexetais.
- **β-D-glicosas** unidas por enlaces β(1→4) (celobiosas)
- Non temos ningun enzima que rompa o enlace β(1→4), por iso non a podemos dixerir.



Homopolisacáridos estructurais

Quitina:

- Exoesqueleto de artrópodos, parede celular de fungos.
- Cadeas lineais de N-acetil-D-glicosamina dispostas en paralelo. Enlaces β(1→4).