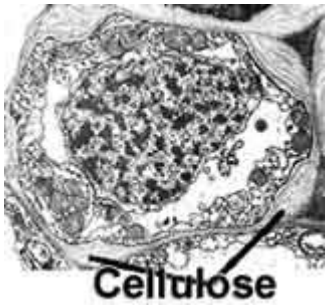
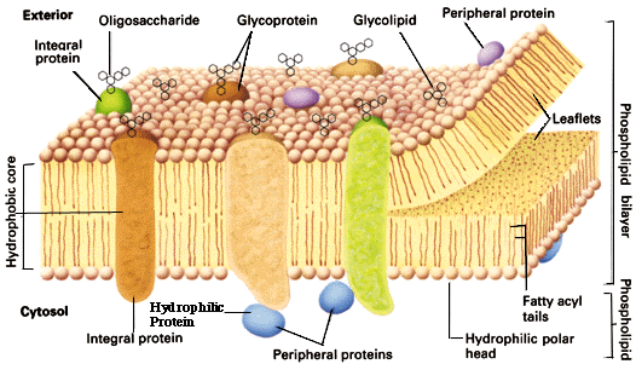
Tema 3: Polisacáridos

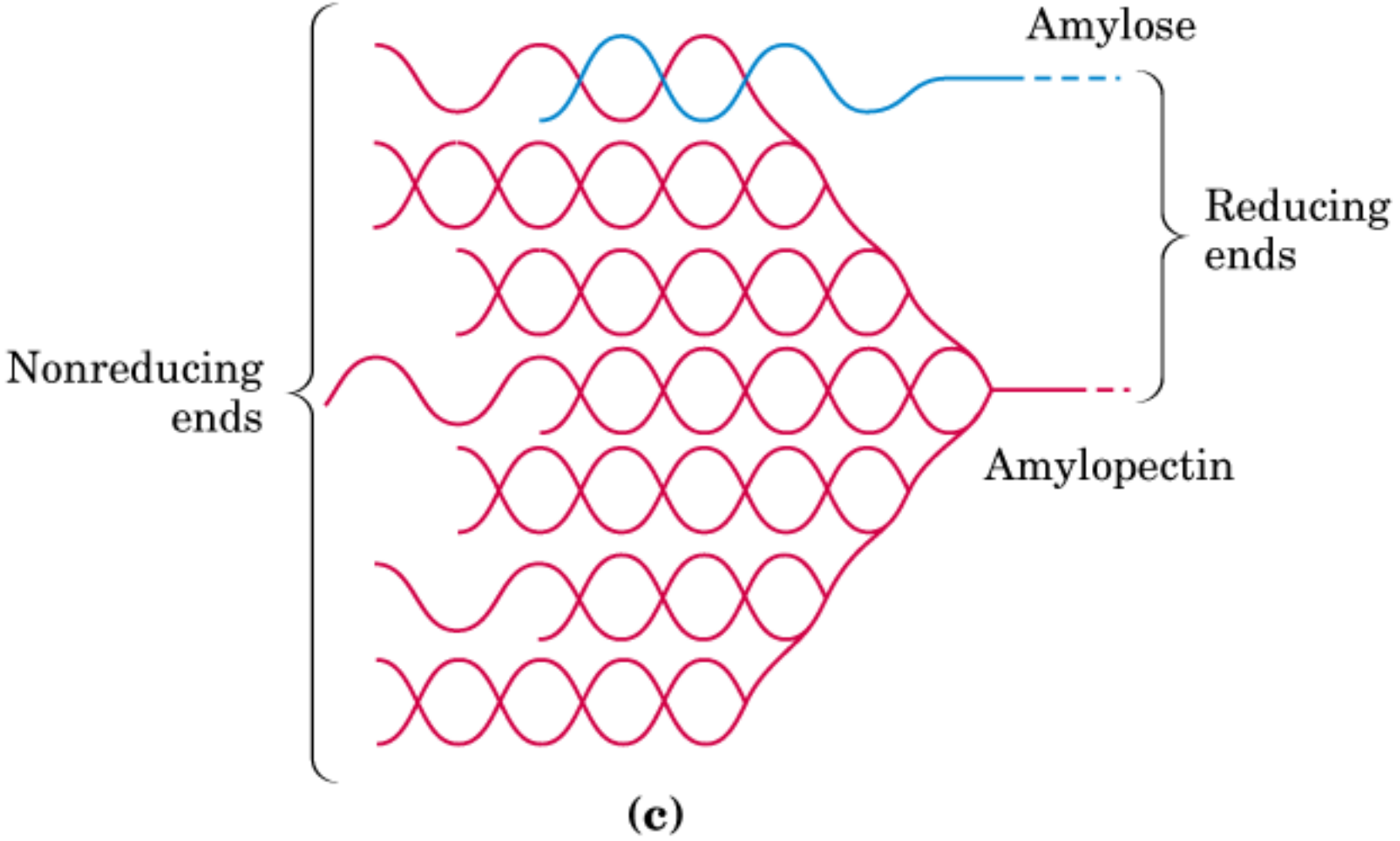








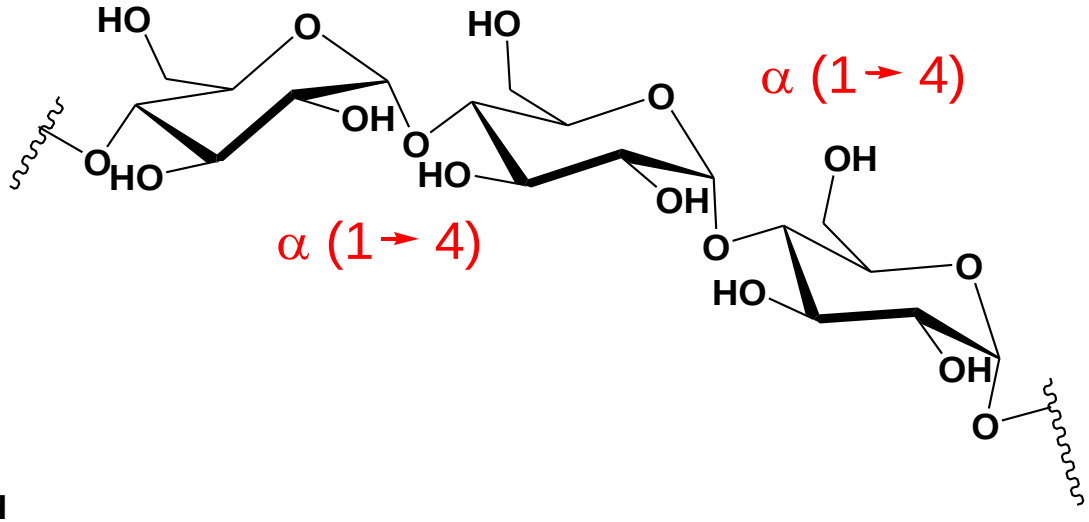
Almidón



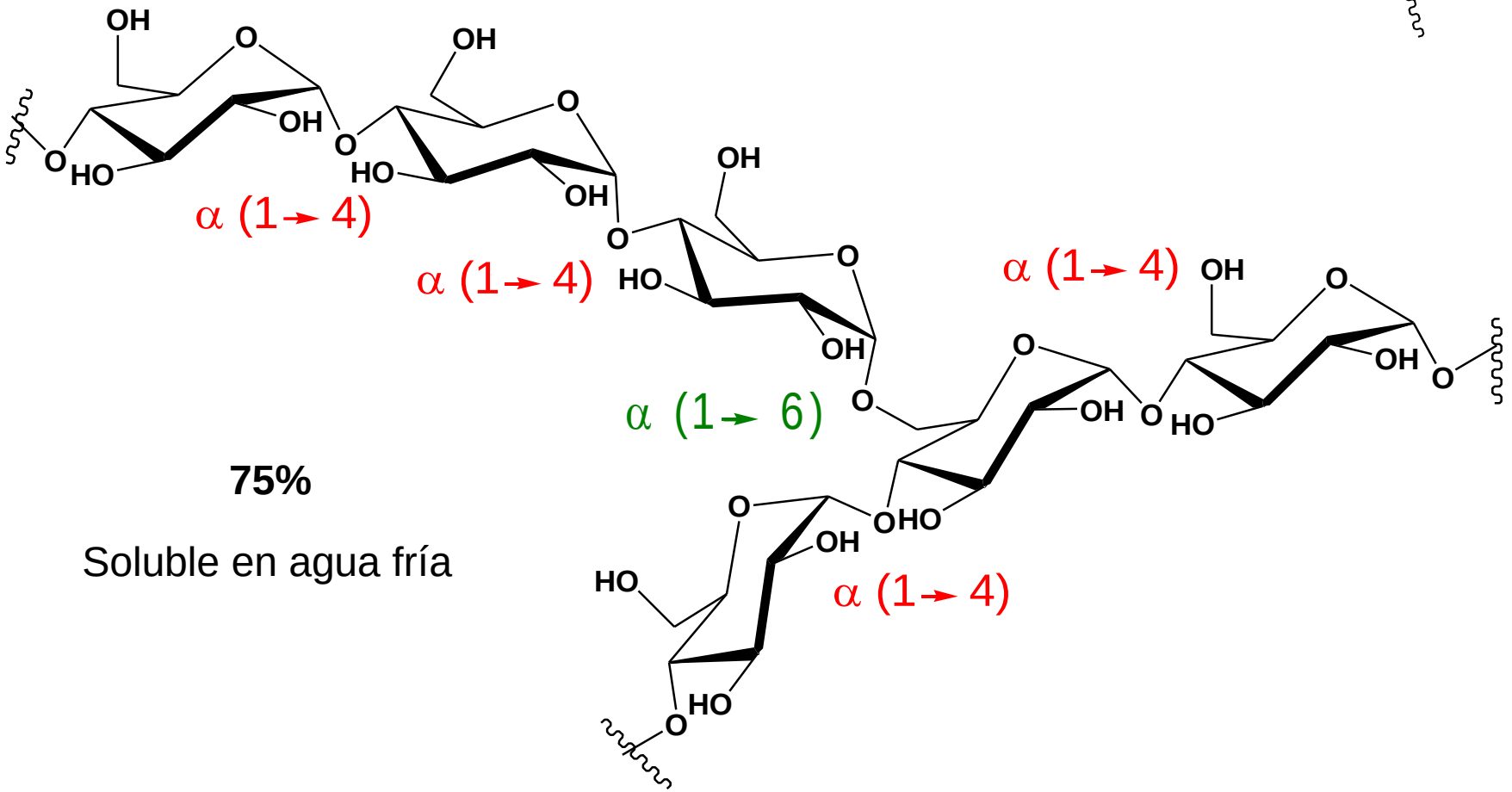
Amilosa

25%

Insoluble en agua fría

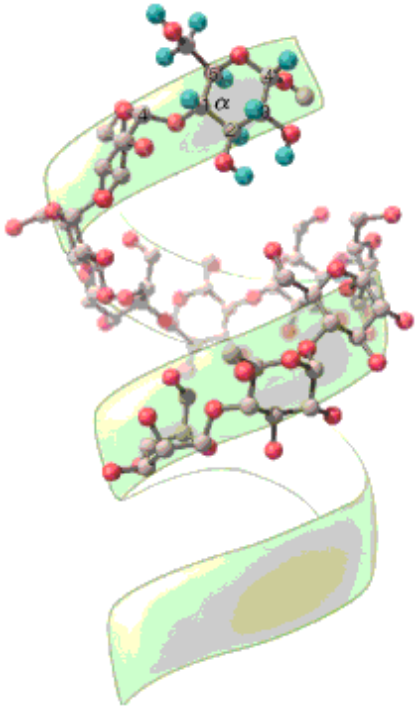


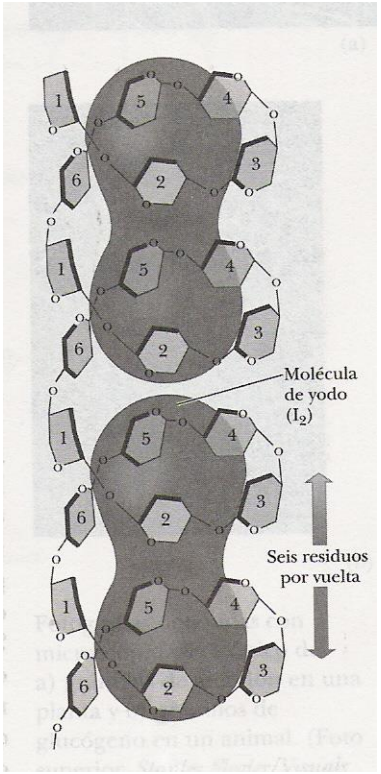
Amilopectina

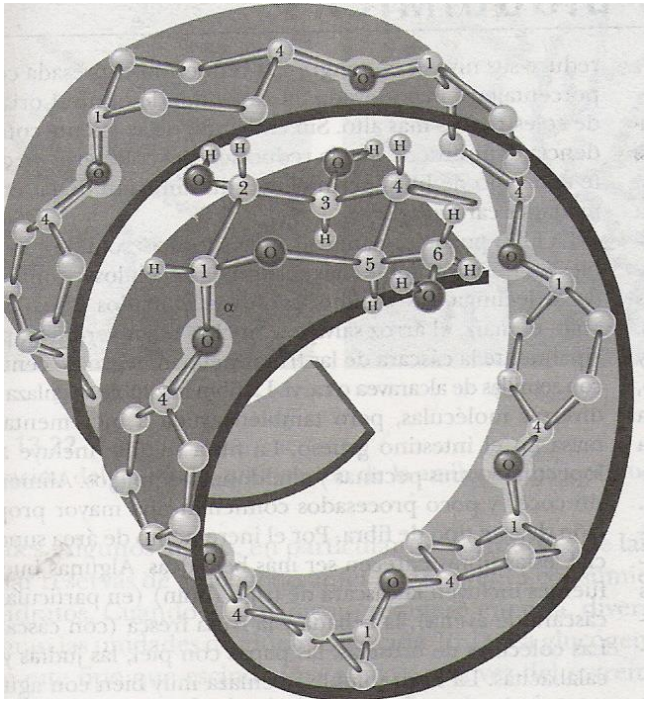


75%

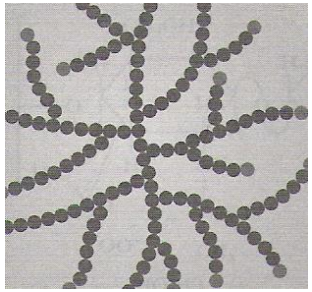
Soluble en agua fría



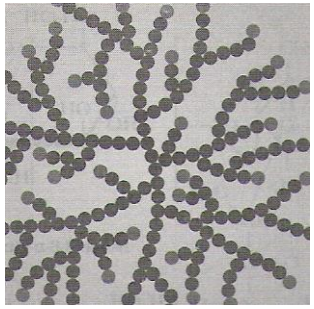

Molécula
de yodo
(I_2)
Seis residuos
por vuelta

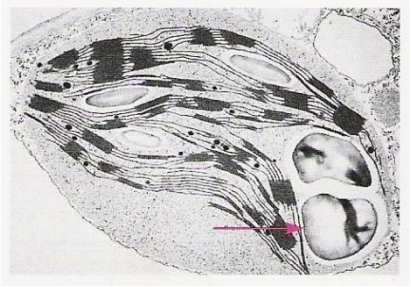


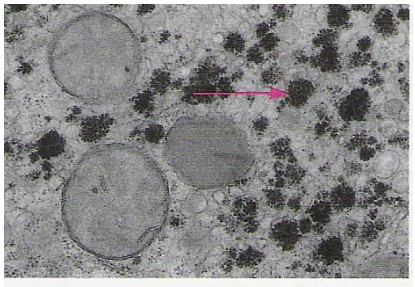
Amilopectina



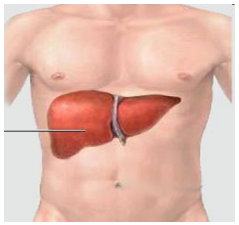
Glucógeno







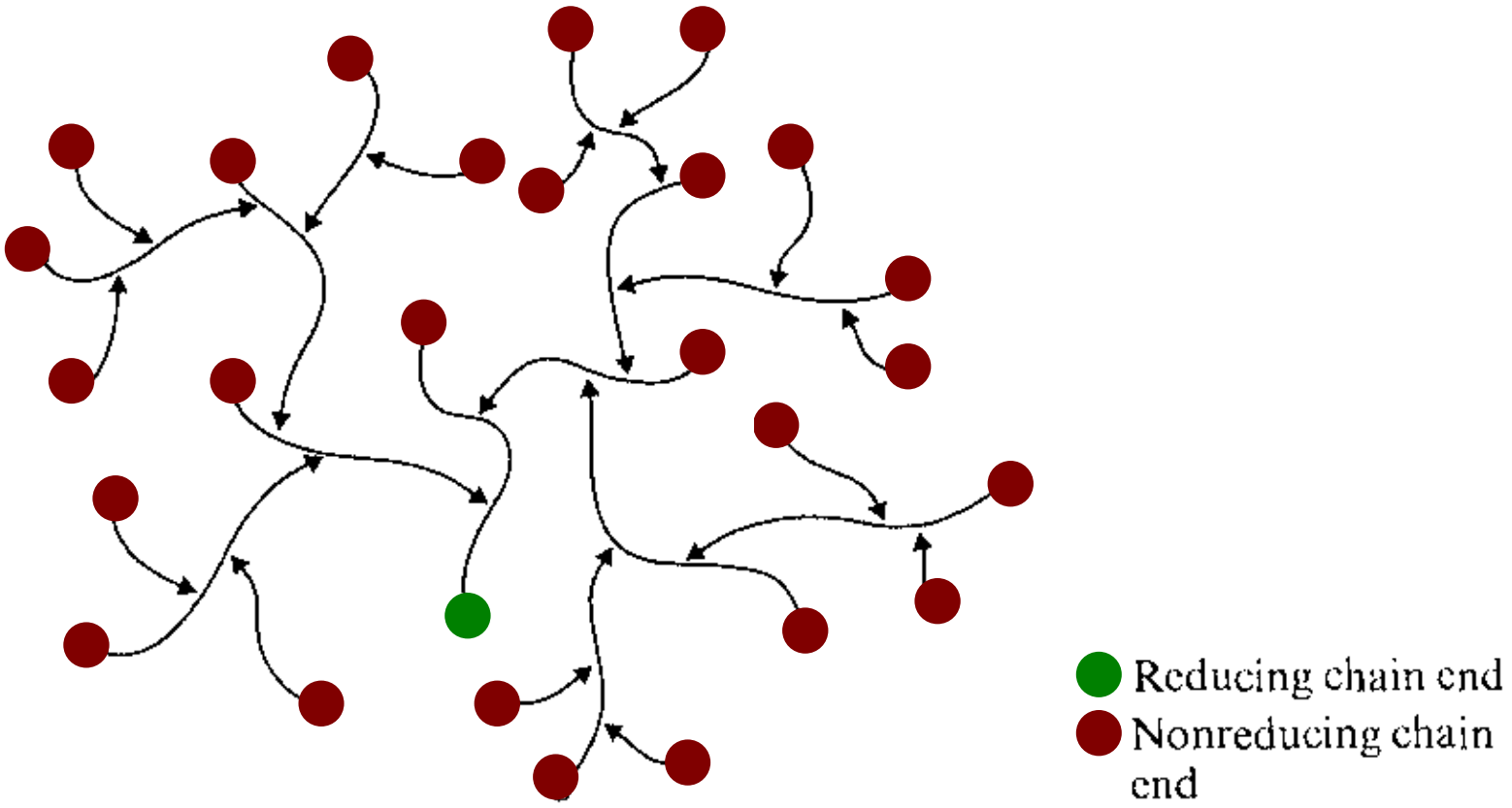






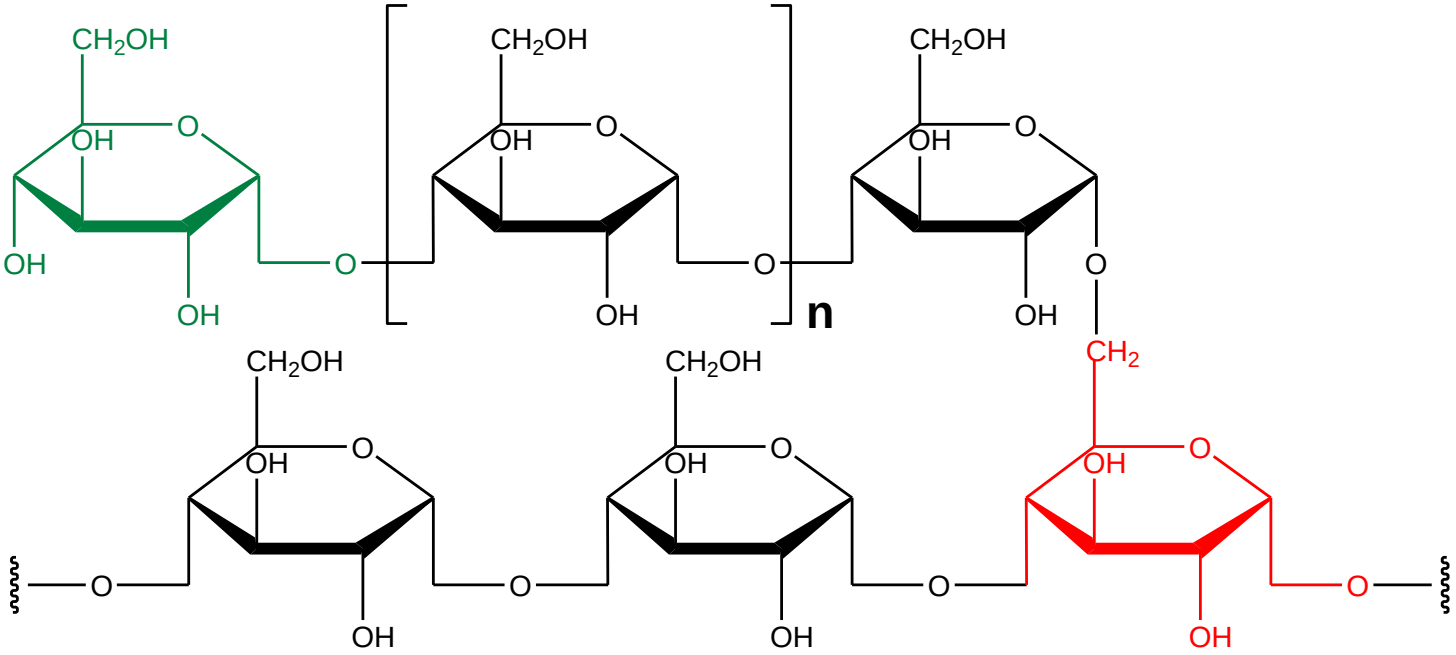


Almidón- glucógeno



n ~ 10 Glucógeno

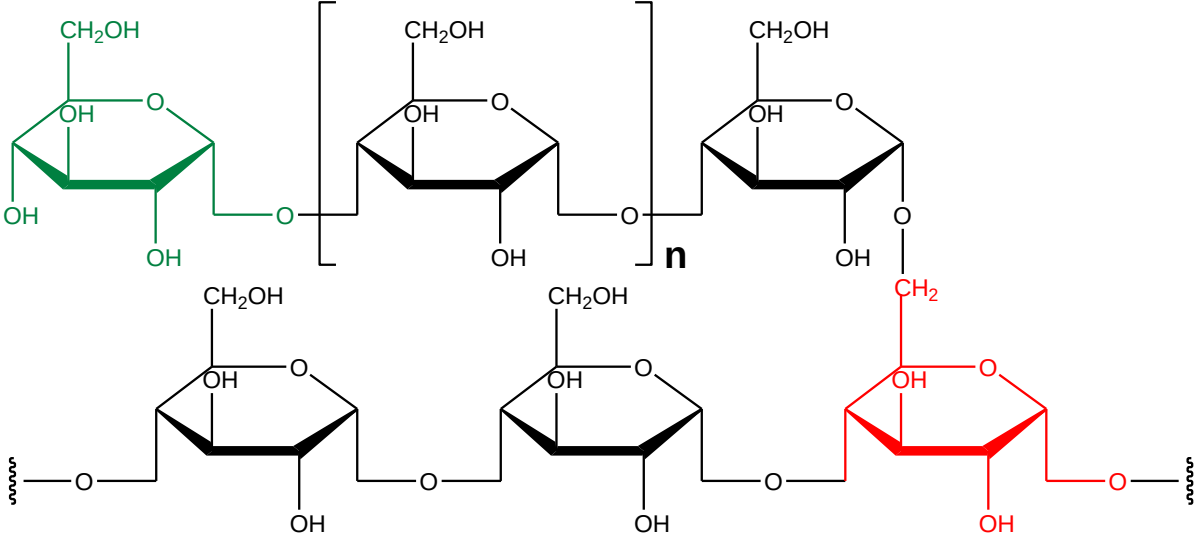
n ~ 25 Amilopectina



Extremo NO reductor

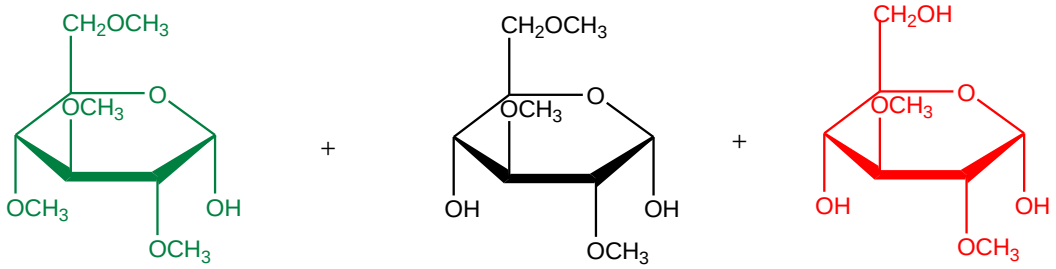
Punto de ramificación

Unidades intermedias

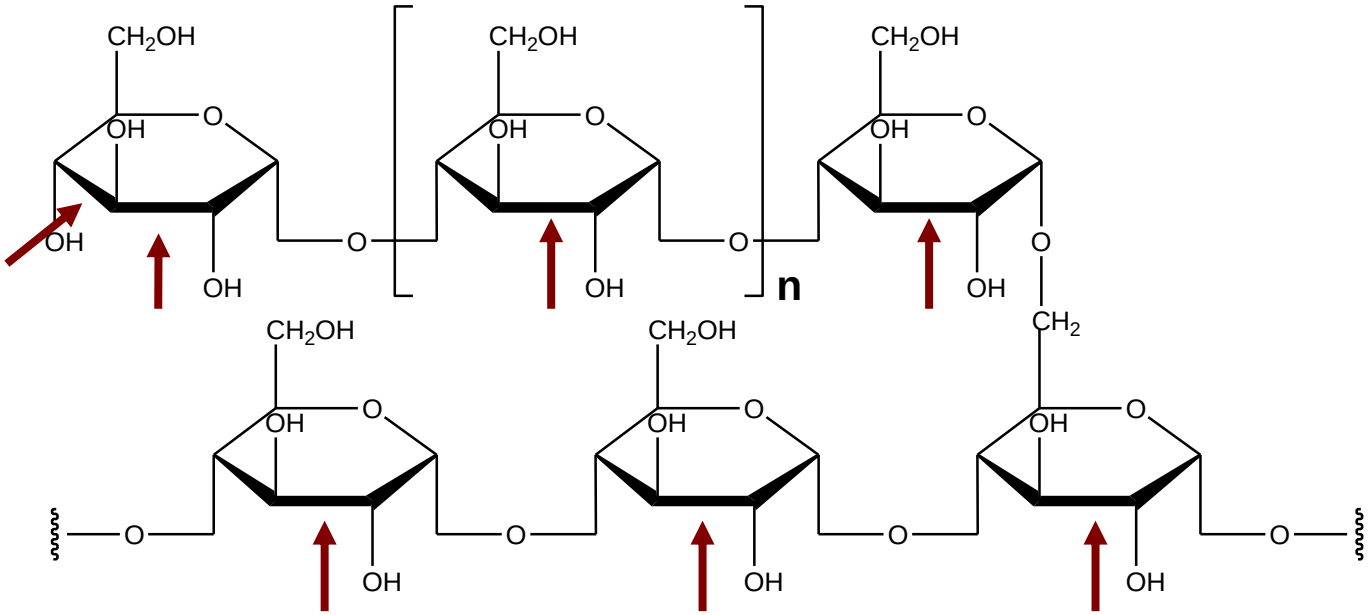


DMSO/ NaH/ ICH_3

HCl

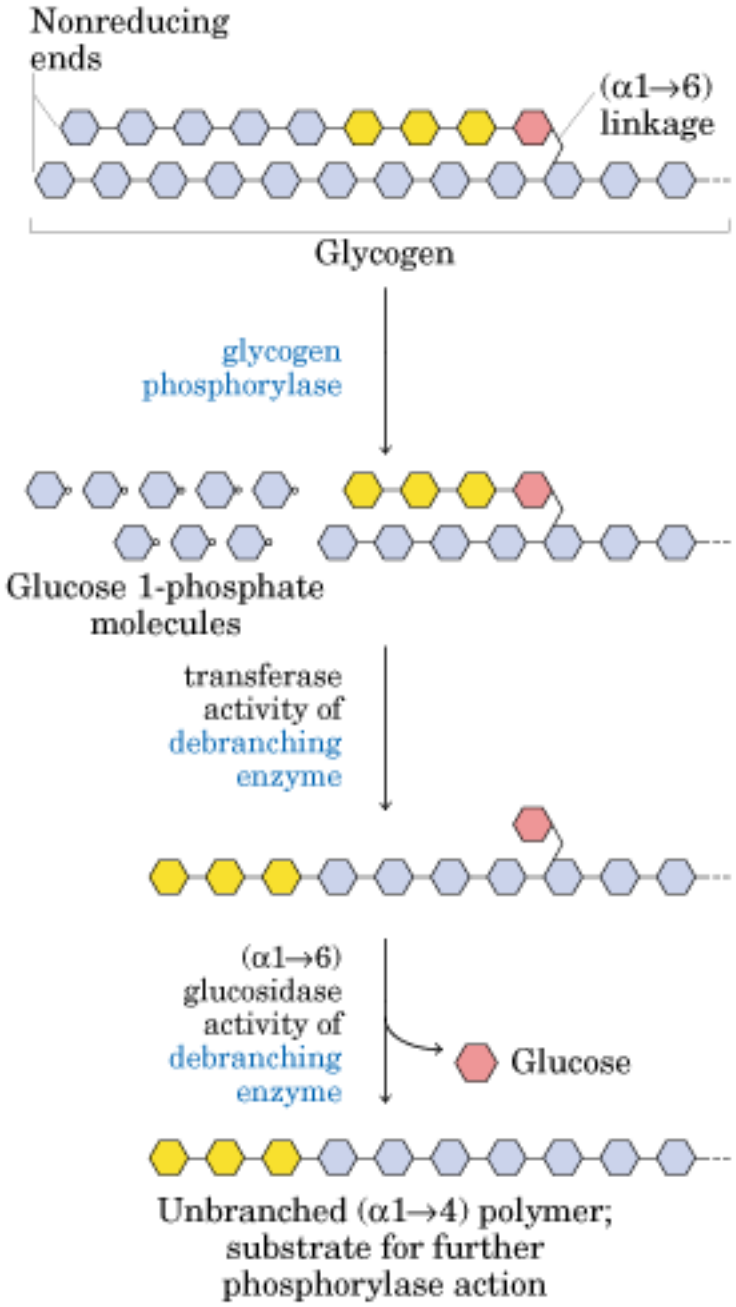


1	**:**	**25**	**:**	**1**	**Amilopectina**
1	**:**	**10**	**:**	**1**	**Glucógeno**

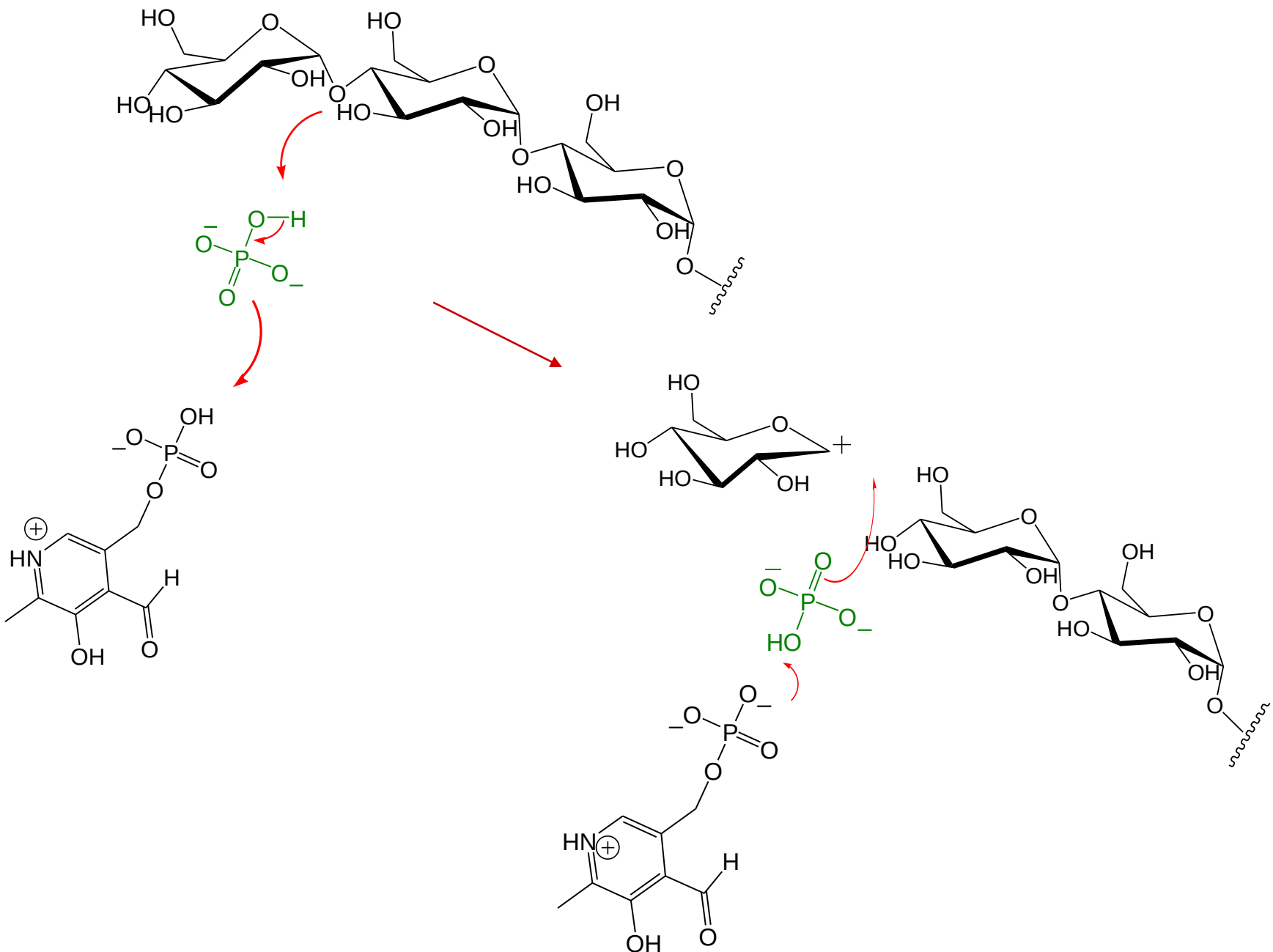


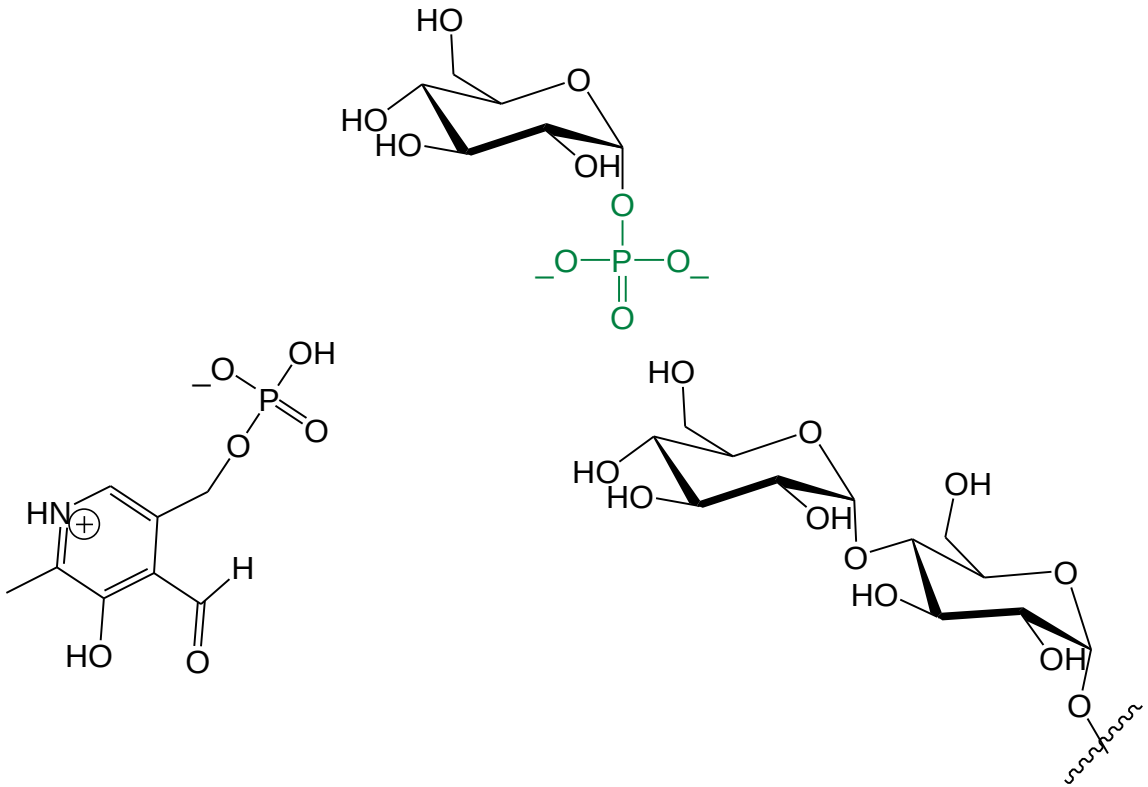
~ 4 % HCOOH Amilopectina

~ 10 % HCOOH Glucógeno

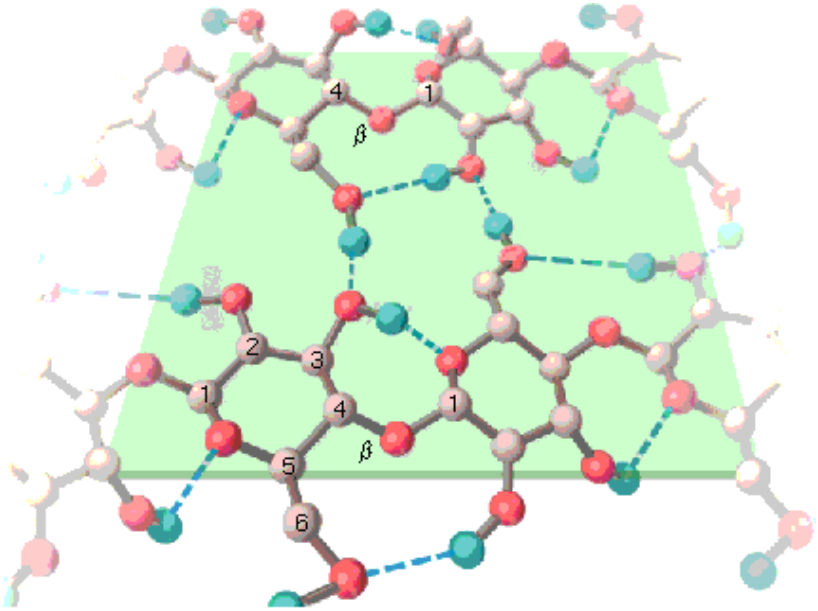

Nonreducing ends
(α1→6) linkage
Glycogen
glycogen phosphorylase
Glucose 1-phosphate molecules
transferase activity of debranching enzyme
(α1→6) glucosidase activity of debranching enzyme
Glucose
Unbranched (α1→4) polymer; substrate for further phosphorylase action

Mecanismo de la enzima glucógenofosforilasa

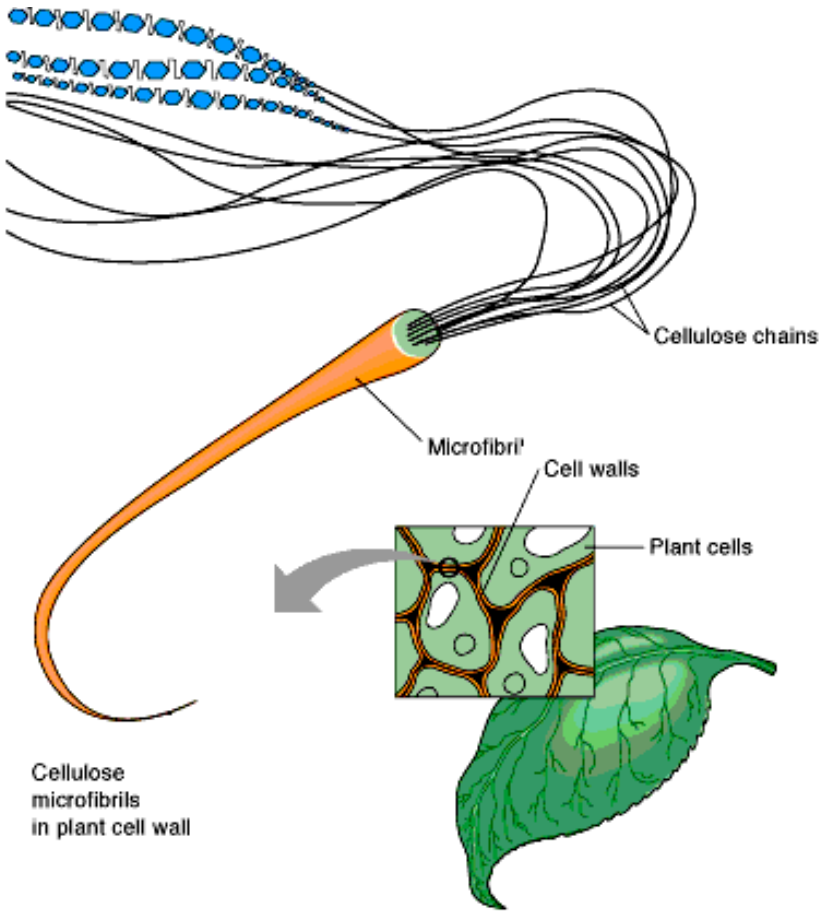


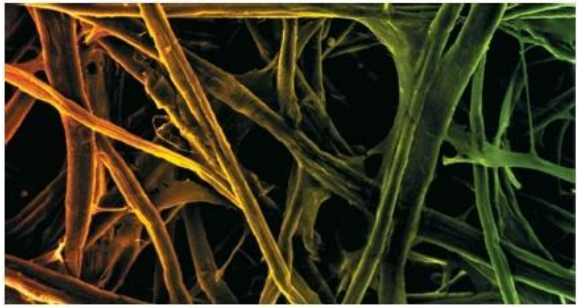

HO
O
HO
HO
OH
O
_O—P—O_
O
_O
OH
P
O
O
HN
H
HO
O
HO
O
HO
HO
OH
O
OH
HO
O
O
OH
O

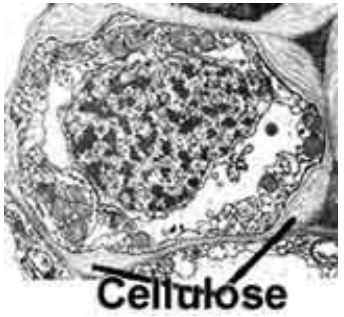
celulosa

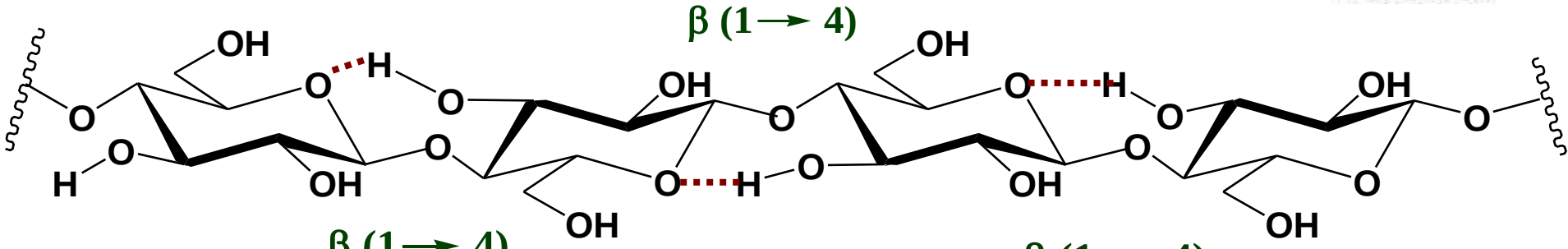

4
1
β
2
3
1
4
1
β
5
6

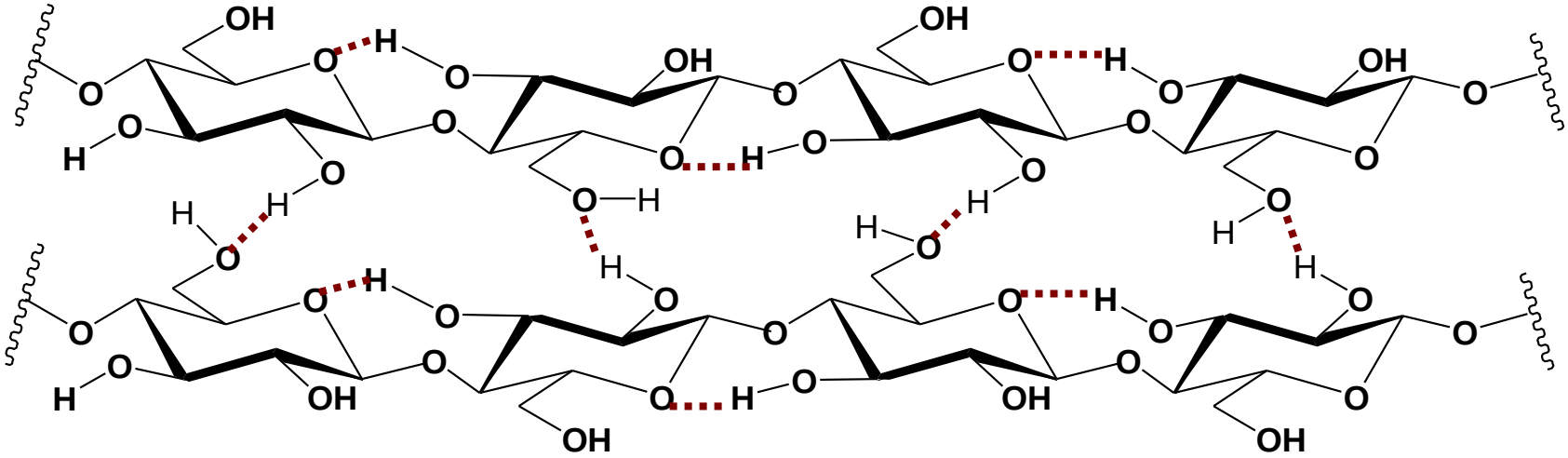



Cellulose chains
Microfibril
Cell walls
Plant cells
Cellulose
microfibrils
in plant cell wall

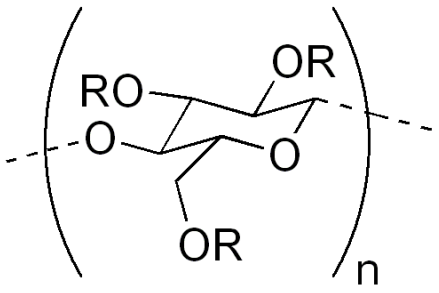



Cellulose


β (1→ 4)
β (1→ 4)
β (1→ 4)

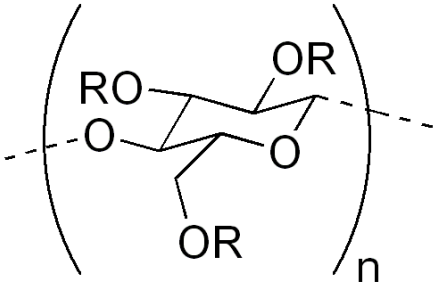


Derivados de celulosa



R = H or CH_2CO_2H





R = H or CH_2CH_3

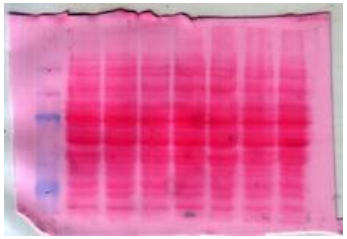
Éteres

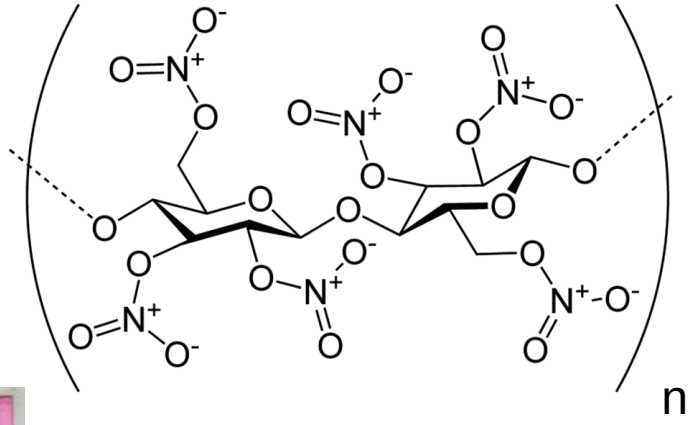
E. Alquil o hidroxialquil celulosas

Esteres

Nitrocelulosa



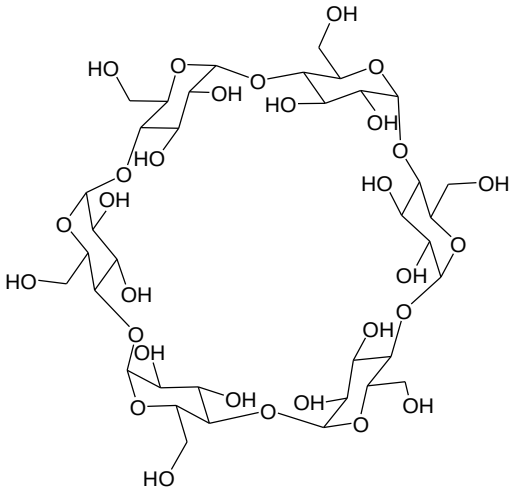




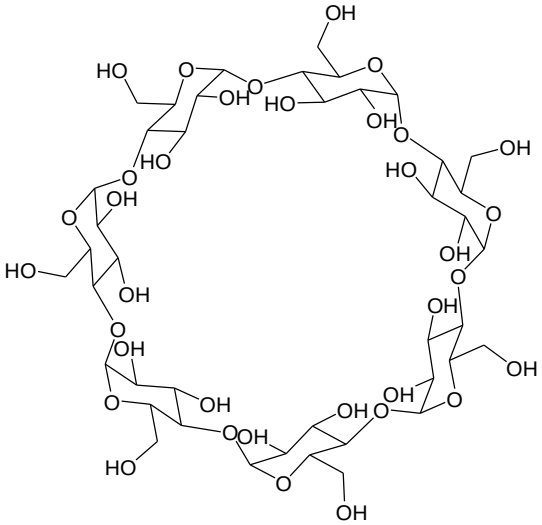




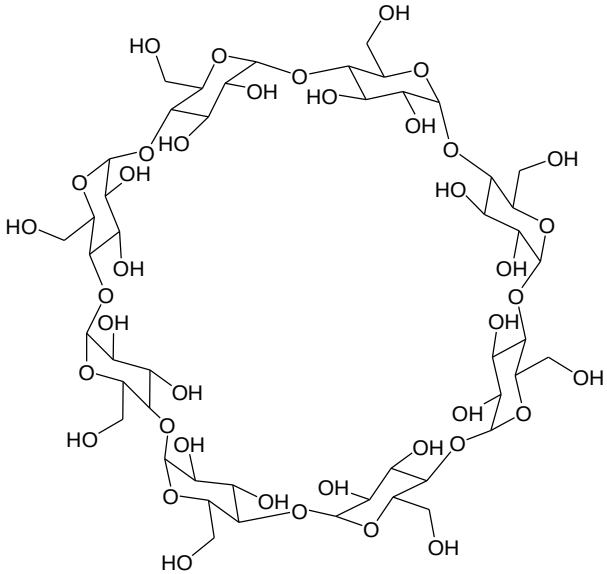
Ciclodextrinas



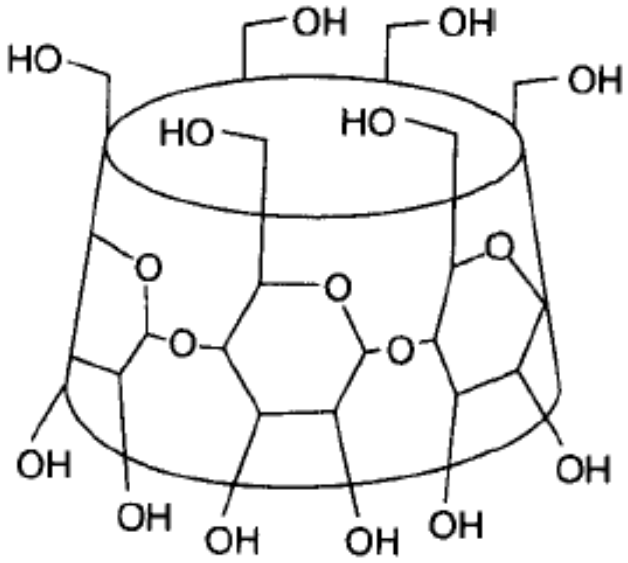
α Ciclodextrina

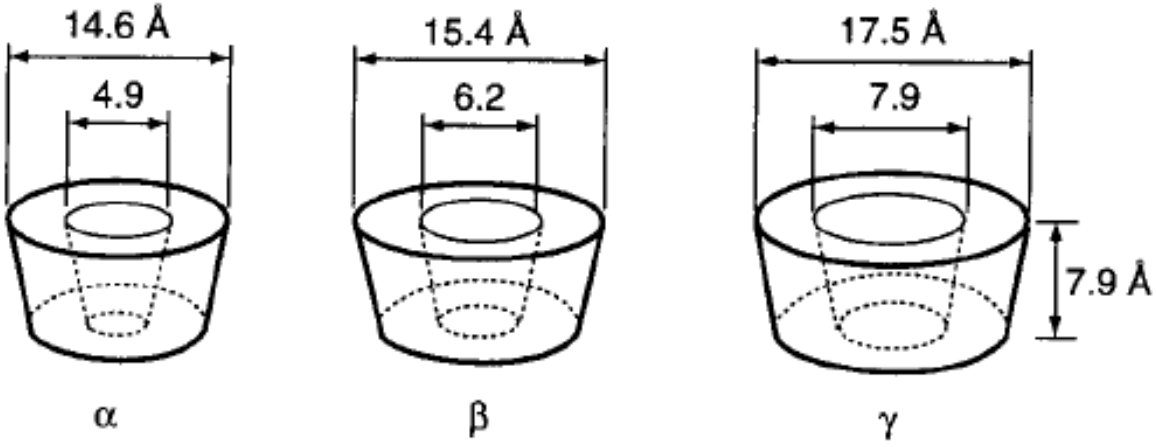


β Ciclodextrina

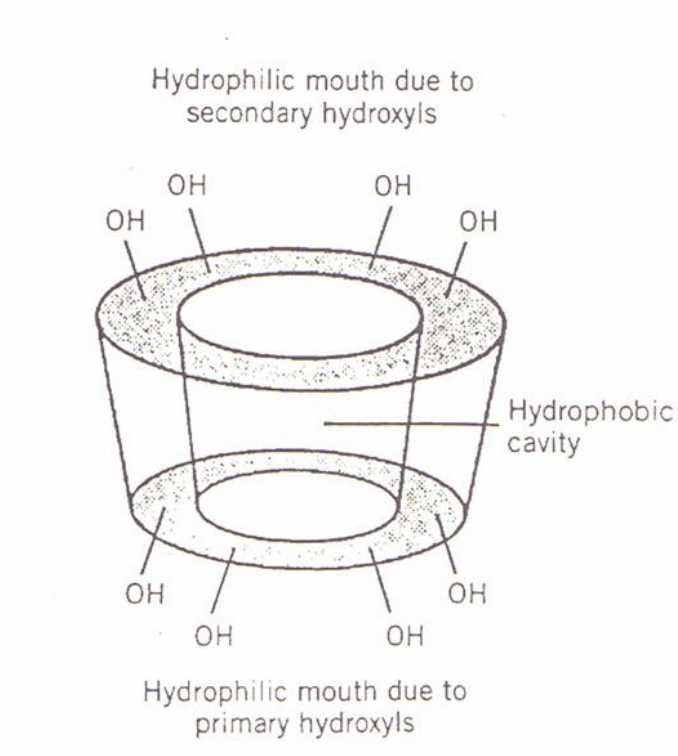


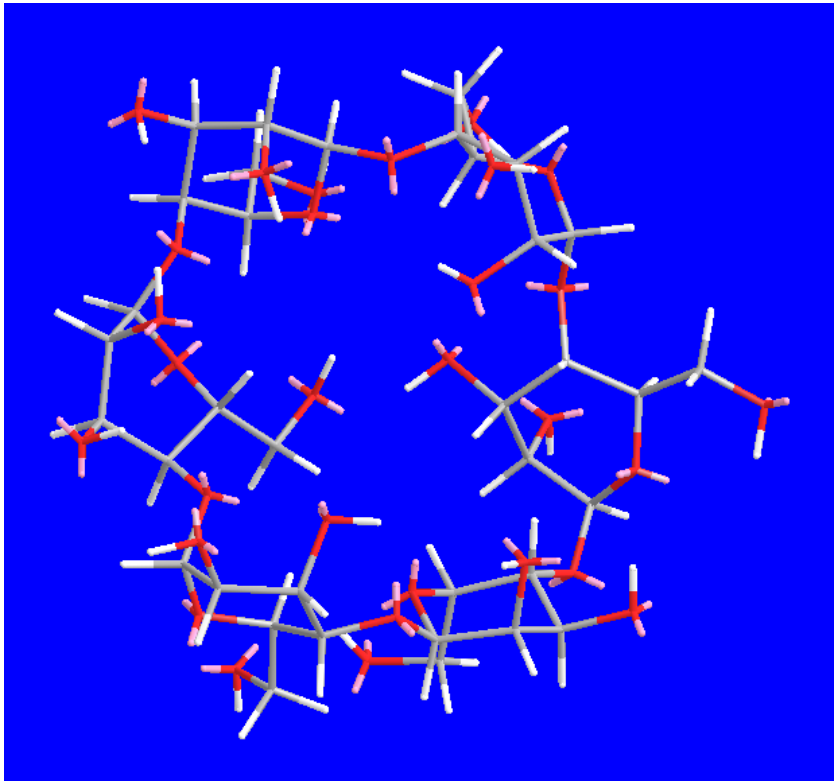
γ Ciclodextrina

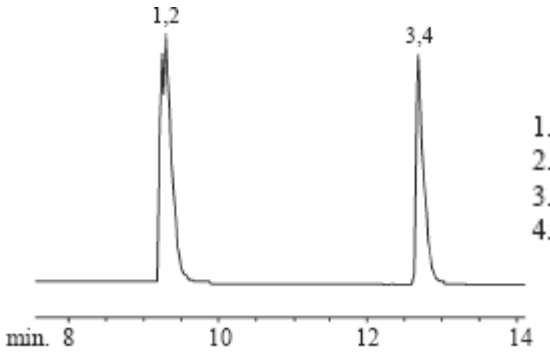




Shape and dimensions of the α-, β-, and γ-cyclodextrin molecules.[138]







1. (S)-(+)-methyl-3-hydroxybutyrate
2. (R)-(–)-methyl-3-hydroxybutyrate
3. (S)-(+)-ethyl-3-hydroxybutyrate
4. (R)-(–)-ethyl-3-hydroxybutyrate

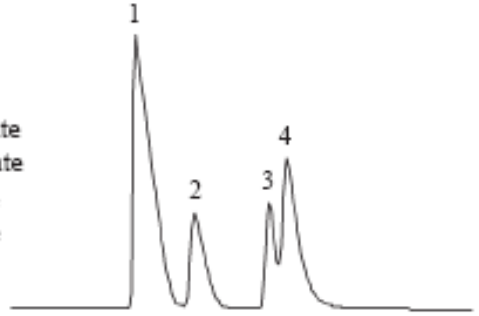
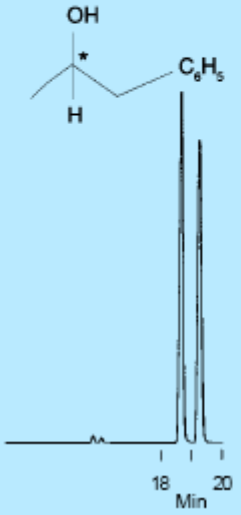


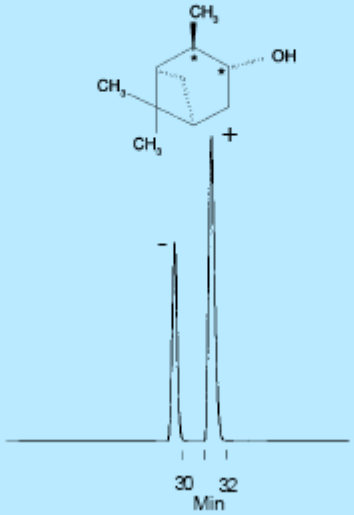
Figure A. Enantioseparation of Alcohols on a β-DEX 325 Column

Column: β-DEX 325, 30m x 0.25mm ID, 0.25µm film
Cat. No.: 24308
Oven: 110°C, 1-phenyl-2-propanol; 100°C, isopinocampheol; and 90°C, 6-methyl-5-hepten-2-ol
Carrier: helium, 20cm/sec set at the analysis temperature
Det.: FID, 300°C
Inj.: 1µL methylene chloride (1mg/mL each analyte), split (100:1) 220°C

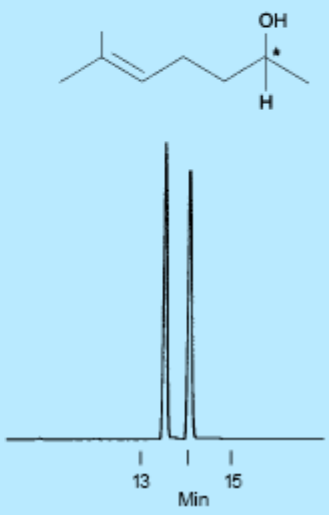
1-Phenyl-2-propanol



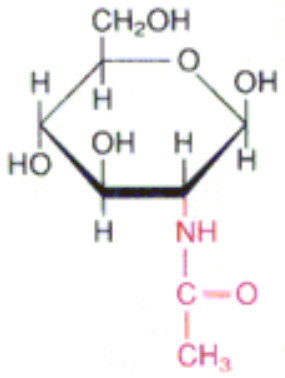
Isopinocampheol



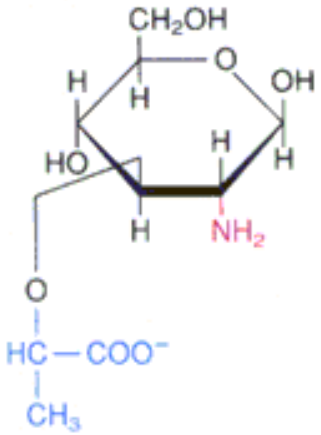
6-Methyl-5-hepten-2-ol



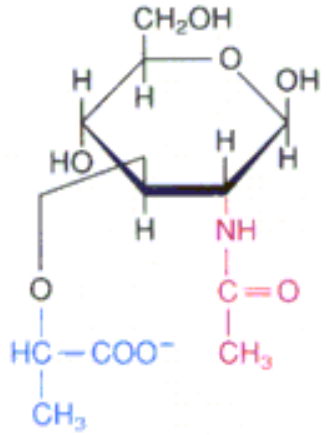
Derivados de monosacáridos presentes frecuentemente en polisacáridos



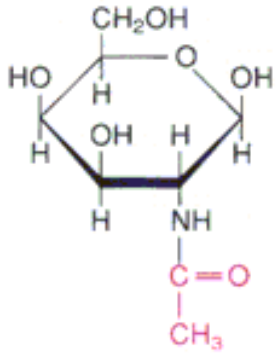
β-D-*N*-Acetylglucosamine



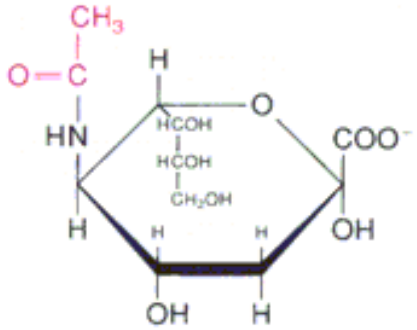
Muramic acid



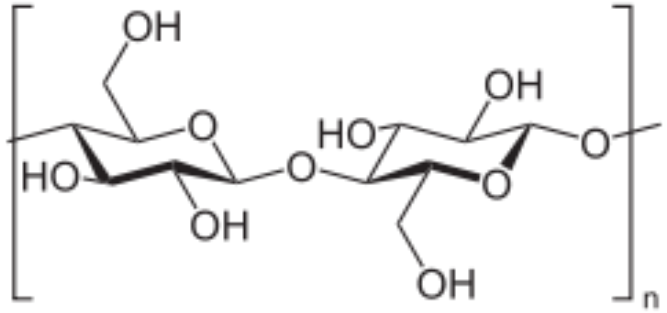
N-Acetylmuramic acid



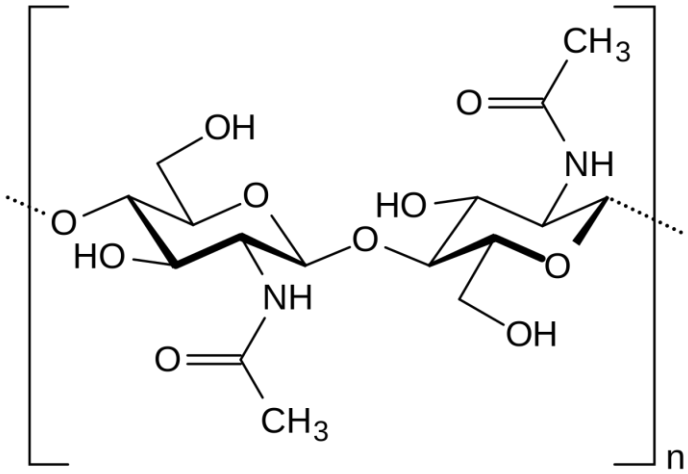
β-D-*N*-Acetylgalactosamine



N-Acetylneuraminic acid
(sialic acid)



celulosa



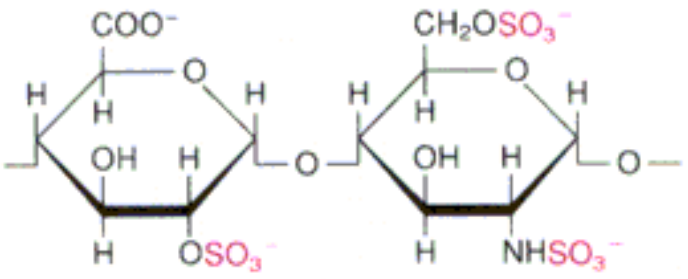


quitina

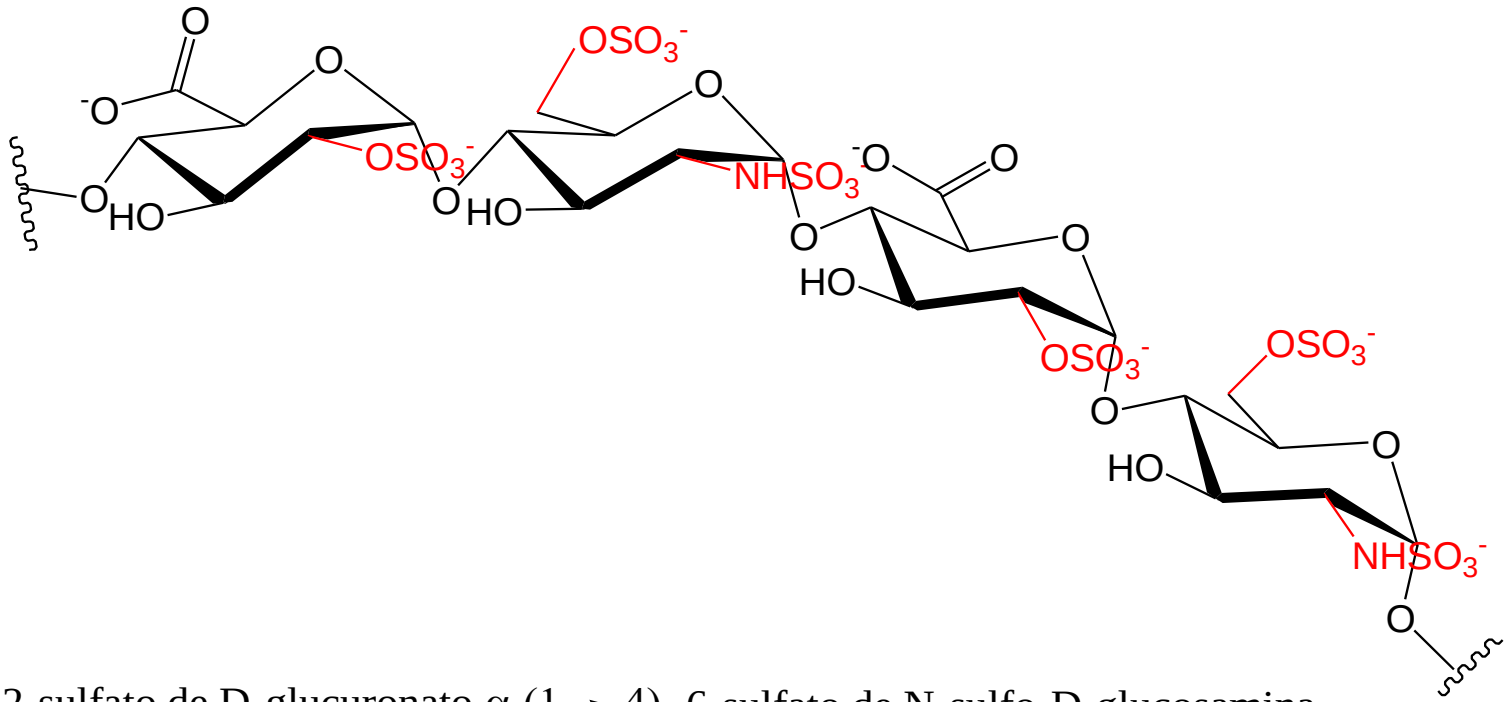
N-acetil-D-glucosamina (β1⟶4)

Heteropolisacáridos

Glucosaminoglicanos o mucopolisacáridos



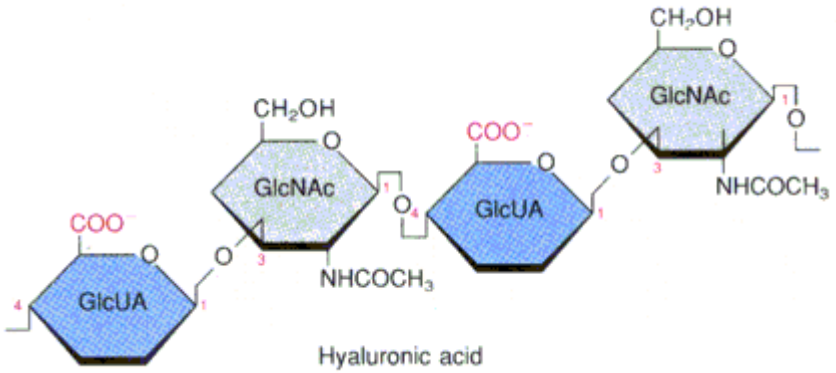
Heparin

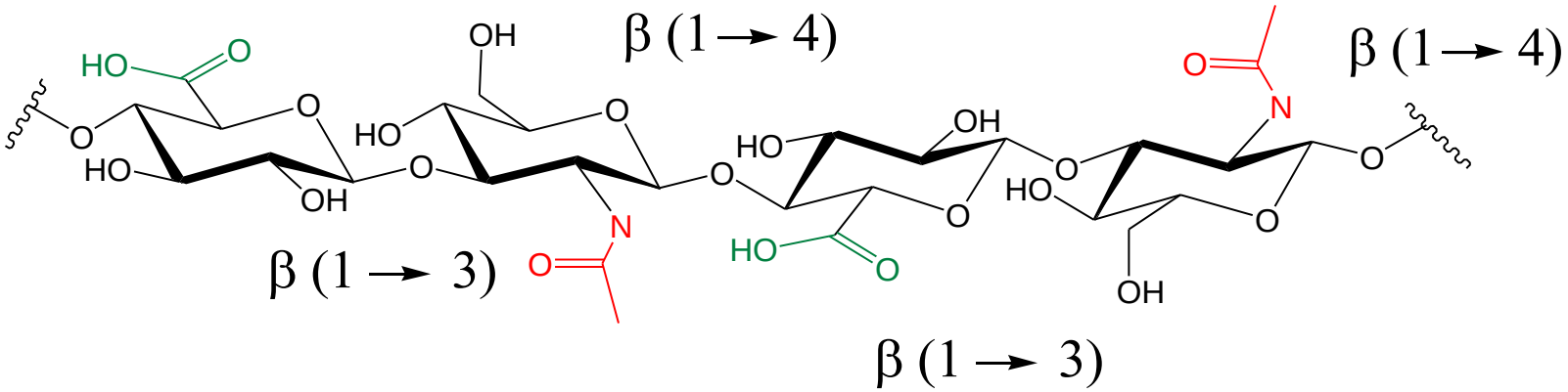


2-sulfato de D-glucuronato α (1→ 4) 6-sulfato de N-sulfo-D-glucosamina

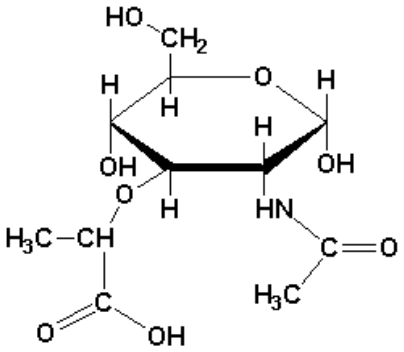
Glucosaminoglicanos o mucopolisacáridos

Acido hialurónico

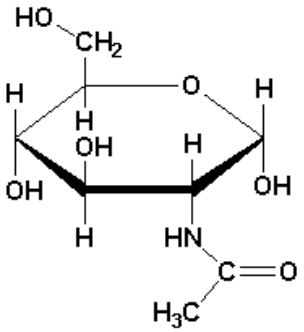




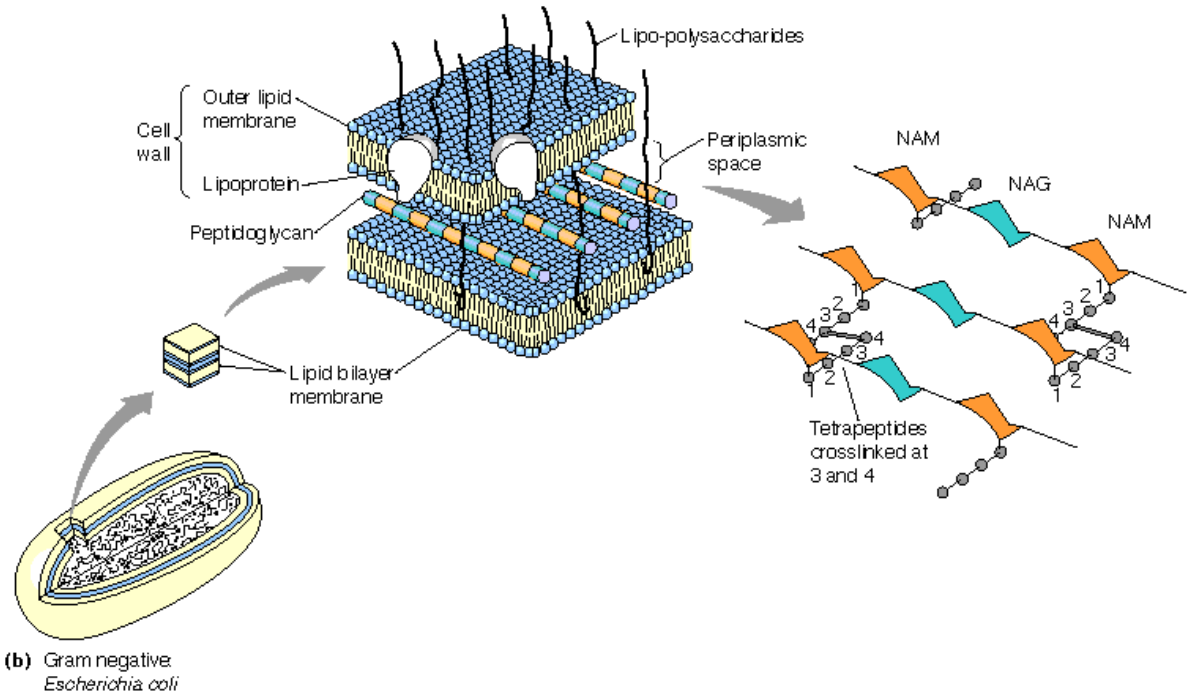
Paredes celulares bacterianas

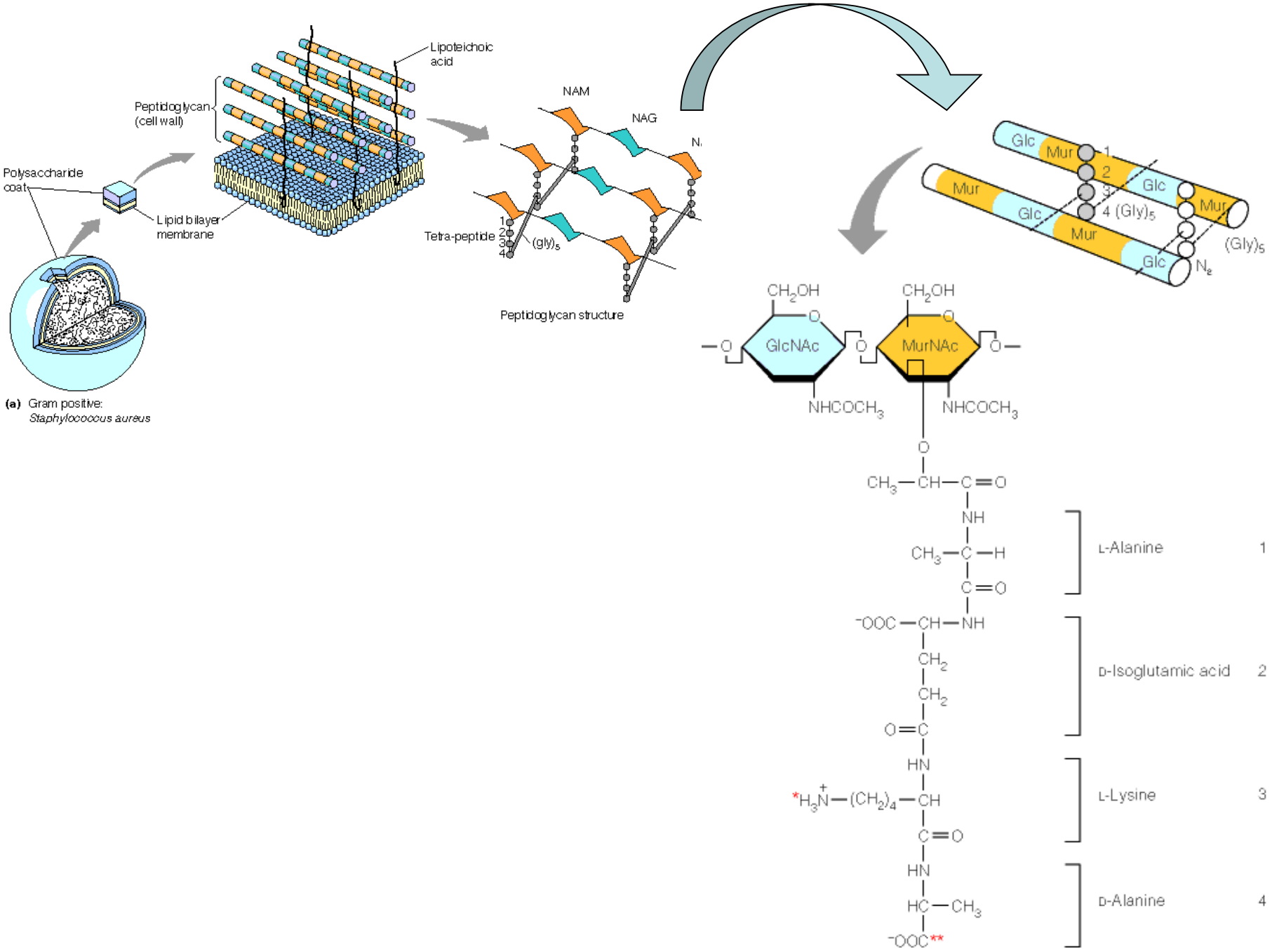


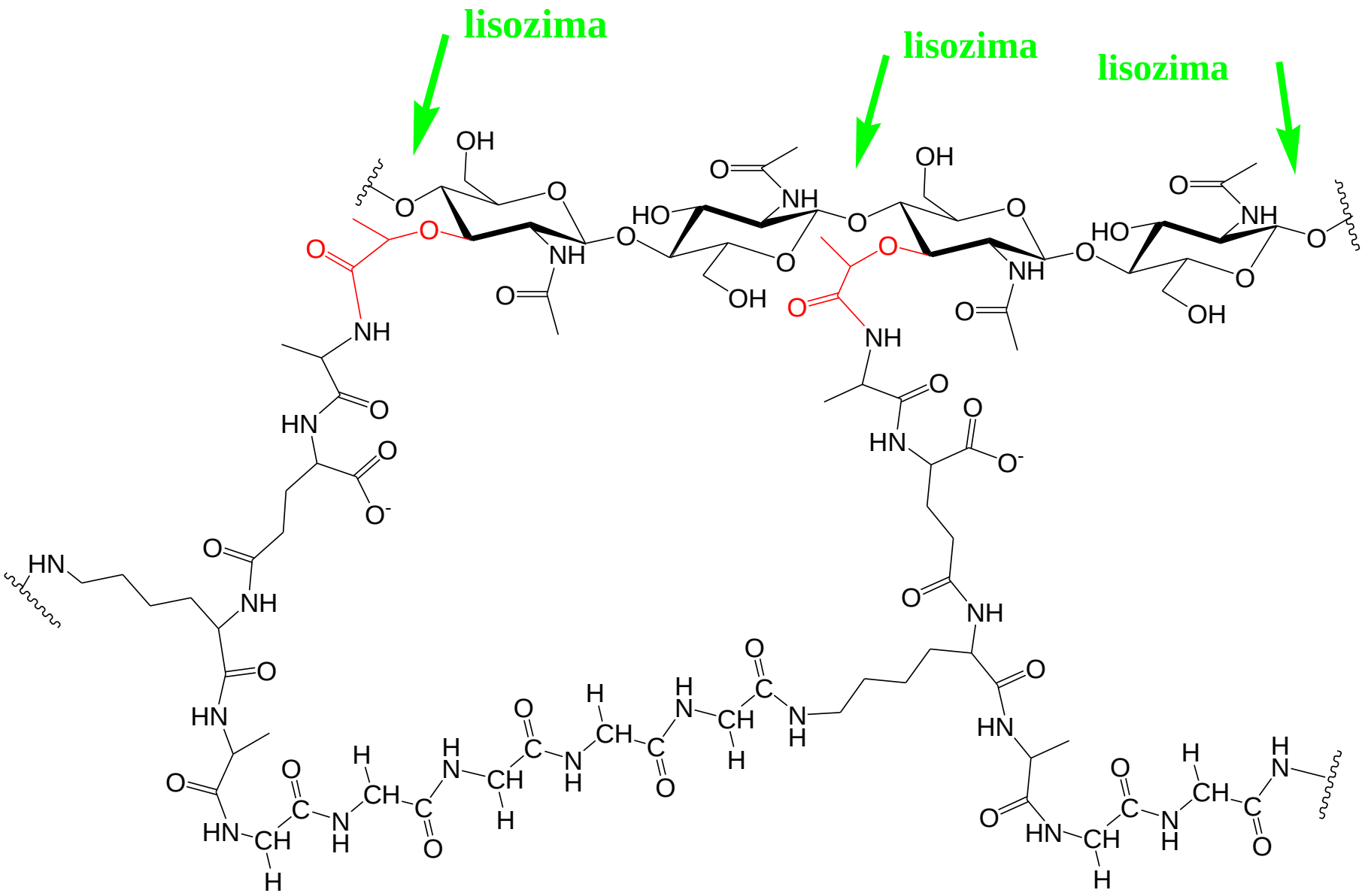
N-Acetylmuramic acid



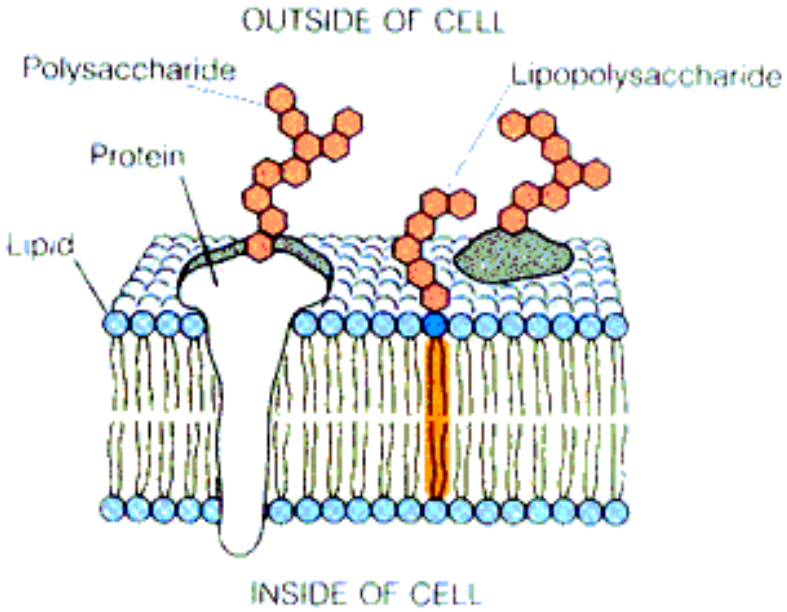
N-acetylglucosamine



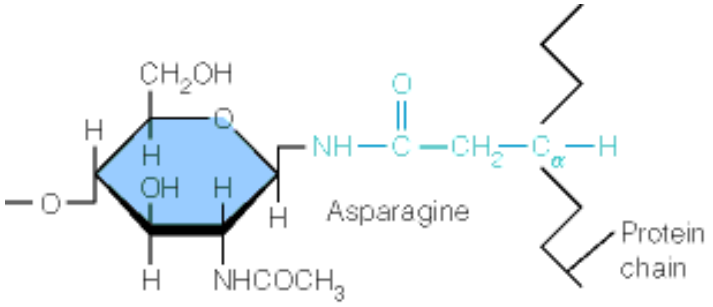

Lipoteichoic acid
Peptidoglycan (cell wall)
Polysaccharide coat
Lipid bilayer membrane
(a) Gram positive: Staphylococcus aureus
NAM
NAG
Tetra-peptide
(gly)5
Peptidoglycan structure
Glc
Mur
Mur
Glc
Glc
Mur
Glc
Mur
1
2
3
4 (Gly)5
(Gly)5
GlcNAc
MurNAc
NHCOCH3
NHCOCH3
L-Alanine 1
D-Isoglutamic acid 2
L-Lysine 3
D-Alanine 4


lisozima
lisozima
lisozima

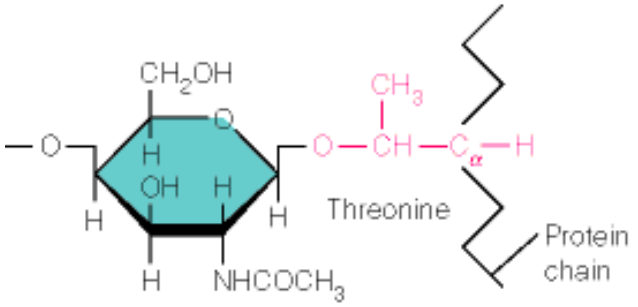
Glucoproteínas y glucolípidos



(a) Cell surface oligosaccharides

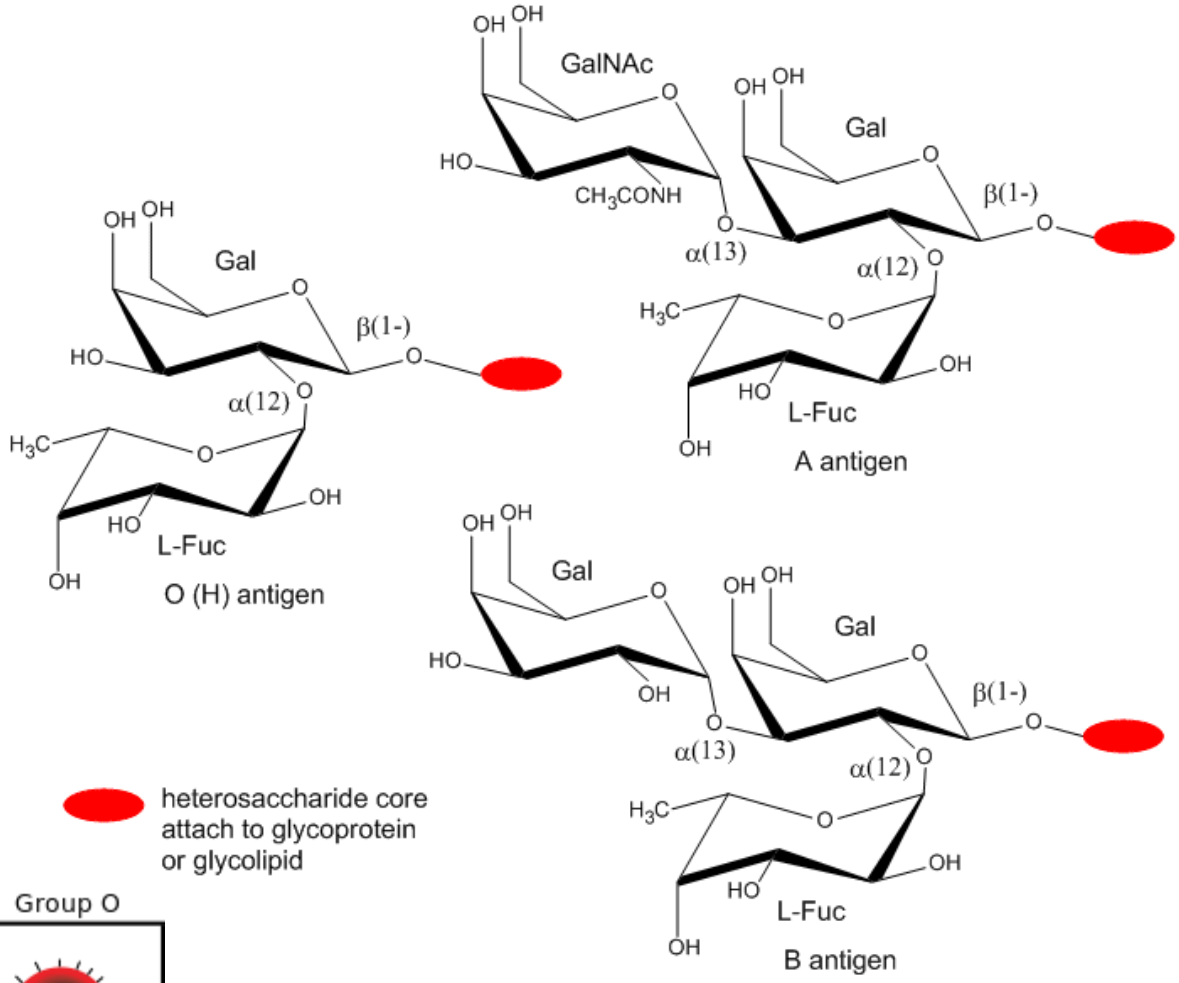


(a) *N*-Acetylglucosamine



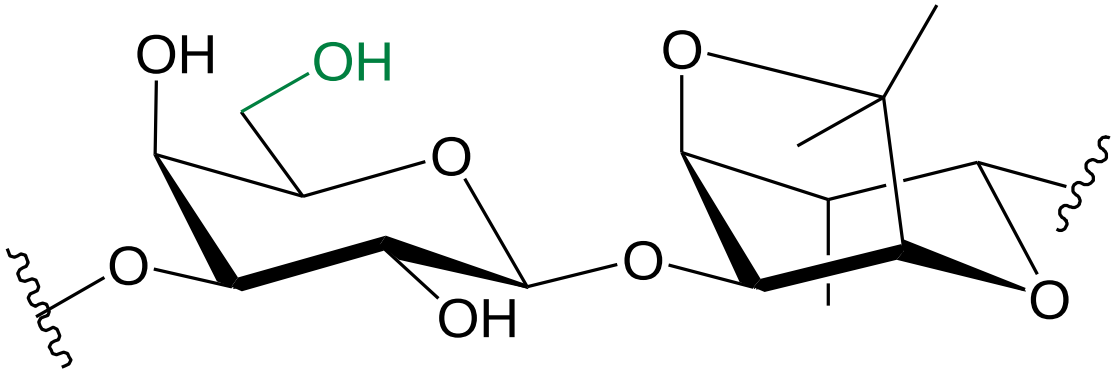
(b) *N*-Acetylgalactosamine

Antígenos de los grupos sanguíneos



	Group A	Group B	Group AB	Group O
Red blood cell type	A	B	AB	O
Antibodies in Plasma	Anti-B	Anti-A	None	Anti-A and Anti-B
Antigens in Red Blood Cell	A antigen	B antigen	A and B antigens	None

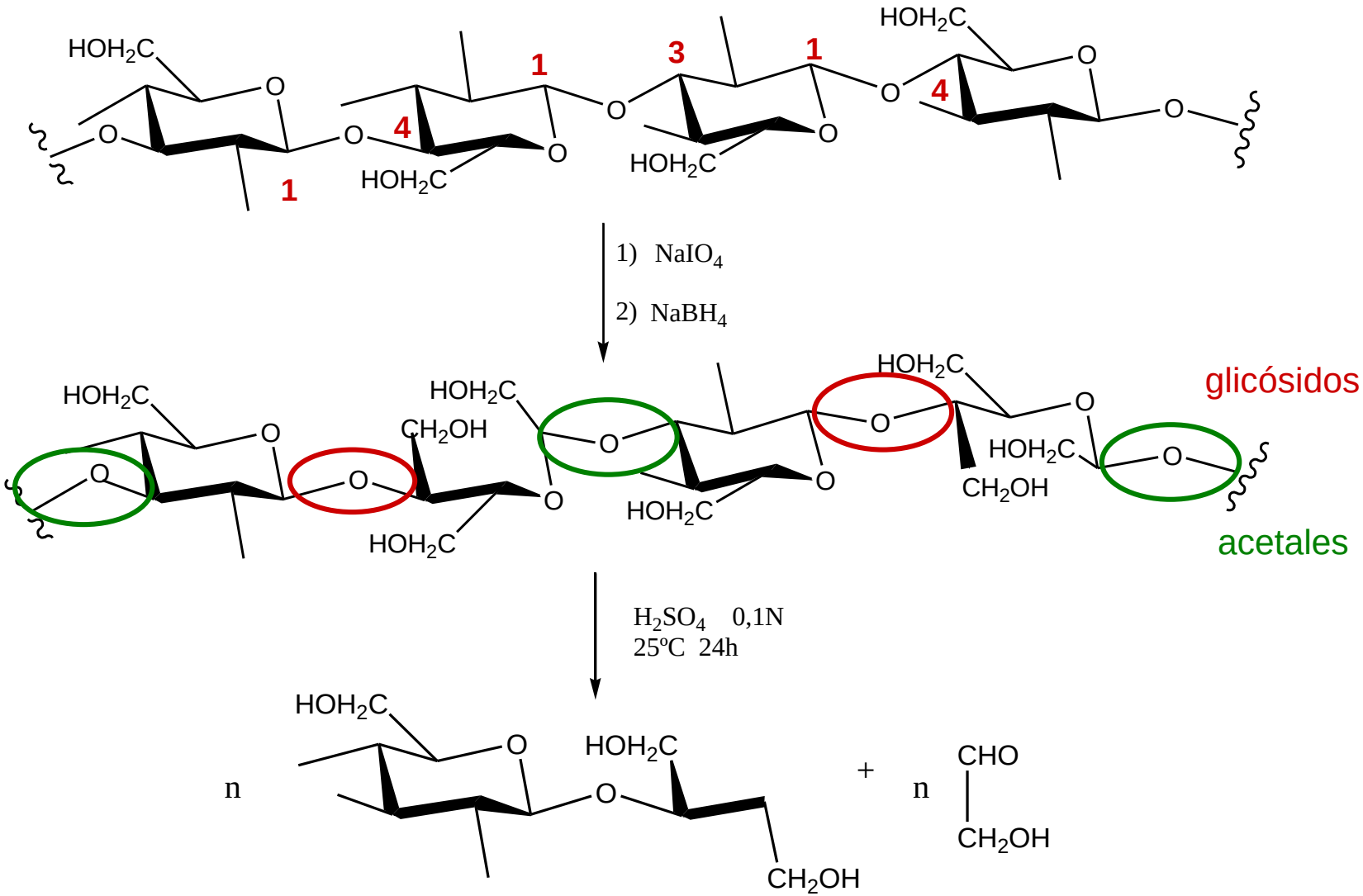
Agarosa



D-galactosa-β (1⟶4) 3,6 anhidro-L-galactosa

Método de Smith

Uniones alternantes 1→3 y 1→4 EJ: Nigerano



Nota: la unión glicosídica es relativamente estable en condiciones ácidas suaves, mientras que la unión acetálica es muy sensible a los ácidos.

BIBLIOGRAFÍA

-**ORGANIC CHEMISTRY**. 2da. Edition.G.Marc LOUDON. Editorial Benjamin
-**ORGANIC CHEMISTRY**. J. Mc MURRY. 3ra Edición 1994. Ed Interamericana
-**QUIMICA ORGANICA.** Francis Carey ·3 Edicion 1999. Ed. Mc Graw Hill.
-**ORGANIC CHEMISTRY J.** Clayden, N. Greeves, S. Warren, and P. Wothers, 2000.Oxford University Press.
-**BIOCHEMISTRY.** Lubert STRYER 3 Edition 1998. Ed. Freemon
-**BIOORGANIC CHEMISTRY** Hermann Dugas. 3rd Edition 1996. Springer Verlang
-**BIOQUÍMICA.** D.y J. Voet 1992. Ed. Omega
-**BIOQUIMICA**. Albert L. LEHNINGER. 2da. Ed. Ediciones Omega
-**PRINCIPIOS DE BIOQUIMICA**. Albert L. LEHNINGER. Ediciones Omega
-**BIOQUIMICA.** Mathews, C and Van Holde, K E. Ed. McGraw- Hill Interamericana. Segunda edición. 1998.
-**QUIMICA ORGANICA. ESTRUCTURA Y FUNCION**. Vollhardt, P and Schore, N. Ed. Omega. 3ra Edición, 2000.

-**CARBOHYDRATES The Sweet Molecules of Life.** Robert Stick 2001 Ed. Academic Press.