

White (General)	Blue	Green	Yellow	Orange	Pink	Purple	Light Blue	Brown	Red
Hexose ○	Gal	Man	Gal	Gal	Alf	All	Tal	Man	
HexNAc □	GalNAc	ManNAc	GalNAc	GalNAc	AlfNAc	AllNAc	TalNAc	ManNAc	
Hexosamine ◻	GalN	ManN	GalN	GalN	AlfN	AllN	TalN	ManN	
Hexosate ◇	GalC	ManC	GalC	GalC	AlfC	AllC	TalC	ManC	
Deoxyhexose △	Qui	Fuc			6AM		6FTal	Fuc	
DeoxyhexNAc △	QuiNAc	FucNAc						FucNAc	
Di-deoxyhexose □	Qui	Tyr		Abe	Par	Dig	Col		
Pentose ☆		Asc	Lyx	Xyl	Rib				
Nonulosonate ◇		Kdn				Neu5Ac	Neu5Gc	Neu	
Udinovon ○	Bac	LDMan5Hep	Kdo	Dha	EDMann5Hep	Man5Ac	Man5Gc	Man	
Aminoglyc ○	Ara	Fru	Tag	S or	Phi				

The Picture Dictionary

Description

Content

The Picture Dictionary of Monosaccharide Symbols offers the pictorial representation of an extended series of monosaccharides. Each symbol follows the accepted rules in terms of shape and colors. Images of the symbols at the png format can be downloaded. Prepared Images (png format) of glycosidic linkages is also provided to be included in the representation of complex glyco-macro-molecules). A list of the most common substituents is also available to be used when needed, along

with the colour coding used throughout the Picture Dictionary.

White (Generic)	Blue	Green	Yellow	Orange	Pink	Purple	Light Blue	Brown	Red
Hexose ○	Glc ●	Man ●	Gal ●	Gul ●	Alt ●	All ●	Tal ●	Ido ●	
HexNAc □	GlcNAc ■	ManNAc ■	GalNAc ■	GulNAc ■	AltNAc ■	AllNAc ■	TalNAc ■	IdoNAc ■	
Hexosamine ◻	GlcN ◻	ManN ◻	GalN ◻	GulN ◻	AltN ◻	AllN ◻	TalN ◻	IdoN ◻	
Hexuronate ◇	GlcA ◇	ManA ◇	GalA ◇	GulA ◇	AltA ◇	AllA ◇	TalA ◇	IdoA ◇	
Deoxyhexose △	Qui ▲	Rha ▲			6dAlt ▲		6dTal ▲		Fuc ▲
DeoxyhexNAc △	QuiNAc ▲	RhaNAc ▲							FucNAc ▲
Di-deoxyhexose ◻	Oli ■	Tyv ■		Abe ■	Par ■	Dig ■	Col ■		
Pentose ☆		Ara ★	Lyx ★	Xyl ★	Rib ★				
Nonulosonate ◇		Kdn ◇				Neu5Ac ◇	Neu5Gc ◇	Neu ◇	
Unknown ◻	Bac ●	LDManHep ●	Kdo ●	Dha ●	DDManHep ●	MurNAc ●	MurNGc ●	Mur ●	
Assigned ◻	Api ●	Fru ●	Tag ●	S cr ●	Psi ●				

The order of presentation is as follows:

- Hexoses and Substituted
- HexNAc and Substituted
- Hexosamines and Substituted
- Hexuronates and Substituted
- Deoxyhexoses and Substituted
- DeoxyhexoseNAc
- Pentoses and Substituted
- Deoxypentoses and Substituted
- Nonulosonate
- Various
- Miscellaneous

Background

The representation of monosaccharides as symbols is becoming more than a common practice in the field of Glycobiology. This is the result of a concerted effort of glycoscientists and the increasing reference to the textbook “Essential of Glycobiology”. Historically, it was engendered by an evaluation of widely used symbol nomenclature originally put forth by Stuart Kornfeld. The symbol notation was extended: first to describe the structure of pathogen polysaccharides (Berger et al.,) and second in a previous version of the Glycopedia chapter (The Monosaccharide Representation in the age of Glycobiology) to account for the occurrence of monosaccharide units found in other kingdoms.

Following these steps, a further extension of the representation has been set forward in the context of the Third Edition of “Essential of Glycobiology” as shown below.

- To ensure harmony with prior publications, no changes were made to the 2nd. Edition symbol set.
- Shapes and colors are internally consistent only for Hexoses, Hexosamines, HexNAcs and Hexuronates.
- Shapes are consistent for Nonulosonates, Deoxyhexoses and Pentoses.
- D and L configurations, pyranose versus furanose, and ring conformations are not represented and commonest versions are assumed. Less common configurations need to be stated in the figure legend.
- The hexagon is flat because the regular hexagon might look too similar to a circle.
- Abbreviations for modifications will also follow the 2nd. Edition symbol set, with additions as needed.
- Monosaccharides not represented in this table can be shown with a Pentagon and a letter inside, defined in the figure legend

Hexoses and Substituted

[Glucose](#) [Glucose 3P](#) [Glucose 6P](#) [Glucose 2S6S](#) [Glucose 2S3Me6S](#) [Glucose 6S](#) [Glucose 6Ac](#)
[Mannose](#) [Mannse 6Ac](#) [Mannose 6P](#) [Mannose Pyruvate](#) [Galactose](#) [Galactose 2S](#) [Galactose 2S3S](#)
[Galactose 2S6S](#) [Galactose 3S](#) [Galactose 3S4S](#) [Galactose 3S6S](#) [Galactose 4S](#)
[Galactose 4S6S](#) [Galactose 6S](#) [Galactose 6Ac](#) [Galactose Me](#) [Galactose 6OMe](#) [Galactose 3,6 Anhydro](#)
[Talose](#) [Gulose](#) [Allose](#) [Idose](#) [Altrose](#)

HexNAc and Substituted

[GlcNAc](#) [GlcNAc\[3S\]](#) [GlcNAc \[3S6S\]](#) [GlcNAc \[4S\]](#) [GlcNAc \[6S\]](#) [ManNAc](#) [GalNAc](#) [GalNAc \[4S\]](#)
[GalNAc \[4S6S\]](#) [TalNAc](#) [GulNAc](#) [AlfNAc](#) [IdoNAc](#) [AltNAc](#)

Hexosamines and Substituted

[Glucosamine GlcN](#) [GlcN \[6S\]](#) [GlcNS](#) [GlcNS \[3S\]](#) [GlcNS \[6S\]](#) [GlcNS \[3S 6S\]](#) [ManN](#) [GalN](#) [TalN](#)
[GulN](#) [AlfN](#) [IdoN](#) [AlfN](#)

Hexuronates and Substituted

[GlcA](#) [GlcA \[2S\]](#) [GlcA \[4S\]](#) [GlcA \[6S\]](#) [ManA](#) [GalA](#) [GalA \[2S3SSMe\]](#) [TalA](#) [GulA](#) [AlIA](#) [doA](#)
[IdoA \[2S\]](#) [AltA](#)

Deoxyhexoses and Substituted

[Qui](#) [Rha](#) [Fuc](#) [Fuc \[2Me\]](#) [Fuc \[4S\]](#)

DeoxyhexoseNAc Pentoses and Substituted

[Ribose](#) [Arabinose](#) [Lyxose](#) [Xylose](#)

Deoxypentoses and Substituted

[DeoxyRibose](#) [DeoxyArabinose](#) [DeoxyXylose](#) [DeoxyXylose](#)

Nonulosonate

[Neu5Gc](#) [Neu5Gc Lactonised](#) [Kdn.](#) [Leg](#) [4e Leg](#) [Pse](#) [Neu5Ac](#) [Neu5Ac Lactonised](#) [Neu](#)

Various

[MurNGc](#) [Hep](#) [Kdo](#) [Dha](#) [Bac](#) [MurNAc](#) [Mur](#) [AceA](#)

Miscellaneous

[Tyv1](#) [Apiose](#) [Fruc](#) [Abequose](#)

Linkage

Substituents

[Acetate](#) [Alanine](#) [Alditol](#) [deoxygenation](#) [Diphosphoethanolamine](#) [Glyceric acid](#) [Glycerol](#) [Glycine](#)
[Lactic acid](#) [Methyl](#) [N Acetyl](#) [Phosphate](#) [Phosphocoline](#) [Phosphoethanolamine](#) [Pyrophosphate](#)
[Pyruvate](#) [Saturation](#) [Sulfate](#) [unsaturation](#)

Templates

[Hexose](#) [HexNAc](#) [Hexosamine](#) [Hexuronate](#) [Deoxyhexose](#) [DeoxyhexoseNAc](#) [Pentose](#)
[DeoxyPentose](#) [Nonulosonate](#) [Various](#) [Miscellaneous](#) [Unsaturated Hexuronic Acid](#) [Hexagon](#)
[Heptagon](#)



R	0	215	0	250	200	125	250	150	55	255
G	200	215	0	0	250	0	100	100	155	255
B	50	215	250	0	250	125	0	50	190	0

Category

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