

تفريغ كيمياء حيوية



اسم الموضوع: **Glycosaminoglyc**
إعداد الصيدلاني /:



لجان التفتعات

Glycosaminoglycans (GAG)

Core protein
Serine
Linking region
Disaccharide
molecule كبريتوليد

تسمى لهم همدول وين موجودين حكا تركب
يكونوا
لأنه فيهم
كميات كبيرة منا
عشان عندها
المين

➤ These compounds bind large amounts of water, thereby producing the gel-like matrix that forms the basis of the body's ground substance.

يكون بار Si ليسها بلزقوا ببعضها لانه فيها ال gel like matrix

➤ The viscous, lubricating properties of mucous secretions are also caused by the presence of glycosaminoglycans, which led to the original naming of these compounds as mucopolysaccharides.

➤ As essential components of cell surfaces, GAGs play an important role in mediating cell-cell signaling and adhesion

↑ ينقل من خلية لخلية

- 1 lining cell ← يعني وفانفها!
- 2 mediating cell-cell signaling
- 3 adhesion → زي لصق

← Classes of GAGs

➤ There are six major classes of glycosaminoglycans, including:

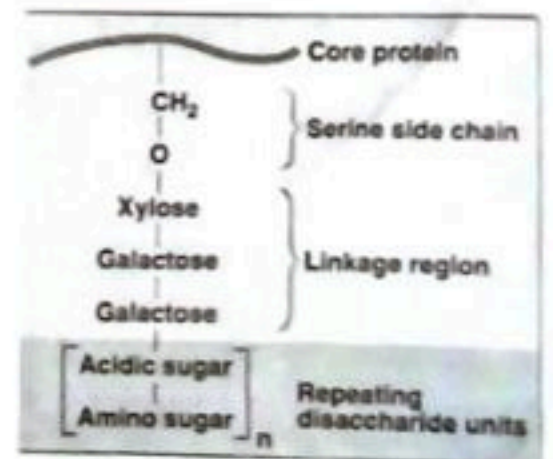
- chondroitin 4- and 6-sulfates → preparation of collagen انبفوا كولاجين يعني الـ
 - keratan sulfate
 - dermatan sulfate
 - Heparin
 - heparan sulfate
 - hyaluronic acid.
- كلمه مرتبطين مع الـ protein covalent bond
ماعدل ← non covalent
- فيها Chondroitin + Vit C 4-and 6 Sulfate

➤ All of the GAGs, except hyaluronic acid, are found covalently attached to protein, forming proteoglycan monomers, which consist of a core protein to which the linear GAG chains are covalently attached

major يعني الاسم الاخير هو يكون

لاختلاف الـ protein يكون فيها
proteoglycan ← يكون فيها لسكريات اكثر من الـ protein

➤ The proteoglycan monomers associate with a molecule of hyaluronic acid to form proteoglycan aggregates.



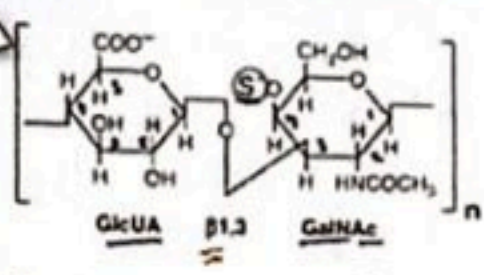
Cartilage
وجوده في الأوتار والرباطات
تكون كالهياكل
Collagen
hyaluronic acid
non-covalent

لا يوجد في
galactose + glucosamine
heterogeneous
L-fructose
N-acetyl neuraminic
mannose
Keratin & Keratan
polymer
KI → cornea
KII → connective tissue

لا يوجد في
not covalently attached
هو الوحيدة التي يوجد بها
vitreous humor of eye
umbilical

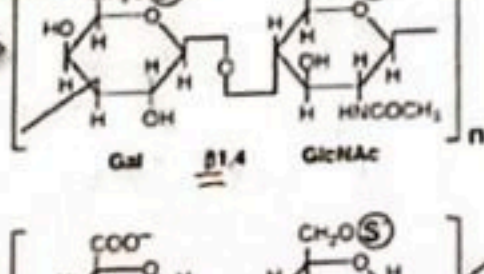
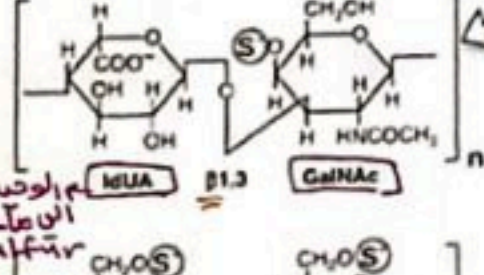
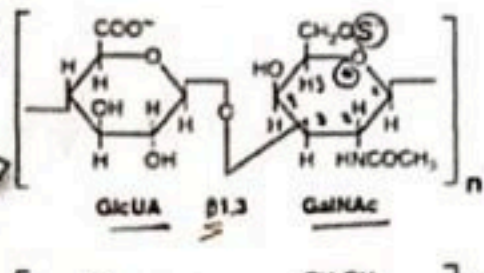
CHONDROITIN 4- AND 6-SULFATES

- Disaccharide unit: N-acetylgalactosamine with sulfate on either C 4 or C 6 and glucuronic acid
- Most abundant GAGs in the body
- Found in cartilage, tendons, ligaments, and aorta
- Form proteoglycan aggregates, often aggregating noncovalently with hyaluronic acid
- In cartilage, bind collagen and hold fibers in a tight, strong network



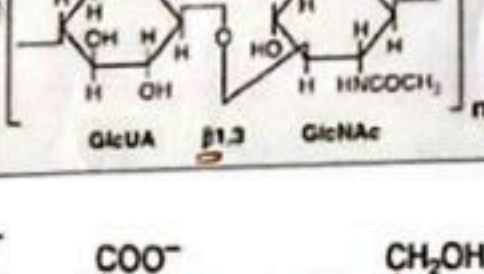
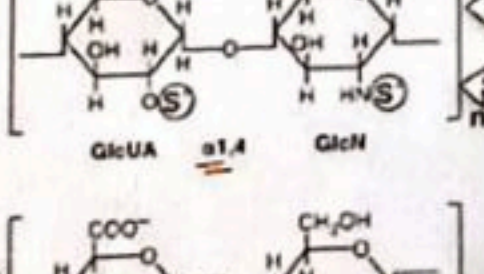
KERATAN SULFATES (KS) I and II

- Disaccharide unit: N-acetylglucosamine and galactose (no uronic acid); variable sulfate content may be present on C 6 of either sugar
- Most heterogeneous GAGs because they contain additional monosaccharides such as L-fucose, N-acetylneuraminic acid, and mannose
- KS I found in corneas; KS II found in loose connective tissue proteoglycan aggregates with chondroitin sulfate



HYALURONIC ACID (HYALURONATE)

- Disaccharide unit: N-acetylglucosamine and glucuronic acid
- Different from other GAGs: unsulfated, not covalently attached to protein, and only GAG not limited to animal tissue, but also found in bacteria
- Serves as a lubricant and shock absorber
- Found in synovial fluid of joints, vitreous humor of the eye, the umbilical cord, loose connective tissue, and cartilage



most abundant
بعضه قوي ومثالي
لا يوجد في تركيبه
Collagen

من اسمه يعني هو بالبرسة
DERMATAN SULFATE

- Disaccharide unit: N-acetylgalactosamine and L-iduronic acid (with variable amounts of glucuronic acid)
- Found in skin, blood vessels, and heart valves

HEPARIN

- Disaccharide unit: Glucosamine and glucuronic or iduronic acid; most glucosamine residues are bound in sulfamide linkages; sulfate also found on C 2 or C 6 of glucosamine and C 2 of uronic acid (an average of 2.5 per disaccharide unit)
- β-Linkage joins the sugars
- Unlike other GAGs that are extracellular compounds, heparin is an intracellular component of mast cells that line arteries, especially in liver, lungs, and skin
- Serves as an anticoagulant

HEPARAN SULFATE

- Disaccharide unit: Same as heparin except some glucosamines are acetylated, and there are fewer sulfate groups
- Extracellular GAG found in basement membrane and as a ubiquitous component of cell surfaces

glucouronic acid + N-acetyl galactosamine
N-acetyl glucosamine

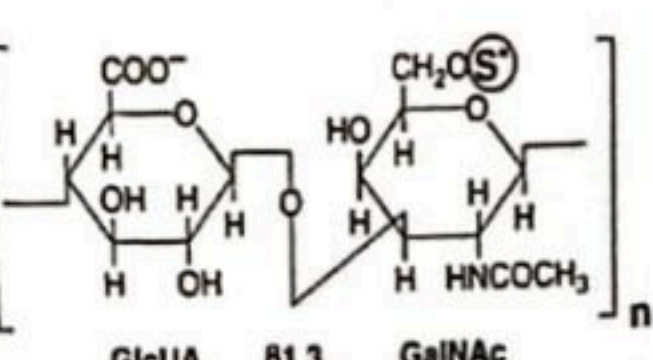
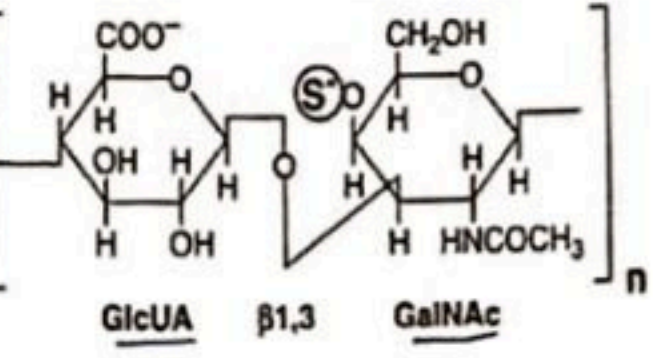
الوحيد التي لا يوجد لها الكلام في الأدمج
glucouronic acid + L-iduronic acid
COOH يعني جوا

للم كمانت، ابيضتيم B
الاحمر α
الوحيد الذي جوا
تليها تصمم extracellular
أماكن التواجد
معدل ال Sulfate يتغير
mast cell
arteries
liver
lungs
skin

نفس التركيبه بين
extra cellular
يتكون موجوده على السطح
basement membrane

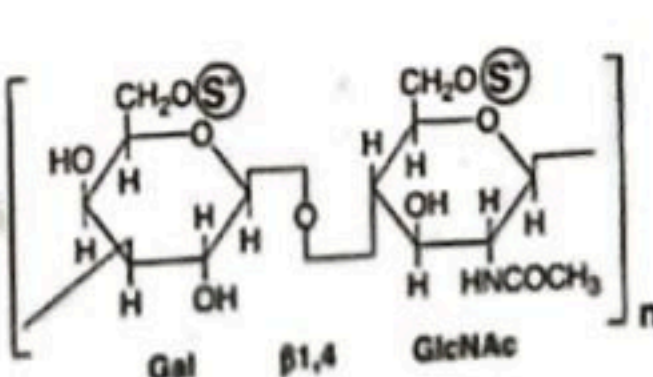
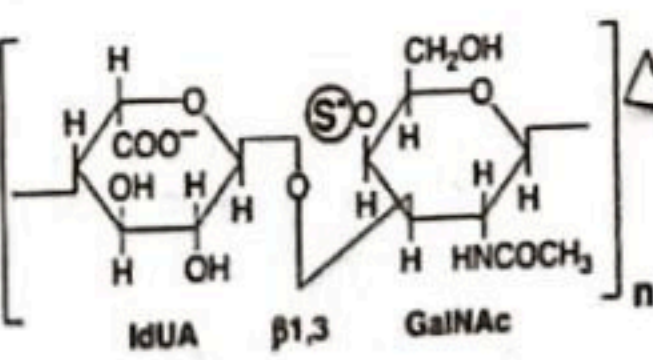
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GlcUA: glucouronic acid
GalNAc: N-acetyl galactosamine
GlcNAc: N-acetyl glucosamine
Gal: galactose
GlcN: glucosamine

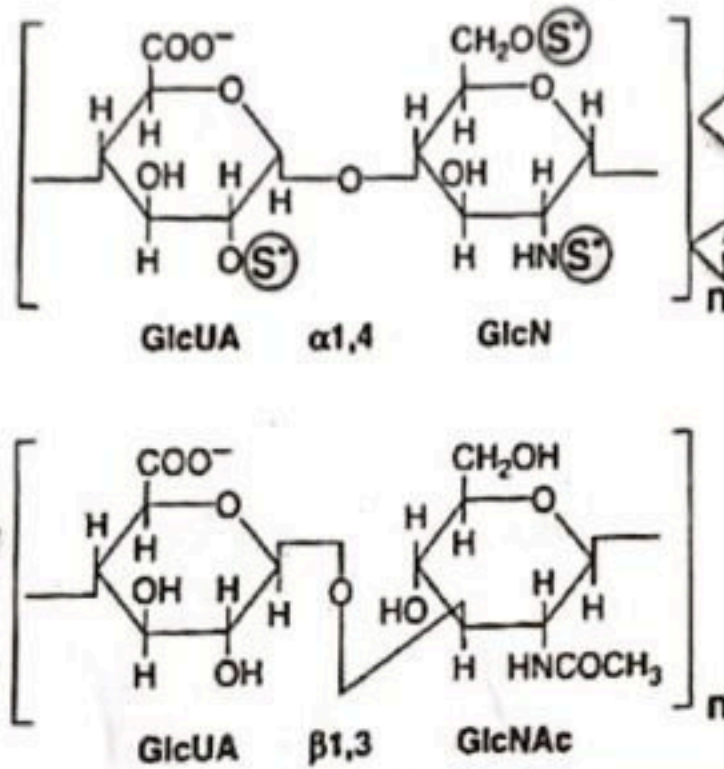
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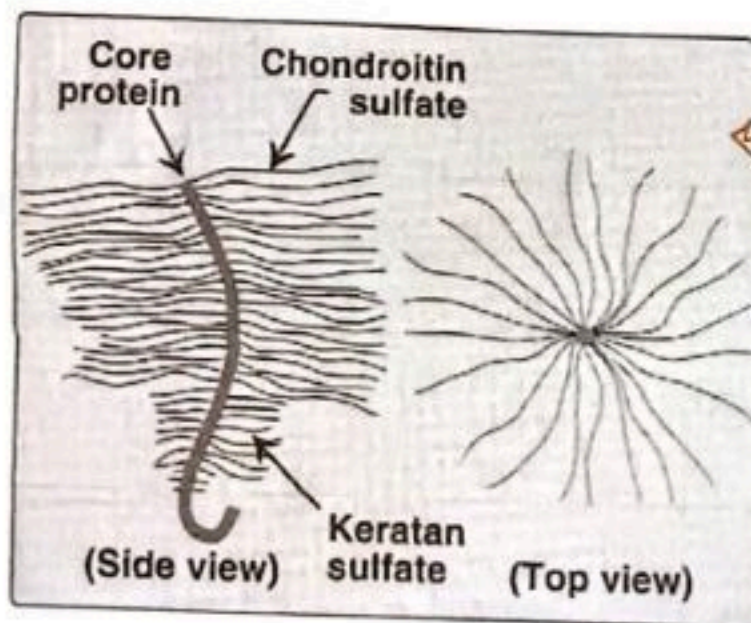
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Test tube
 Brush
 التي بتتنظن ما تطلع عليها من جنب
 من فوق
 من جنب
 هلا راجدين

