

Supplementary Table 1. GTs enrolled in this study.

GT	Family	GT	Family	GT	Family	GT	Family	GT	Family
ALG 1	N-glycosylation	GALNT 17	O-GalNAc	LFN G	O-Fucose	B4GALT 4	Elongation	B3GAT2	Capping
ALG 2	N-glycosylation	GALNT 18	O-GalNAc	RFN G	O-Fucose	B3GNT2	Elongation	A4GNT	Capping
ALG 3	N-glycosylation	GALNT 19	O-GalNAc	B3GLCT	O-Fucose	B3GNT3	Elongation	ABO	Capping
ALG 5	N-glycosylation	GALNT 20	O-GalNAc	POM T1	O-Mannose	B3GNT4	Elongation	B4GALNT2	Capping
ALG 6	N-glycosylation	C1GALT1	O-GalNAc	POM T2	O-Mannose	B3GNT7	Elongation	B3GNTL1	Other
ALG 8	N-glycosylation	C1GALT1	O-GalNAc	POM GNT1	O-Mannose	B3GNT8	Elongation	CERCAM	Other
ALG 9	N-glycosylation	GCNT1	O-GalNAc	POM GNT2	O-Mannose	B3GNT9	Elongation	GLT1D1	Other
ALG 10	N-glycosylation	GCNT3	O-GalNAc	MGA T5B	O-Mannose	B4GALNT3	Elongation	GLT6D1	Other
ALG 10B	N-glycosylation	GCNT4	O-GalNAc	B3GALNT2	O-Mannose	B4GALNT4	Elongation	GLT8D1	Other
ALG 11	N-glycosylation	B3GNT 6	O-GalNAc	FKT N	O-Mannose	GCNT2	Elongation	GLT8D2	Other
ALG 12	N-glycosylation	UGCG	Glycosphingo lipid	FKRP	O-Mannose	GCNT6	Elongation	GTDC1	Other
ALG 13	N-glycosylation	UGT8	Glycosphingo lipid	B4GAT1	O-Mannose	GCNT7	Elongation	KDELC1	Other
ALG 14	N-glycosylation	B4GALT5	Glycosphingo lipid	LARGE	O-Mannose	FUT1	Capping	KDELC2	Other
DPM 1	N-glycosylation	B4GALT6	Glycosphingo lipid	LARGE2	O-Mannose	FUT2	Capping		
FUT8	N-glycosylation	A4GALT	Glycosphingo lipid	TMT C1	O-Mannose	FUT3	Capping		
MGA T1	N-glycosylation	B3GALNT1	Glycosphingo lipid	TMT C2	O-Mannose	FUT4	Capping		
MGA T2	N-glycosylation	B3GNT 5	Glycosphingo lipid	TMT C3	O-Mannose	FUT5	Capping		

MGA T3	N-glycosylation	B4GAL NT1	Glycosphingo lipid	TMT C4	O-Mannose	FUT6	Capping
MGA T4A	N-glycosylation	GBGT1	Glycosphingo lipid	DPY1 9L1	C-Mannose	FUT7	Capping
MGA T4B	N-glycosylation	GXYLT 2	O-Glucose	DPY1 9L2	C-Mannose	FUT9	Capping
MGA T4C	N-glycosylation	POGLU T1	O-Glucose	DPY1 9L3	C-Mannose	FUT10	Capping
MGA T4D	N-glycosylation	XXYLT 1	O-Glucose	DPY1 9L4	C-Mannose	FUT11	Capping
MGA T5	N-glycosylation	XYLT1	Glycosaminoglycan	COL GAL T1	O-Galactose	ST3GAL 1	Capping
STT3 A	N-glycosylation	XYLT2	Glycosaminoglycan	COL GAL T2	O-Galactose	ST3GAL 2	Capping
STT3 B	N-glycosylation	B4GAL T7	Glycosaminoglycan	HAS1	Hyaluronan	ST3GAL 3	Capping
UGG T1	N-glycosylation	B3GAL T6	Glycosaminoglycan	HAS2	Hyaluronan	ST3GAL 4	Capping
UGG T2	N-glycosylation	B3GAT 3	Glycosaminoglycan	HAS3	Hyaluronan	ST3GAL 5	Capping
GAL NT1	O-GalNAc	CSGAL NACT1	Glycosaminoglycan	GYG 1	Glycogen	ST3GAL 6	Capping
GAL NT2	O-GalNAc	CSGAL NACT2	Glycosaminoglycan	GYG 2	Glycogen	ST6GAL 1	Capping
GAL NT3	O-GalNAc	CHPF	Glycosaminoglycan	GYS1	Glycogen	ST6GAL 2	Capping
GAL NT4	O-GalNAc	CHPF2	Glycosaminoglycan	GYS2	Glycogen	ST6GAL NAC1	Capping
GAL NT5	O-GalNAc	CHSY1	Glycosaminoglycan	PIGA	GPI anchor	ST6GAL NAC2	Capping
GAL NT6	O-GalNAc	CHSY3	Glycosaminoglycan	PIGB	GPI anchor	ST6GAL NAC3	Capping

			lycan				
			Glycos				
GAL	O-GalNA	EXT1	aminog	PIGM	GPI anchor	ST6GAL	Capping
NT7	c		lycan			NAC4	
			Glycos				
GAL	O-GalNA	EXT2	aminog	PIGV	GPI anchor	ST6GAL	Capping
NT8	c		lycan			NAC5	
			Glycos				
GAL	O-GalNA	EXTL1	aminog	PIGZ	GPI anchor	ST6GAL	Capping
NT9	c		lycan			NAC6	
			Glycos				
GAL	O-GalNA	EXTL2	aminog	B3G ALT1	Elongation	ST8SIA1	Capping
NT10	c		lycan				
			Glycos				
GAL	O-GalNA	EXTL3	aminog	B3G ALT2	Elongation	ST8SIA2	Capping
NT11	c		lycan				
			O-Glc	B3G			
GAL	O-GalNA	OGT	NAc	ALT4	Elongation	ST8SIA3	Capping
NT12	c						
			O-Glc	B3G			
GAL	O-GalNA	EOGT	NAc	ALT5	Elongation	ST8SIA4	Capping
NT13	c						
			O-Fuc	B4G			
GAL	O-GalNA	POFUT	ose	ALT1	Elongation	ST8SIA5	Capping
NT14	c	1					
			O-Fuc	B4G			
GAL	O-GalNA	POFUT	ose	ALT2	Elongation	ST8SIA6	Capping
NT15	c	2					
			O-Fuc	B4G			
GAL	O-GalNA	MFNG	ose	ALT3	Elongation	B3GAT1	Capping
NT16	c						
