

Revisiting some O-Glycans

Table 1. Different types of O-linked glycans in humans.

Type of O-linked glycan	Structure and peptide linkage	Glycoprotein
Mucin-type	(R)-GalNAc1-Ser/Thr	Secreted + plasma membrane
GAG	(R)-GlcA1-3Gal1-3Gal1-4Xyl1-Ser	Proteoglycans
O-linked GlcNAc	GlcNAc1-Ser/Thr	Nuclear and cytoplasmic
O-linked Gal	Glc1-2Gal1-O-Lys	Collagens
O-linked Man	NeuAc2-3Gal1-4GlcNAc1-2Man1-Ser/Thr	α -Dystroglycan
O-linked Glc	Xyl1-3Xyl1-3Glc1-Ser	EGF protein domains
O-linked Fuc	NeuAc2-8Gal1-4GlcNAc1-3Fuc1-Ser/Thr	EGF protein domains
	Glc1-3Fuc1-Ser/Thr	TSR repeats

Wopereis et al., 2006, Clinical Chemistry 52:574-600

Table 2. Diversity of mucin-type O-linked glycans.

Core	Structure	Human tissue
1	Gal1-3GalNAc	Most cells and secreted proteins
2	Gal1-3 (GlcNAc1-6)GalNAc	All blood cells
3	GlcNAc1-3GalNAc	Colon and saliva
4	GlcNAc1-3 (GlcNAc1-6)GalNAc	Mucin-secreting cell types
5	GalNAc1-3GalNAc	Meconium
6	GlcNAc1-6GalNAc	Ovarian tissue
7	GlcNAc1-6GalNAc	
8	Gal1-3GalNAc	Bronchia

Wopereis et al., 2006, Clinical Chemistry 52:574-600

Glycosaminoglycans and Proteoglycans

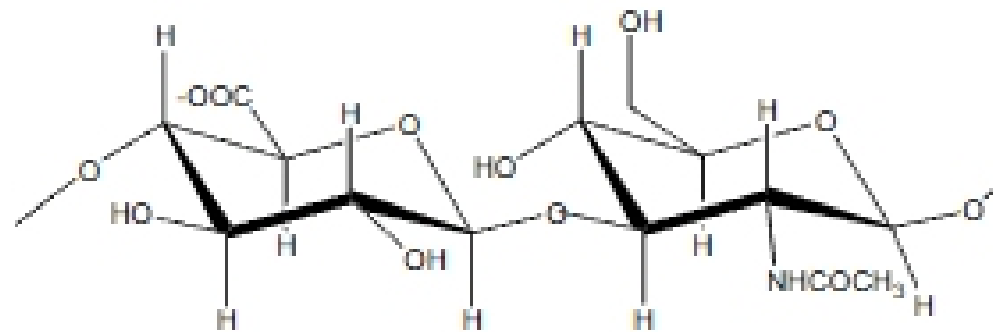
Glycosaminoglycans: anionic polysaccharides made up of repeating disaccharide units

- * one of the sugars is an **amino sugar**:
N-acetyl glucosamine (**GlcNAc**) or
N-acetyl galactosamine (**GalNAc**)
- * at least one of the sugars is **negatively charged**
due to a **carboxyl** group or a **sulfate**

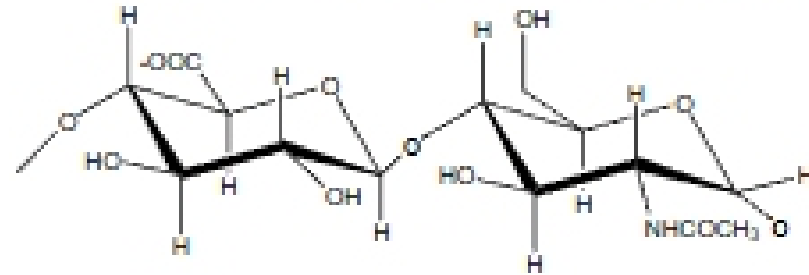
Wopereis et al., 2006, Clinical Chemistry 52:574-600

Examples:

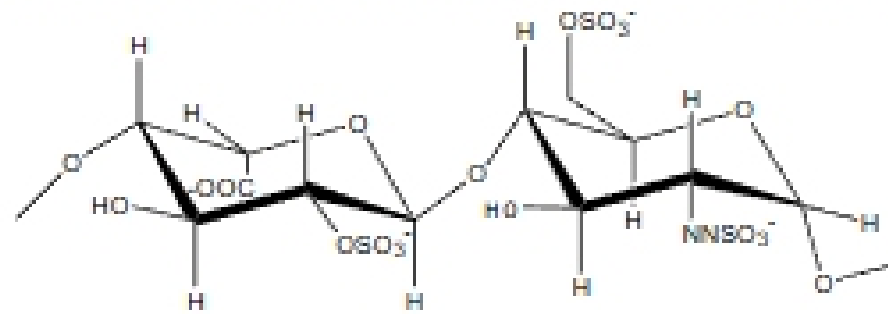
hyaluronic acid (hyaluronan)
[D-GlcA- β 1,3-D-GlcNAc- β 1,4-] $_n$



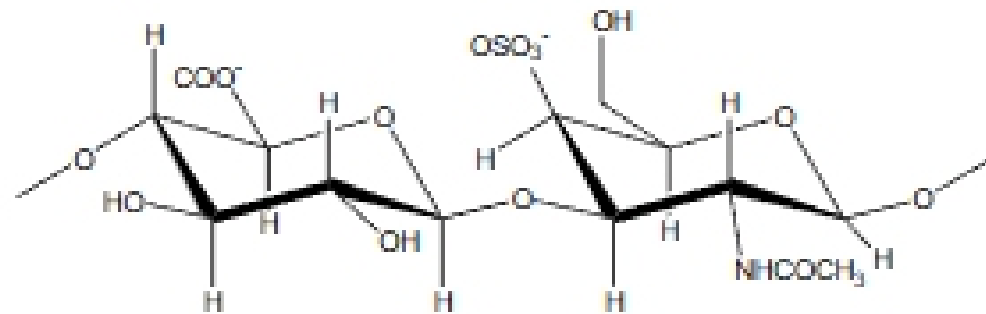
heparan sulfate / heparin
[D-GlcA β 1,4-D-GlcNAc- α 1,4-]n



or **[L-IdoA(2-OSO₃⁻)- α 1,4-D-GlcNSO₃(6-OSO₃⁻)- α 1,4-]n**



chondroitin sulfate (CS)
[D-GlcA β 1,3-D-GalNAc(4-SO₃)- β 1,4-]n



dermatan sulfate (DS),
[L-IdoU α 1,3-D-GalNAc(4-SO₃)- β 1,4-]n

