Carbohydrates

reducing sugars

Açúcar - Carboidrato

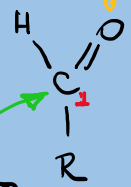
Oxidação - Perda ¡ē¡

Redução - Ganho ¡ē¡

→ Contém grupo aldéido

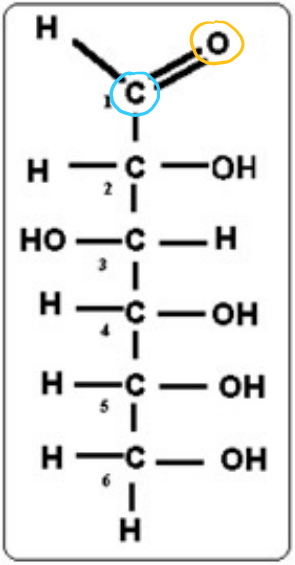
Carbono anomérico

Todos os monossacarídeos

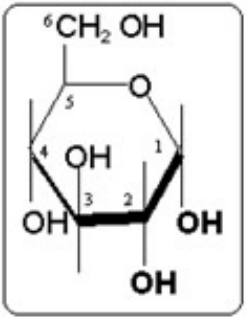


Glicose + Frutose

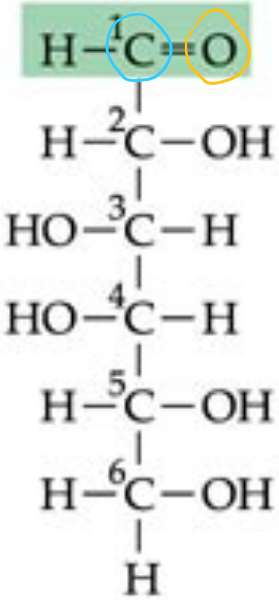
GLICOSE



forma linear

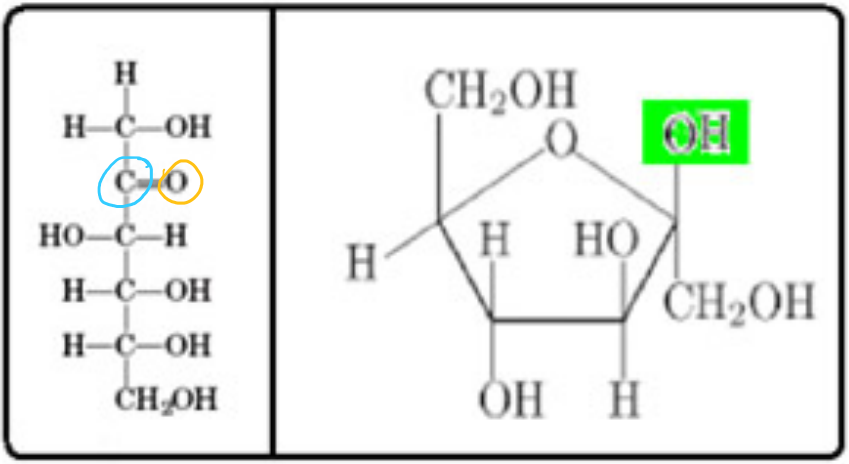


forma cíclica

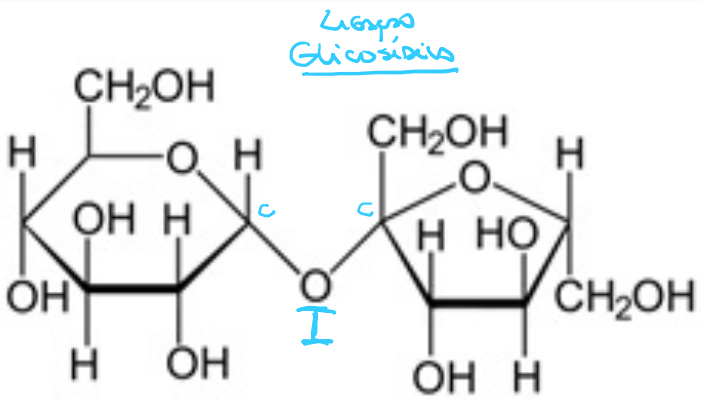


Galactose ($C_6H_{12}O_6$)
(aldose)

Frutose



Cadeia aberta **Cadeia fechada**



sucrose molecule

Carbohydrates

Which one is the EXCEPTION?

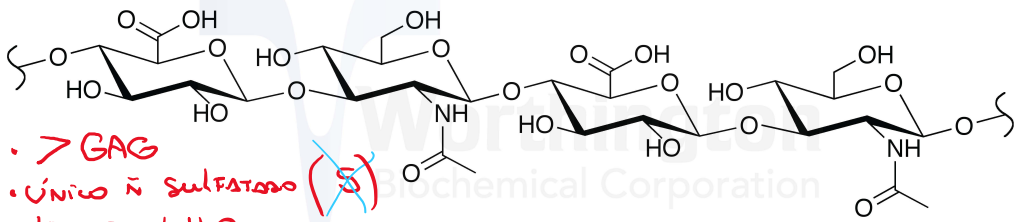
- **sucrose**

Carbohydrates

Proteoglycans ① extracellular matrix, collagen and elastin, fibronectin, and laminin.

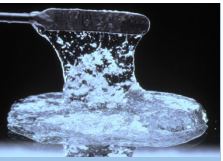
Proteoglycans ② glycosaminoglycans (GAGs).

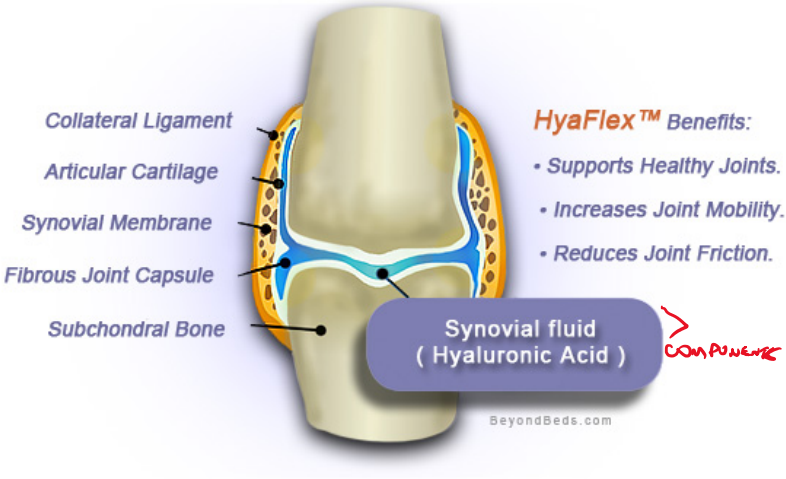
Hyaluronic Acid



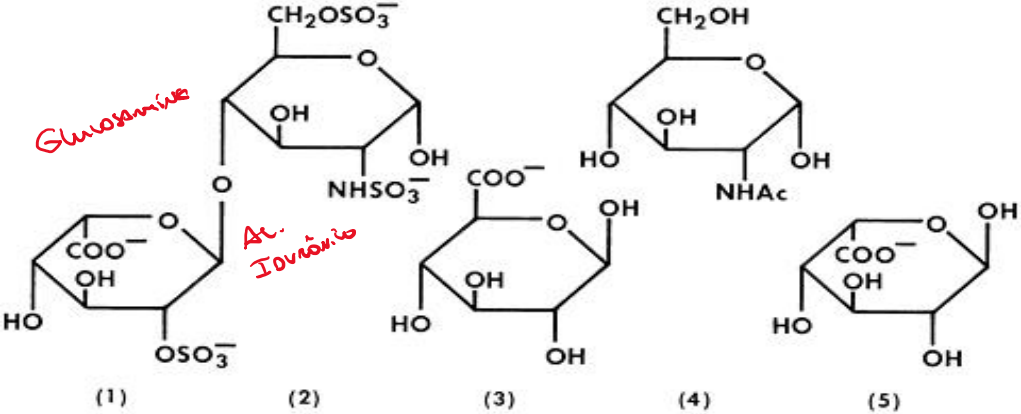
- > GAG
- único ñ sulfatado (S)
- Liga c/ H_2O

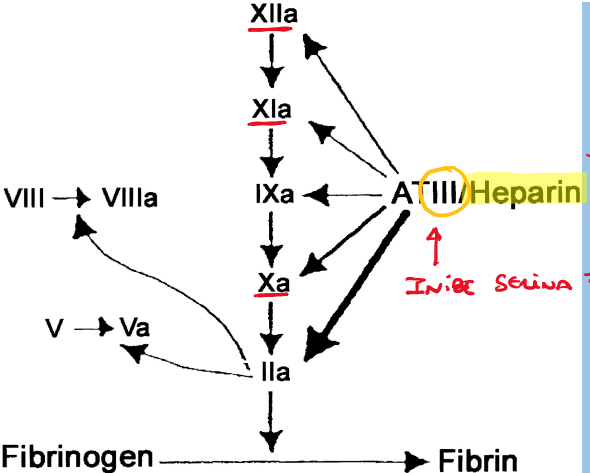
[β-D-Glucuronic acid][N-Acetyl-β-D-Glucosamine][β-D-Glucuronic acid][N-Acetyl-β-D-Glucosamine]





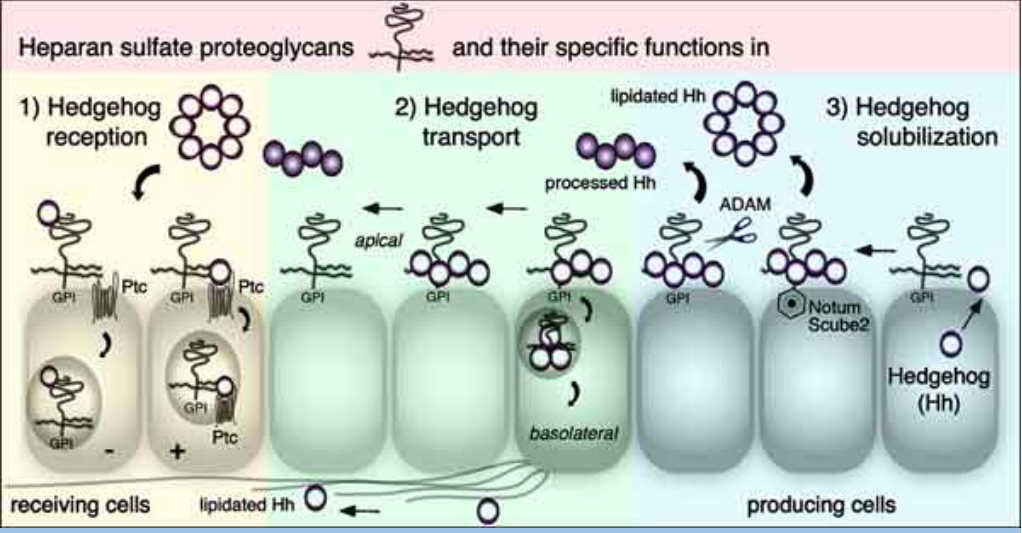
> componente



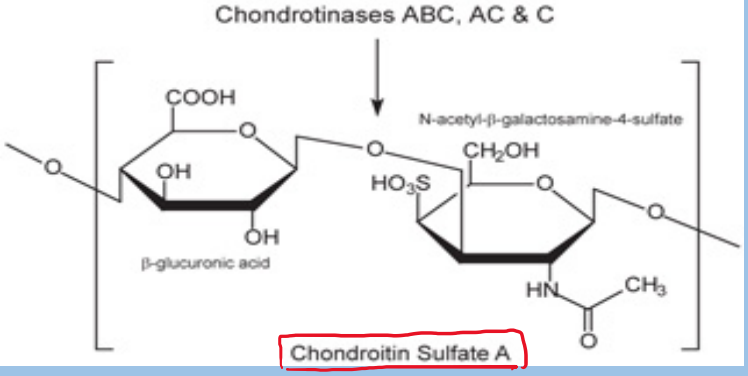


Inibe Serina Protease

- Previne excesso de Fibrina
- Mastócitos / Basófilos



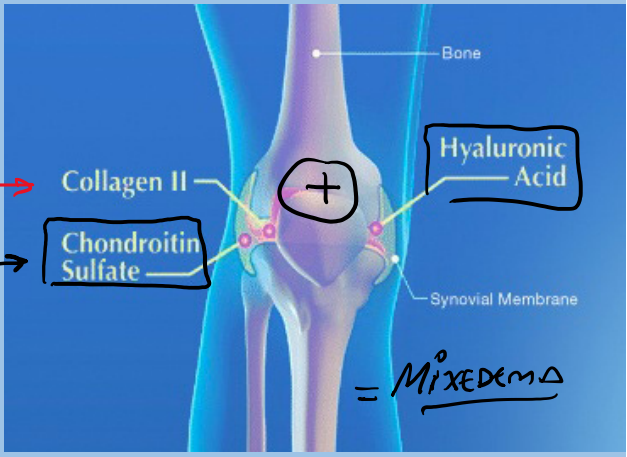
- Membrana plasmática
- Repele albumina (glomérulo)
- carregado ⊖
- Glucosamine - Ac. glucurônico
- <u>SNC</u>



(+) ABUNDANTE

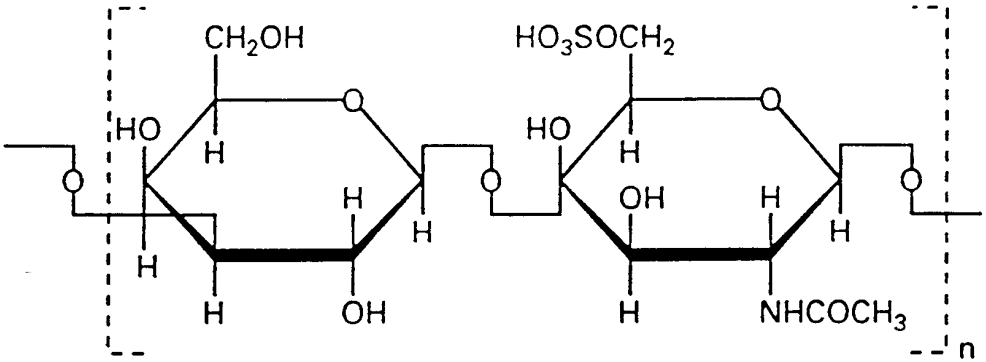
> COMPONENTE

EXCESO DE



= MIXEDEMA

Keratosulfate

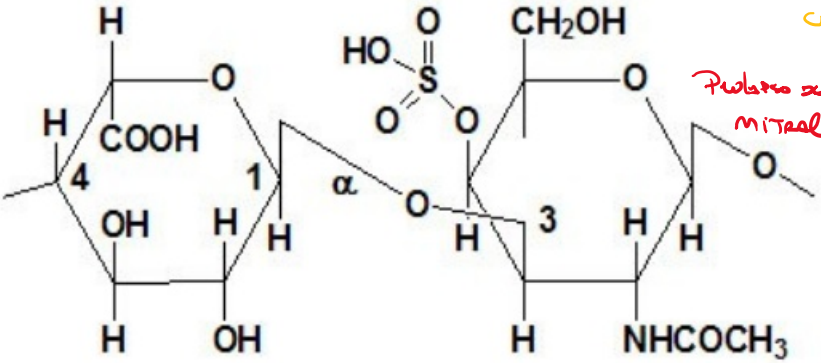


- Cartilaem

Repeating unit of keratosulfate

Structure of dermatan sulphate

Pele, vasos, tendões, válvulas do coração



Prolapso da mitral

Excesso

L-iduronate

N-acetyl-D-galactosamine-4-sulfate

Carbohydrates

where

they interact with collagen and elastin, fibronectin, and laminin.

consist of a core protein

glycosaminoglycans (GAGs).

- **both statements are true**

Carbohydrates

disaccharide made by the union

GLUCOSE + FRUTOSE

DISSACARÍDEOS

EPITÉLIO DO INTESTINO → MALTASE, SUCRASE, LACTASE
(BRUSH BORDER)

QUEBRA OS DISSACARÍDEOS EM MONOSSACARÍDEOS

PERDE 1 H_2O

L. Glicosídica

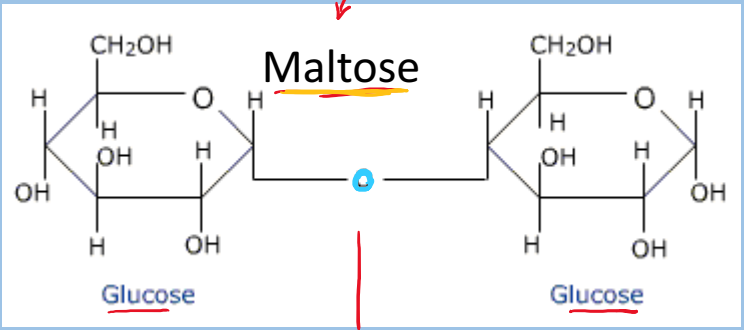
m + m = Dissacarídeo
= Oligossacarídeos
= Polissacarídeos

Grupo Hidroxil
Reage com
- OH ou - NH
(Purina, álcool, Pirimidina ou outro açúcar)

Ligações O- Glicosídicas - Oxigênio envolvido → Polissacarídeos

Ligações N- Glicosídicas - Nitrogênio envolvido → Glicoproteínas e Nucleotídeos

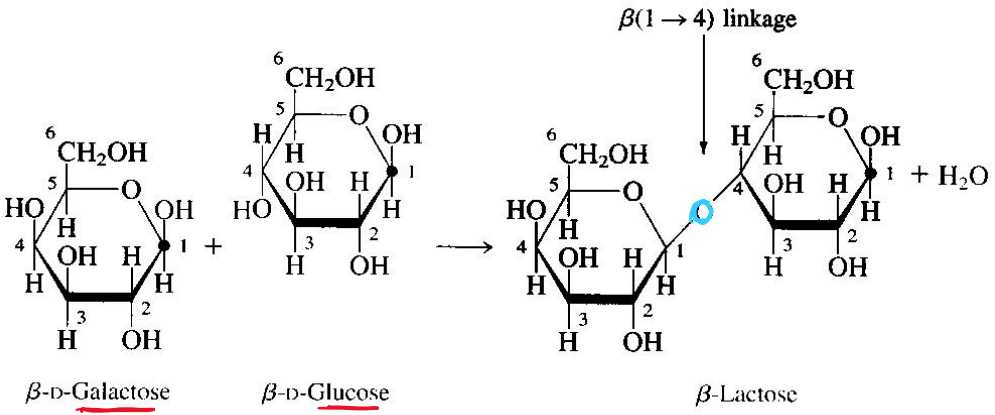
Amido

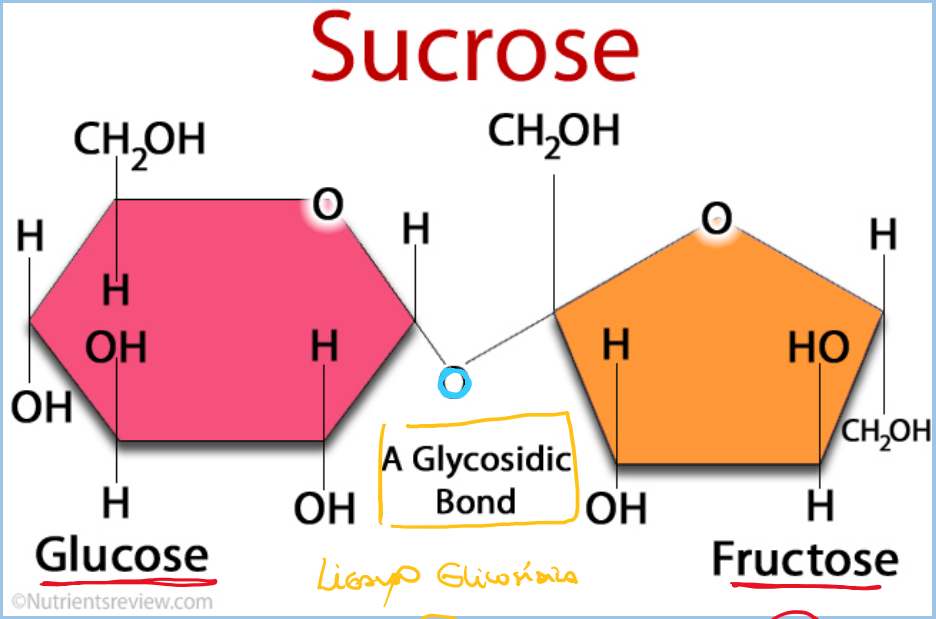


Hidrólise

AÇUCAR DO LEITE

GALACTOSE + GLUCOSE ⟶ LACTOSE





Ligação Glicosídica

M + M

Perde H_2O

= Dissacarídeo

Carbohydrates

glucose with fructose?

- **sucrose**

Carbohydrates

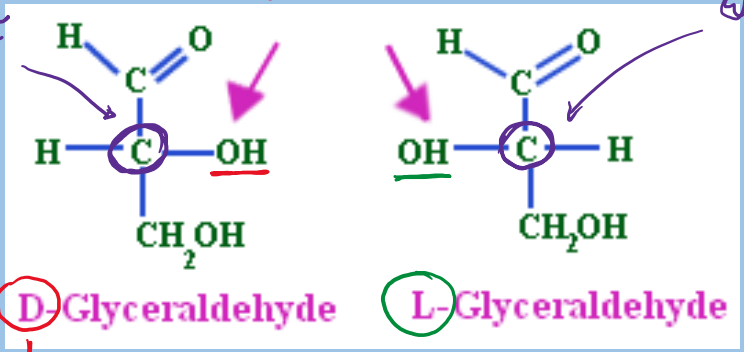
Glucose, fructose, and ribose are classified as:

Proyección de Fischer

Grupo Hidroxilo

Quiral

Quiral

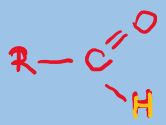


DERECHA

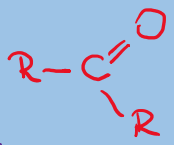
IZQUIERDA

$(CH_2O)_x$ Fórmula Geral

Aldeídos (Aldoses)



Cetonas (Cetose)



Trioses 3C (Gliceraldeído - Dihidroxiacetona) $C_3H_8O_3$

Tetroses 4C (Erythrose)

Pentoses 5C (Ribose, Desoxirribose)

Hexoses 6C (Glicose, Frutose, Galactose) - $C_6H_{12}O_6$

Heptoses 7C (Sedoheptulose)

Frutoses
- Glicose / Galactose (6C) - Açúcares de Piranose
- Ribose / Desoxirribose (5C) - Açúcares de Furanose

Carbohydrates

classified as:

- **monosaccharides**

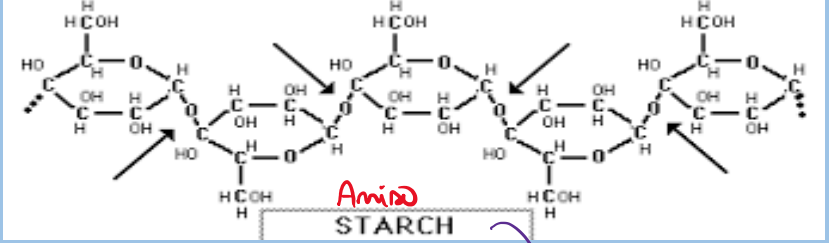
Carbohydrates

Starch, cellulose, glycogen, chitin and glycosaminoglycans

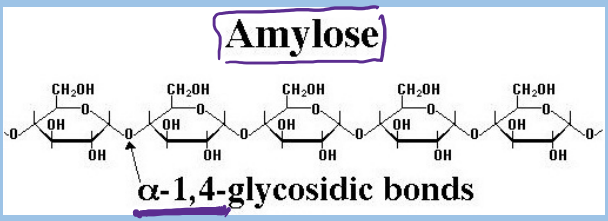
- 1 monomero
- 2 monómeros (Lactose, Sacarose, Maltose)
- 3 a 10 monomeros (Antígenos do Sg, Membr. Glicopro-teicas)

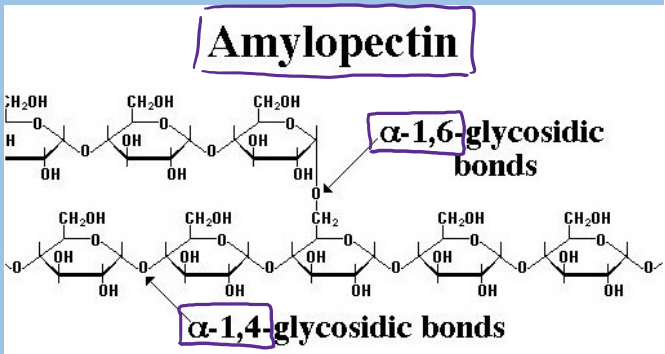
{ Armazenar glicose
Formação de elementos estruturais

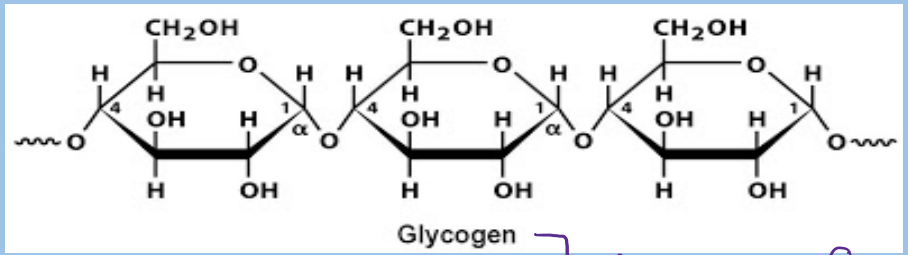
> 10 monomeros
- Amido
- Glicogênio
- Celulose
- Quitina
- GAG's



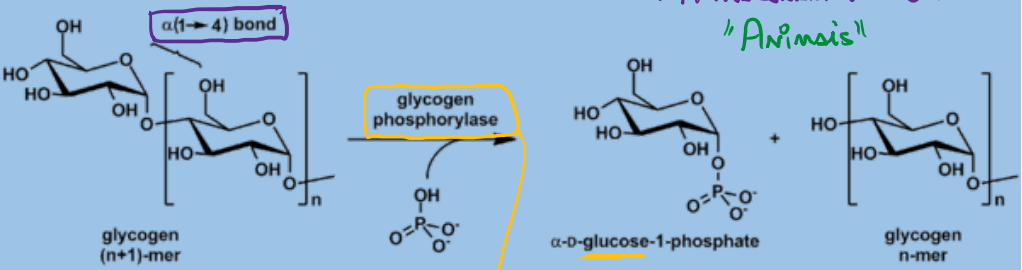
Armazenado Glicose
"Plantas"
α - Amilase
↳ Parótidas
↳ Pâncreas







→ Armazenamento Glicose "Animais"



(+) Ramificado

Clivagem α 1,4

Libera glicose

Ñ REGULADO QUANDO O NÍVEL NO Sg é baixo

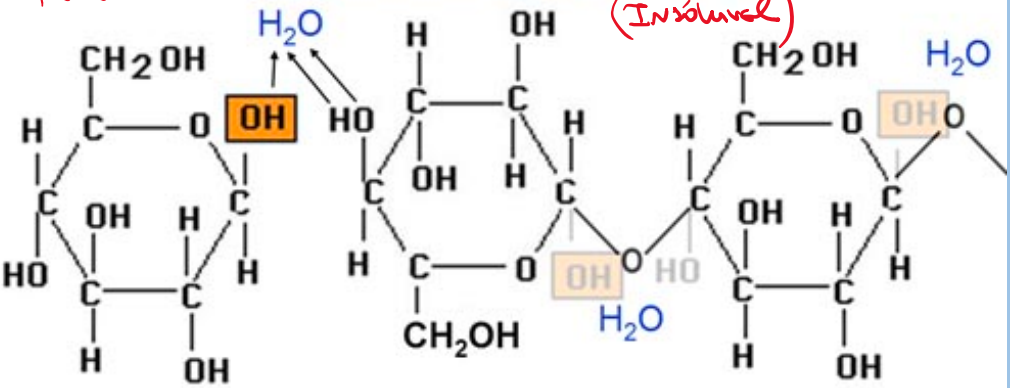
"WELL-FED STATE"

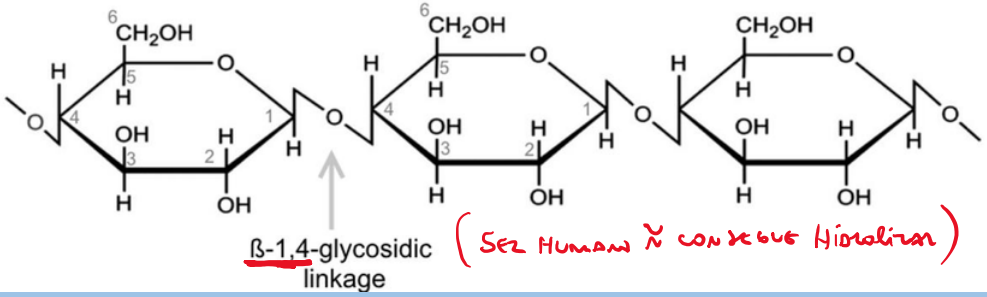
→ Fígado e músculos produzem glicogênios (glicose em excesso)

Estrutural Plantas

CELLULOSE

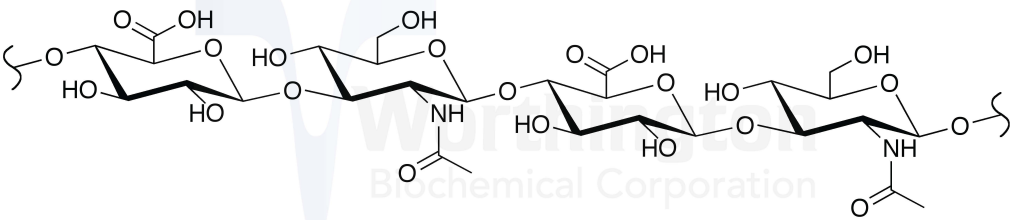
(Insolúvel)





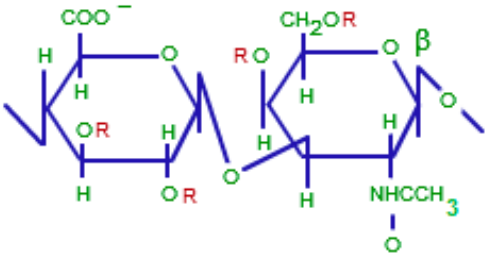
(Ser humano ñ consegue hidrolisar)

Hyaluronic Acid

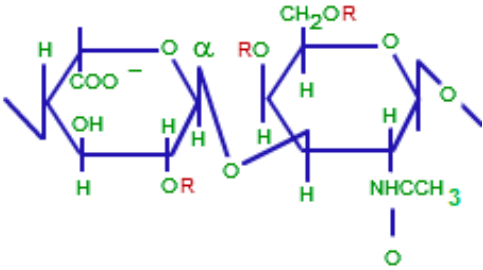


[β-D-Glucuronic acid][N-Acetyl-β-D-Glucosamine][β-D-Glucuronic acid][N-Acetyl-β-D-Glucosamine]

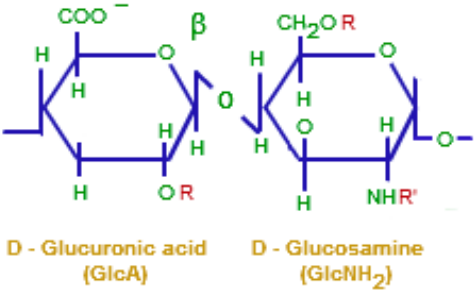
- Correct ⊖
- Matrix extracellular



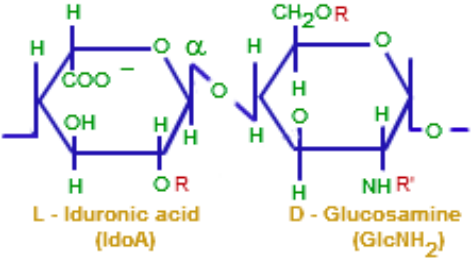
Chonodroitin Sulfate



Dermatan Sulfate



Heparan Sulfate



Heparin

classified as which type of carbohydrate?

- **polysaccharides**

Carbohydrates

Glycoproteins are short, branched oligosaccharides

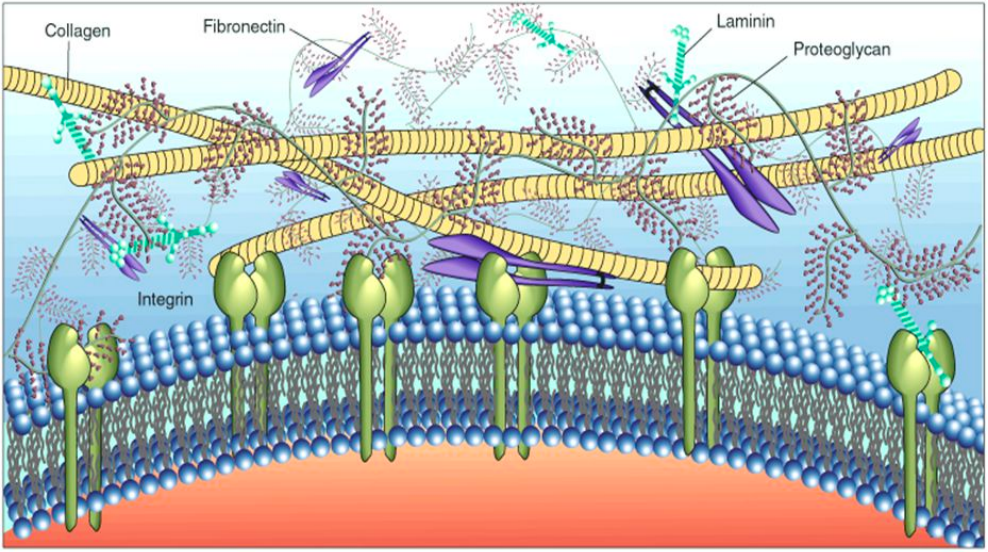
Proteoglycans a protein core that function in the extracellular matrix. OK

POLISACCARIDOS LARGOS !! LINEALES

Polisse, longer
Linear

Interaction

Collagens, Proteoglycans, Elastin, Fibronectin, Laminin, Tenascin.



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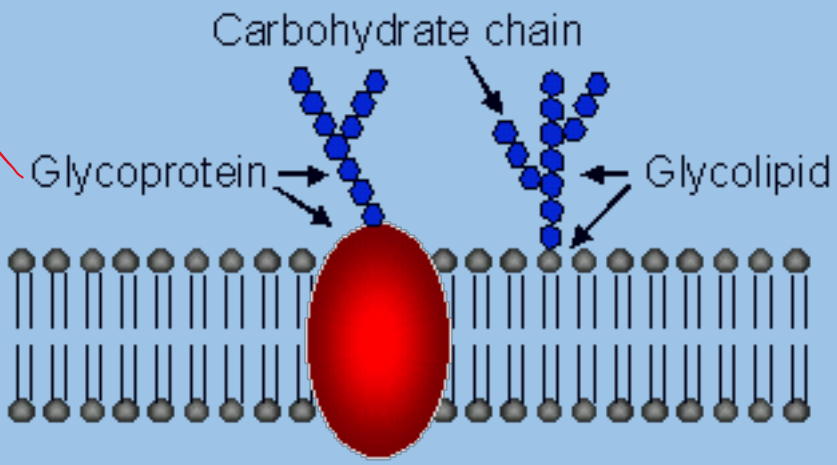
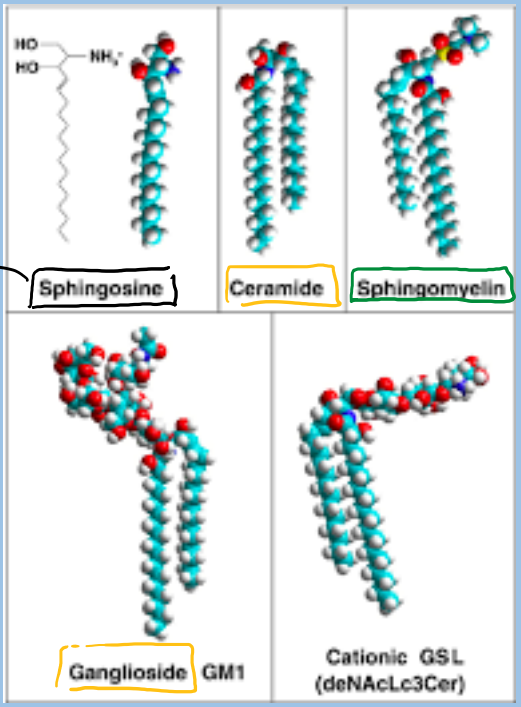
⊕ Importantes - Antígenos do Grupo Sanguíneo
Laminin
Fibronectina



Esfingolípidos - Glicoconjugados - Tecido Nervoso

amino alcool



CEREBROSÍDEOS

Carbohydrates

function in

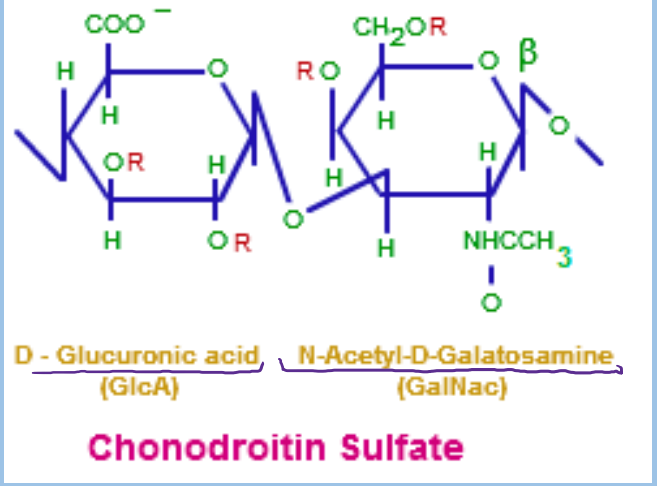
blood group antigens, cell-cell adhesion, and coagulation factors.

Proteoglycans are short, branched disaccharides attached

- **the first statement is true, the second is false**

Carbohydrates

The most abundant



VASOS Sg - OSSOS - CARTILAGENS

→ MANTÉM H_2O E NUTRIENTES

→ PERMITE Q MOLÉCULAS SE MOVAM ATRAVÉS DA CARTILAGEM

- PROPRIEDADES ANTI-INFLAMATÓRIAS
- HEPARINA -> CONCENTRAÇÃO DE SULFATO
- Ac. HIALURÓNICO - Ñ CONTÉM SULFATO -> GAG

GAG'S

POLISSACARÍDEOS Ñ RAMIFICADOS C/ DISSAC. REPETIDOS

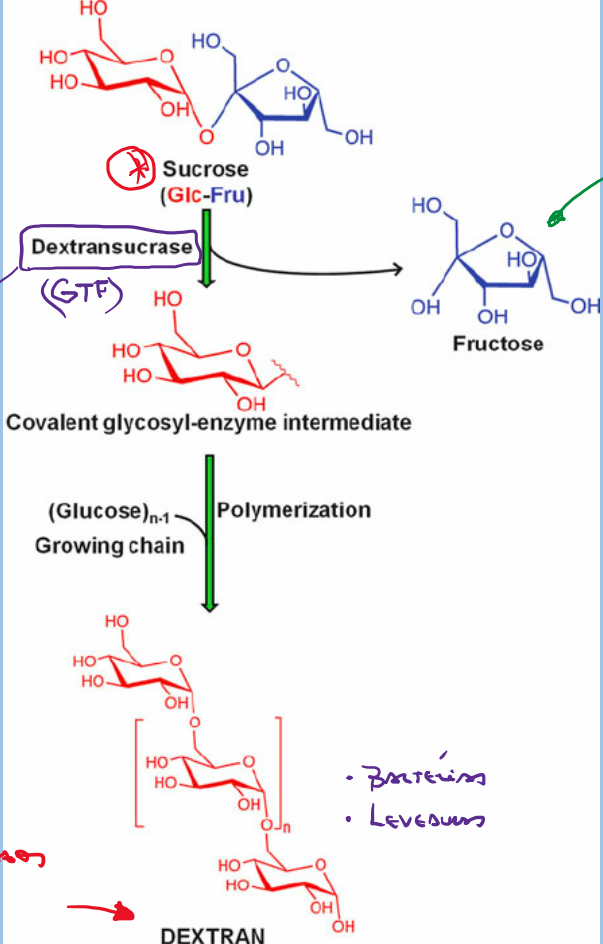
glycosaminoglycan (GAG)

- **chondroitin sulfate**

Carbohydrates

Dextrans are (A)_____of (B)_____ is (C)_____, substrate is (D)_____. A side is (E)_____, formed (F)_____

AUMENTAM ADESÃO BACTERIANA NOS DENTES (PLACA DENTAL)


Sucrose
(Glc-Fru)
Dextransucrase
(GTF)
Fructose
Covalent glycosyl-enzyme intermediate
(Glucose)n-1
Growing chain
Polymerization
DEXTRAN
Enzima
Produto 2ário
Produzida por Streptococcus Mutans
Polissacarídeos
• Bactérias
• Leveduras

Carbohydrates

produced extracellularly by bacteria and yeast. The enzyme used substrate is (D)_____. A side product of dextran production is (E)_____, which is (F)_____and stored intracellularly as reserve nutrients.:

polysaccharides

glucose

dextran sucrase

sucrose

fructose

levans