

Supporting information for

Effects of Hapten Density on the Induced Antibody Repertoire

Qian Li,^[a] Luis G. Rodriguez,^[b] David F. Farnsworth,^[a] and Jeffrey C. Gildersleeve*^[a]

^[a] Chemical Biology Laboratory, National Cancer Institute, 376 Boyles St., Frederick, MD 21702
gildersj@mail.nih.gov

^[b] Optical Microscopy and Analysis Laboratory, SAIC-Frederick, Inc., Advanced Technology Program, NCI-Frederick, Frederick, MD 21702

Table S1. List of Components on the Array and Abbreviations¹

Group	Abbreviation	Description
Carbohydrates	3'SLacNac	Sialyl α 2-3Gal β 1-4GlcNac – BSA
	6'Slac	Sialyl α 2-3Gal β 1-4Glc-APD-HSA
	Adi - 04	GalNAc α 1-3Gal β -BSA (4/BSA)
	Adi - 17	GalNAc α 1-3Gal β -BSA (17/BSA)
	alphaGal	Gal α 1-3Gal β 1-4GlcNac-BSA
	Ara5	Ara α 1-5Ara α 1-5Ara α 1-5Ara α 1-5Ara α 1-BSA
	Bdi	Gal α 1-3Gal- BSA
	BG-A	GalNAc α 1-3(Fuc α 1-2)Gal β - BSA
	BG-A1	GalNAc α 1-3(Fuc α 1-2)Gal β 1-3GlcNac β 1-3Gal β 1-4(Glc)-APD-HSA
	BG-B (Dextra)	Gal α 1-3(Fuc α 1-2)Gal β -BSA from Dextra
	BG-B (EMD)	Gal α 1-3(Fuc α 1-2)Gal β -BSA from EMD
	BG-H1	Fuc α 1-2Gal β 1-3GlcNac β 1-3Gal β 1-4Glc β -APD-HSA
	BG-H2	Fuc α 1-2Gal β 1-4GlcNac β -HSA
	Cellobiose	Glc β 1-4Glc β -BSA
	Celotriose	Glc β 1-4Glc β 1-4Glc β -BSA
	Chito 3	GlcNac β 1-4GlcNac β 1-4GlcNac β -BSA (8/BSA)
	Chito 3 - 20	GlcNac β 1-4GlcNac β 1-4GlcNac β -BSA (20/BSA)
	DSLNT	Sia α 2-3Gal β 1-3(Sia α 2-6)GlcNac β 1-3Gal β 1-BSA
	Forssman Di - 04	GalNAc α 1-3GalNAc β 1-BSA (4/BSA)
	Forssman Di - 21	GalNAc α 1-3GalNAc β 1-BSA (21/BSA)
	Forssman Di - 31	GalNAc α 1-3GalNAc β 1-BSA (31/BSA)
	Fuc-a	Fuc- α - BSA (22/BSA)
	Fuc-a 04	Fuc- α - BSA (4/BSA)
	Fuc-b - 04	Fuc- β - BSA (4/BSA)
	Fuc-b - 22	Fuc- β - BSA (22/BSA)
	G2M4	Man β 1-4(Gal α 1-6)Man β 1-4(Gal α 1-6)Man β 1-4Man β 1-BSA
	GA1 - 06	Gal β 1-3GalNAc β 1-4Gal β 1-BSA (GA1tri or asialo-GM1; 6/BSA)
	GA1 - 20	Gal β 1-3GalNAc β 1-4Gal β 1-BSA (GA1tri or asialo-GM1; 20/BSA)
	GA1di	Gal β 1-3GalNAc β – HSA
	GA2di - 04	GalNAc β 1-4Gal β - BSA (GA2di or asialo-GM2; 4/BSA)
	GA2di - 16	GalNAc β 1-4Gal β - BSA (GA2di or asialo-GM2; 16/BSA)
	GA2di - 37	GalNAc β 1-4Gal β - BSA (GA2di or asialo-GM2; 37/BSA)
	GA2di - accurate	GalNAc β 1-4Gal β - BSA (from accurate chemicals)
	Gal3	Gal α 1-3Gal β 1-4Gal α -BSA (Gal3)
	Gal-a	Gal- α - BSA
	Gala1-4Galb	Gal α 1-4Gal β -CETE-BSA
	Gal-b	Gal- β - BSA
	Galb1-6Man-a	Gal β 1-6Man- α - BSA
	GalNAc-a - 04	GalNAc- α - BSA (4/BSA)
	GalNAc-a - 22	GalNAc- α - BSA (22/BSA)
	GalNAca1-6Galb - 04	GalNAc α 1-6Gal β -BSA (4/BSA)
	GalNAca1-6Galb - 21	GalNAc α 1-6Gal β -BSA (21/BSA)
	GalNAc-b	GalNAc- β - BSA
	Gb4	GalNAc β 1-3Gal α 1-4Gal β 1-BSA
	Glc-a	Glc- α - BSA
	Glc α 1-6Glc α 1-4Glc α 1-4Glc β -CETE-BSA	Glc α 1-6Glc α 1-4Glc α 1-4Glc β -CETE-BSA
	Glc-b	Glc- β - BSA

Group	Abbreviation	Description
	GlcNAc α 1-4Galb	GlcNAc α 1-4Gal β -BSA (20/BSA)
	GlcNAc α 1-4Galb - 03	GlcNAc α 1-4Gal β -BSA (3/BSA)
	GlcNAc-b	GlcNAc- β - BSA
	GM1	Gal β 1-3GalNAc β 1-4(Sia α 2-3)Gal β -4Glc-HSA
	GM3	Sialyl α 2-3Gal β 1-4Glc-APD-HSA
	Isomaltose	Glc α 1-6Glc β -BSA
	LacNAc	Gal β 1-4GlcNAc - BSA
	LacNAc (trimeric)	Gal β 1-4GlcNAc β 1-3Gal β 1-4GlcNAc β 1-3Gal β 1-4GlcNAc β -APE-HSA
	Lactose	Gal β 1-4Glc β - BSA
	LeA	Gal β 1-3[Fuca1-4]GlcNAc β 1-3Gal β 1-4Glc β - BSA
	LeB	Fuca α 1-2Gal β 1-3[Fuca α 1-4]GlcNAc β 1-3Gal β 1-4Glc β -BSA
	LeC	Gal β 1-3GlcNAc β - BSA
	LeX (dimeric)	Gal β 1-4[Fuca α 1-3]GlcNAc β 1-3Gal β 1-4(Fuca α 1-3)GlcNAc β 1-3Gal β 1-APE-BSA
	LeX (monomeric)	Gal β 1-4[Fuca α 1-3]GlcNAc-APD-HSA
	LeY	Fuca α 1-2Gal β 1-4[Fuca α 1-3]GlcNAc -HSA
	LNH - 13	Galb1-4GlcNAcb1-6(Galb1-3GlcNAcb1-3)Galb1-4Glc (13/BSA)
	LNnH - 11	Galb1-4GlcNAcb1-6(Galb1-4GlcNAcb1-3)Galb1-4Glc (11/BSA)
	LNnT	Gal β 1-4GlcNAc β 1-3Gal β 1-BSA (14/BSA)
	LNnT - 04	Gal β 1-4GlcNAc β 1-3Gal β 1-BSA (4/BSA)
	LNT - 05	Gal β 1-3GlcNAc β 1-3Gal β -BSA (5/BSA)
	LNT - 20	Gal β 1-3GlcNAc β 1-3Gal β -BSA (20/BSA)
	LSTa	Sia α 2-3Gal β 1-3GlcNAc β 1-3Gal β 1-BSA
	LSTb	Gal β 1-3(Sia α 2-6)GlcNAc β 1-3Gal β 1-BSA
	LSTc	Sia α 2-6Gal β 1-3GlcNAc β 1-3Gal β 1-BSA
	Maltopentaose	Glc α 1-4Glc α 1-4Glc α 1-4Glc α 1-4Glc α -BSA
	Maltose	Glc α 1-4Glc β -BSA
	Man3	Man α 1-6(Man α 1-3)Man β 1-4GlcNAc -BSA
	Man5	Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-3)Man β 1-4GlcNAc-BSA
	Man6	Man α 1-2Man α 1-3Man α 1-6(Man α 1-2Man α 1-3)Man β 1-4GlcNAc-BSA
	Man7D1	Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-2Man α 1-2Man α 1-3)Man β 1-4GlcNAc-BSA
	Man7D3	Man α 1-2Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-2Man α 1-3)Man β 1-4GlcNAc-BSA
	Man8D1D3	Man α 1-2Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-2Man α 1-2Man α 1-3)Man β 1-4GlcNAc-BSA
	Man9	Man α 1-2Man α 1-6(Man α 1-2Man α 1-3)Man α 1-6(Man α 1-2Man α 1-2Man α 1-3)Man β 1-4GlcNAc-BSA
	Man-a	Man- α - BSA
	Man α 1-6Man-a	Man α 1-6Man- α - BSA
	Manb4	Man β 1-4Man β 1-4Man β 1-4Man β 1-BSA
	ManT	Man α 1-6[Man α 1-3]Man β -BSA
	NA2	Gal β 1-4GlcNAc β 1-2Man α 1-6[Galb1-4GlcNAcb1-2Man α 1-3]Man β 1-4GlcNAc -BSA
	NA3	Gal β 1-4GlcNAc β 1-2Man α 1-6[Galb1-4GlcNAcb1-2(Galb1-4GlcNAcb1-2)Man α 1-3]Man β 1-4GlcNAc -BSA
	NA4	Gal β 1-4GlcNAc β 1-2(Galb1-4GlcNAcb1-6)Man α 1-6[Galb1-4GlcNAcb1-2(Galb1-4GlcNAcb1-4)Man α 1-3]Man β 1-4GlcNAc -BSA
	NGA2	GlcNAc β 1-2Man α 1-6(GlcNAcb1-2Man α 1-3)Man β 1-4GlcNAc -BSA
	NGA2B	GlcNAc β 1-2Man α 1-6(GlcNAcb1-2Man α 1-3)(GlcNAcb1-4)Man β 1-4GlcNAc -BSA
	NGA3	GlcNAc β 1-2Man α 1-6[GlcNAcb1-2(GlcNAcb1-4)Man α 1-3]Man β 1-4GlcNAc -BSA
	NGA3B	GlcNAc β 1-2Man α 1-6[GlcNAcb1-2(GlcNAcb1-4)Man α 1-3][GlcNAc β 1-4]Man β 1-4GlcNAc-BSA
	NGA4	GlcNAc β 1-2(GlcNAc β 1-6)Man α 1-6[GlcNAcb1-2(GlcNAcb1-4)Man α 1-3]Man β 1-4GlcNAc-BSA
	NGA4(B)2	GlcNAc β 1-2(GlcNAc β 1-4)(GlcNAc β 1-6)Man α 1-6[GlcNAcb1-2Man α 1-3][GlcNAc β 1-4]Man β 1-4GlcNAc -BSA
	NGA5B	GlcNAc β 1-2(GlcNAc β 1-4)(GlcNAc β 1-6)Man α 1-6[GlcNAcb1-2(GlcNAcb1-4)Man α 1-3][GlcNAc β 1-4]Man β 1-4GlcNAc -BSA

Group	Abbreviation	Description	
	P1	Gal α 1-4Gal β 1-4GlcNAc-BSA	
	Pk or Gb3	Gal α 1-4Gal β 1-4Glc-HSA	
	pLNH	Gal β 1-3GlcNAc β 1-3Gal β 1-4GlcNAc β 1-3Gal β 1-BSA (21/BSA)	
	pLNH - 07	Gal β 1-3GlcNAc β 1-3Gal β 1-4GlcNAc β 1-3Gal β 1-BSA (7/BSA)	
	Rha-a	Rha- α – BSA	
	Rha-b	Rha- β - BSA	
	Sialyl LeA	Sia α 2-3Gal β 1-3[Fuc α 1-4]GlcNAc β 1-3Gal β 1-APD-HSA	
	Sialyl LeX	Sialyl α 2-3Gal β 1-4[Fuc α 1-3]GlcNAc – BSA	
	X3Glc3	Xyl α 1-6Glc β 1-4(Xyl α 1-6)Glc β 1-4(Xyl α 1-6)Glc β 1-BSA	
	Xyl β 4	Xyl β 1-4Xyl β 1-4Xyl β 1-4Xyl β 1-BSA	
Glycoproteins	AGE30	Advanced glycation endproducts from glucose day 30	
	AGE60	Advanced glycation endproducts from glucose day 60	
	AGE90	Advanced glycation endproducts from glucose day 90	
	Alpha-1-acid glycoprotein	alpha1 Acid Glycoprotein	
	Alpha-fetoprotein	alpha fetoprotein	
	BSM	Bovine submaxillary mucin (STn, STF, S-GlcNAc β 1-3, ~20% of Sia is acetylated at 7,8, or 9)	
	BSM (asialo)	Asialo-Bovine submaxillary mucin (aBSM, Tn, TF, GlcNAc β 1-3GalNAc)	
	BSM (deacetylated)	Deacetylated-Bovine submaxillary mucin	
	BSM (ox)	periodate oxidized bovine submaxillary mucin	
	CEA	carcinoembryonic antigen	
	FABP	Fatty Acid Binding Protein	
	fetuin	fetuin (Sia2-3LacNAc, Sia2-6LacNAc, SiaLeC, STF)	
	fetuin (asialo)	asialofetuin (Galb1-4GlcNAc, Galb1-3GlcNAc, Galb1-3GalNAc)	
	Fetuin (ox)	periodate oxidized fetuin	
	glycophorin (asialo)	asialo-glycophorin A	
	Glycophorin A	Glycophorin A	
	hsp90	Heat Shock Protein 90	
	KLH	Keyhole limpet hemocyanin	
	KLH (oxidized)	periodate oxidized Keyhole limpet hemocyanin	
	OSM	Ovine submaxillary mucin (94% STn, 4% TF, 2% Fuca1-2Gal β 1-3GalNAc)	
	OSM (asialo)	asialo-Ovine submaxillary mucin	
	OSM (asialo, enzym)	enzyme treated asialo-OSM (almost all Tn)	
	OSM (enzym)	enzyme treated Ovine submaxillary mucin (almost all STn)	
	OSM (ox)	periodate oxidized ovine submaxillary mucin	
	ovalbumin	ovalbumin (56% Man5+Man6)	
	Ovalbumin (ox)	periodate oxidized ovalbumin	
	PSA	Prostate Specific Antigen; human seminal fluid	
	Tgl	Thyroglobulin	
	Peptides	Ac-A-Tn(Thr)-S-G - 05	Ac-Ala-(GalNAcα)Thr-Ser-Gly-Hex (5/BSA)
		Ac-A-Tn(Thr)-S-G - 08	Ac-Ala-(GalNAcα)Thr-Ser-Gly-Hex (8/BSA)
		Ac-A-Tn(Thr)-S-G - 23	Ac-Ala-(GalNAcα)Thr-Ser-Gly-Hex (23/BSA)
		Ac-S-S-S-G	Ac-Ser-Ser-Ser-Gly-BSA (24/BSA)
Ac-S-TF(Ser)-S-G - 04		AcSer-(Galβ1-3GalNAcα)Ser-Ser-Gly-Hex-BSA (4/BSA)	
Ac-S-TF(Ser)-S-G - 16		AcSer-(Galβ1-3GalNAcα)Ser-Ser-Gly-Hex-BSA (16/BSA)	
Ac-S-TF(Ser)-S-G - 28		AcSer-(Galβ1-3GalNAcα)Ser-Ser-Gly-Hex-BSA (28/BSA)	
Ac-S-Tn(Ser)-S-G - 04		AcSer-(GalNAcα)Ser-Ser-Gly-Hex-BSA (4/BSA)	
Ac-S-Tn(Ser)-S-G - 22		AcSer-(GalNAcα)Ser-Ser-Gly-Hex-BSA (22/BSA)	
Ac-S-Tn(Ser)-S-G - 33		AcSer-(GalNAcα)Ser-Ser-Gly-Hex-BSA (33/BSA)	

Group	Abbreviation	Description
	Ac-S-Tn(Thr)-A-G - 04	Ac-Ser-(GalNAc)Thr-Ala-Gly-Hex (4/BSA)
	Ac-S-Tn(Thr)-A-G - 08	Ac-Ser-(GalNAc)Thr-Ala-Gly-Hex (8/BSA)
	Ac-S-Tn(Thr)-A-G - 22	Ac-Ser-(GalNAc)Thr-Ala-Gly-Hex (22/BSA)
	Ac-S-Tn(Thr)-G-G - 03	Ac-Ser-(GalNAc)Thr-Gly-Gly-Hex (3/BSA)
	Ac-S-Tn(Thr)-G-G - 07	Ac-Ser-(GalNAc)Thr-Gly-Gly-Hex (7/BSA)
	Ac-S-Tn(Thr)-G-G - 19	Ac-Ser-(GalNAc)Thr-Gly-Gly-Hex (19/BSA)
	Ac-S-Tn(Thr)-S-G - 04	AcSer-(GalNAcα)Thr-Ser-Gly-Hex-BSA (4/BSA)
	Ac-S-Tn(Thr)-S-G - 24	AcSer-(GalNAcα)Thr-Ser-Gly-Hex-BSA (24/BSA)
	Ac-S-Tn(Thr)-S-G HSA-23	AcSer-(GalNAc α)Thr-Ser-Gly-Hex-HSA (23/HSA)
	Ac-S-Tn(Thr)-S-G HSA-04	AcSer-(GalNAc α)Thr-Ser-Gly-Hex-HSA (4/HSA)
	Ac-T-Tn(Thr)-P-G - 04	Ac-Thr-(GalNAc)Thr-Pro-Gly-Hex (4/BSA)
	Ac-T-Tn(Thr)-P-G - 08	Ac-Thr-(GalNAc)Thr-Pro-Gly-Hex (8/BSA)
	Ac-T-Tn(Thr)-P-G - 21	Ac-Thr-(GalNAc)Thr-Pro-Gly-Hex (21/BSA)
	Ac-TF(Ser)-G - 04	Ac(Gal β 1-3GalNAc α)Ser-Gly-Hex-BSA (4/BSA)
	Ac-TF(Ser)-G - 24	Ac(Gal β 1-3GalNAc α)Ser-Gly-Hex-BSA (24/BSA)
	Ac-V-Tn(Thr)-S-G - 04	Ac-Val-(GalNAc)Thr-Ser-Gly-Hex (4/BSA)
	Ac-V-Tn(Thr)-S-G - 08	Ac-Val-(GalNAc)Thr-Ser-Gly-Hex (8/BSA)
	Ac-V-Tn(Thr)-S-G - 19	Ac-Val-(GalNAc)Thr-Ser-Gly-Hex (19/BSA)
	Tn3 - 03	Ac(GalNAc α)Ser-(GalNAc α)Ser-(GalNAc α)Ser-Gly-Hex-BSA (3/BSA)
	Tn3 - 15	Ac(GalNAc α)Ser-(GalNAc α)Ser-(GalNAc α)Ser-Gly-Hex-BSA (15/BSA)
	Tn3 - 27	Ac(GalNAc α)Ser-(GalNAc α)Ser-(GalNAc α)Ser-Gly-Hex-BSA (27/BSA)
	Ac-Tn(Thr)-G	Ac(GalNAc α)Thr-Gly-Hex-BSA (21/BSA)
Controls	BSA	Bovine serum albumin
	BSA-#2	Bovine serum albumin
	Cy3	Cy3-BSA (20 μ g/mL + BSA, 125 μ g/mL total)
	Cy5	Cy5-BSA (30 μ g/mL+ BSA, 125 μ g/mL total)
	HSA	Human serum albumin (isolated from serum)
	HSA (recomb)	human serum albumin (recombinant)

¹ Array components listed in figure 2 of the main paper are shown in blue.

Linkers

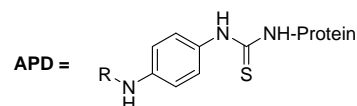
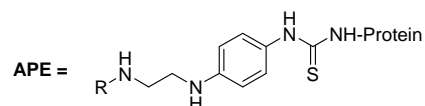
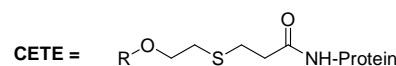
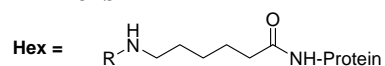


Table S2. Microarray data for rabbit serum (1:2000)

Name	Rabbit1	Rabbit2	Rabbit3	Rabbit4
3'SLacNAc	3	3	4	1
6'SIac	25	82	22	55
Ac-A-Tn(Thr)-S-G - 05	7416	7688	7880	13445
Ac-A-Tn(Thr)-S-G - 08	10504	9621	10545	15318
Ac-A-Tn(Thr)-S-G - 23	12699	11196	12885	16444
Ac-S-TF(Ser)-S-G - 28	7242	3034	2181	2772
Ac-S-TF(Ser)-S-G - 04	1333	2027	509	1193
Ac-S-TF(Ser)-S-G - 16	5457	2933	1384	2024
Ac-S-Tn(Ser)-S-G - 04	2497	1193	5266	10101
Ac-S-Tn(Ser)-S-G - 22	8911	4844	9420	16219
Ac-S-Tn(Ser)-S-G - 33	9450	5340	10008	16437
Ac-S-Tn(Thr)-A-G - 04	9523	8338	9992	15840
Ac-S-Tn(Thr)-A-G - 08	10786	9149	10971	15470
Ac-S-Tn(Thr)-A-G - 22	13008	11356	13738	16116
Ac-S-Tn(Thr)-G-G - 03	12424	9949	10402	14504
Ac-S-Tn(Thr)-G-G - 07	12038	9844	11754	15566
Ac-S-Tn(Thr)-G-G - 19	12423	11036	13575	16400
Ac-S-Tn(Thr)-S-G - 04	11363	9127	11437	15978
Ac-S-Tn(Thr)-S-G - 24	14606	12784	15051	16851
Ac-T-Tn(Thr)-P-G - 04	677	2680	2423	2396
Ac-T-Tn(Thr)-P-G - 08	110	3423	2293	3916
Ac-T-Tn(Thr)-P-G - 21	272	4985	3173	7147
Ac-V-Tn(Thr)-S-G - 04	1424	6394	5318	10970
Ac-V-Tn(Thr)-S-G - 08	2747	8589	6957	12719
Ac-V-Tn(Thr)-S-G - 19	4441	9997	8148	14173
Adi - 04	46	28	29	26
Adi - 17	7	4	68	284
AGE30	9	3	35	68
AGE60	5	2	7	10
AGE90	10	5	11	16
Alpha-1-acid glycoprotein	1	0	2	2
Alpha-fetoprotein	6	4	3	3
alphaGal	0	0	1	1
Ara5	6	5	2	3
Asialo-BSM	2	2	2	3
Asialo-fetuin	2	3	4	4
Asialo-glycophorin	4	2	23	17
Asialo-OSM	4	6	9	18
Asialo-OSM (enzyme treated)	5	2	16	17
Bdi	9	4	9	3
BG-A	5	2	59	89
BG-A1	13	32	20	28
BG-B (Dextra)	2	0	2	3
BG-B (EMD)	5	6	3	5
BG-H1	40	52	7	23
BG-H2	17	17	63	59
BSA-#1	10	7	7	6

Name	Rabbit1	Rabbit2	Rabbit3	Rabbit4
BSA-#2	28	106	972	76
BSM	2	2	2	2
BSM (deacetylated)	3	2	2	1
BSM (oxidized)	6	3	6	4
CEA	3	2	3	3
Cellobiose	48	9	9	8
Cellotriose	49	18	7	12
Chito 3	78	7	103	33
Chito 3 - 20	48	50	43	52
Cy3	27375	26942	27492	27262
Cy5	222	59	305	122
DSLNT	2	1	1	5
FABP	2	2	3	3
Fetuin	0	0	1	5
Fetuin (oxidized)	0	0	2	5
Forssman Di - 04	8	8	8	11
Forssman Di - 21	5	1	13	23
Forssman Di - 31	65	44	231	67
Fuc-a - 04	10	5	10	13
Fuc-a - 22	89	6	18	10
Fuc-b - 04	0	7	4	4
Fuc-b - 21	9	4	19	8
G2M4	3	1	3	4
GA1 - 06	15	12	20	19
GA1 - 20	1	0	2	3
GA1di	20	24	15	13
GA2di - 04	15	15	14	9
GA2di - 16	6	2	5	4
GA2di - 37	54	46	152	300
GA2di (accurate)	27	20	40	437
Gal3	5	1	14	11
Gal-a	8	4	10	91
Gala1-4Galb	32	7	108	634
Gal-b	6	3	14	82
Galb1-6Man-a	5	3	6	5
GalNAc-a - 04	144	128	380	813
GalNAc-a - 22	8	23	112	3396
GalNAca1-6Galb - 04	44	31	22	21
GalNAca1-6Galb - 21	9	15	256	90
GalNAc-b	7	3	6	15
Gb4	172	16	344	1903
Glc-a	15	7	18	23
Glca1-6Glca1-4Glca1-4Glc-b	5	2	6	9
Glc-b	15	18	28	16
GlcNAca1-4Galb - 03	0	0	33	2
GlcNAca1-4Galb - 20	8	3	12	22
GlcNAc-b	6	4	8	18
Glycophorin	3	2	16	12
GM1	51	67	157	233

Name	Rabbit1	Rabbit2	Rabbit3	Rabbit4
GM3	46	53	30	37
HSA (isolated from serum)	63	117	16	9
hsp90	1	2	3	2
Isomaltose	5	3	3	5
KLH	7	123	5	4
KLH (oxidized)	4	4	4	4
LacNAc	7	5	4	3
LacNAc (trimeric)	13	25	9	90
Lactose	135	92	644	262
LeA	21	2	37	34
LeB	5	2	26	7
LeC	5	3	13	7
LeX (dimeric)	3	1	4	39
LeX (monomeric)	25	21	21	7
LeY	17	67	15	48
LNH - 13	1	0	1	4
LNnH - 11	2	1	3	2
LNnT	4	1	16	4
LNnT - 04	4	1	6	11
LNT - 05	32	21	20	21
LNT - 20	1	0	0	2
LSTa	1	1	0	1
LSTb	2	2	3	3
LSTc	1	3	4	3
Maltopentaose	2	1	1	2
Maltose	7	6	6	6
Man3	5	2	15	30
Man5	2	1	10	12
Man6	3	1	13	19
Man7D1	1	1	3	3
Man7D3	2	1	6	5
Man8D1D3	1	0	0	1
Man9	3	0	10	10
Man-a	262	6	9	10
Mana1-6Man-a	7	4	3	2
Manb4	5	3	2	6
ManT	5	2	5	5
NA2	180	87	38	133
NA3	45	22	20	75
NA4	81	51	34	143
NGA2	25	15	16	57
NGA2B	28	18	18	71
NGA3	59	39	29	83
NGA3B	45	24	23	74
NGA4	36	24	20	60
NGA4(B)2	35	17	20	49
NGA5B	32	19	18	49
OSM	3	3	1	1
OSM (enzyme treated)	3	2	16	19

Name	Rabbit1	Rabbit2	Rabbit3	Rabbit4
OSM (oxidized)	0	1	9	4
Ovalbumin	1	2	3	8
Ovalbumin (oxidized)	6	2	4	4
P1	84	384	176	705
Pk or Gb3	102	323	39	41
pLNH - 07	6	2	11	4
pLNH - 21	4	3	2	8
PSA	2	2	2	3
Rha-a	62	15	15	45
Rha-b	17	5	10	9
rHSA	61	112	54	77
Sialyl LeA	9	18	8	13
Sialyl LeX	7	12	5	7
Ac-S-S-S-G	709	341	974	1866
S-Tn(Thr)-S-G HSA-23	10478	9310	10755	14794
S-Tn(Thr)-S-G HSA-04	13784	12132	14085	16429
TF(Ser)-G - 04	567	240	113	585
TF(Ser)-G - 24	195	110	50	179
Tgl	2	1	1	1
Tn	103	892	1096	5069
Tn3 - 03	5	8	952	523
Tn3 - 15	9	19	2396	876
Tn3 - 27	197	117	2408	1221
X3Glc3	3	3	2	2
Xylb4	7	12	5	4

Table S3. Percentage of inhibition by BSA-conjugates

Inhibited with Ac-S-Tn(Thr)-S-G-04

	Rabbit 1	Rabbit 2	Rabbit 3	Rabbit 4
Ac-S-Tn(Thr)-S-G - 04	100	99	99	98
Ac-S-Tn(Thr)-S-G - 24	99	94	91	91
Ac-S-S-S-G	100	60	93	96
Tn3 - 27	ND	ND	100	100

Inhibited with Ac-S-Tn(Thr)-S-G-24

	Rabbit 1	Rabbit 2	Rabbit 3	Rabbit 4
Ac-S-Tn(Thr)-S-G - 04	100	100	100	100
Ac-S-Tn(Thr)-S-G - 24	100	99	99	98
Ac-S-S-S-G	100	93	99	99
Tn3 - 27	ND	ND	100	100

Inhibited with Ac-S-S-S-G

	Rabbit 1	Rabbit 2	Rabbit 3	Rabbit 4
Ac-S-Tn(Thr)-S-G - 04	7	0	11	0
Ac-S-Tn(Thr)-S-G - 24	4	8	8	0
Ac-S-S-S-G	86	57	60	54
Tn3 - 27	ND	ND	0	0

Inhibited with Tn3-27

	Rabbit 1	Rabbit 2	Rabbit 3	Rabbit 4
Ac-S-Tn(Thr)-S-G - 04	0	1	16	3
Ac-S-Tn(Thr)-S-G - 24	4	8	8	0
Ac-S-S-S-G	0	10	21	0
Tn3 - 27	ND	ND	84	49

ND: Not detectable

Figure S1. MALDI-MS Data for HSA conjugates

(4/HSA: 7 Eq of Ac-S-Tn(Thr)-S-G (1) produced a final average ratio of 4 haptens per HSA)

(23/HSA: 100 Eq of Ac-S-Tn(Thr)-S-G (1) produced a final average ratio of 23 haptens per HSA)

