1 27mer

1.1 27mer Selection Sets

	Symbol	Set	# Peptides	HLA-I Coverage	HLA-II Coverage	Total Coverage	# B-cell Epitope Regions
0	⊛	CD4+/CD8+	4	92.2%	88.5%	81.6%	0
1	⊛^{d}	CD4+/CD8+ (H2^d ligands)	4	93.8%	84.7%	79.5%	0
2	⊛^{b}	CD4+/CD8+ (H2^b ligands)	3	92.2%	84.7%	78.1%	0
3	⊛^{bd}	CD4+/CD8+ (H2^b and H2^d ligands)	4	92.1%	84.7%	78.0%	0
4	∘	CD4+	3	91.3%	88.5%	80.8%	0
5	∘^{d}	CD4+ (H2^d ligands)	3	91.3%	88.5%	80.8%	0
6	∘^{b}	CD4+ (H2^b ligands)	3	76.8%	84.7%	65.0%	0
7	∘^{bd}	CD4+ (H2^b and H2^d ligands)	3	92.2%	84.7%	78.1%	0
8	∗	CD8+	3	95.8%	61.3%	58.7%	0
9	∗^{d}	CD8+ (H2^d ligands)	3	95.1%	76.2%	72.5%	0
10	∗^{b}	CD8+ (H2^b ligands)	3	95.8%	61.3%	58.7%	0
11	∗^{bd}	CD8+ (H2^b and H2^d ligands)	3	94.7%	72.6%	68.8%	0
12	⊠	B-Cell/CD4+/CD8+	3	88.9%	62.7%	55.7%	3
13	⊡	B-Cell/CD4+	3	88.9%	62.7%	55.7%	3
14	⊡^{d}	B-Cell/CD4+ (H2^d ligands)	1	66.2%	39.9%	26.4%	1
15	⊡^{b}	B-Cell/CD4+ (H2^b ligands)	2	64.8%	39.4%	25.5%	2
16	⊞	B-Cell/CD8+	3	90.8%	57.7%	52.4%	3
17	⊞^{d}	B-Cell/CD8+ (H2^d ligands)	1	81.8%	38.4%	31.4%	1
18	⊞^{b}	B-Cell/CD8+ (H2^b ligands)	2	89.4%	46.5%	41.5%	2
19	⊞^{bd}	B-Cell/CD8+ (H2^b and H2^d ligands)	1	81.8%	38.4%	31.4%	1
20	□	B-Cell	3	81.8%	52.8%	43.2%	3
21	□^{d}	B-Cell (H2^d ligands)	3	81.8%	52.8%	43.2%	3
22	□^{b}	B-Cell (H2^b ligands)	3	81.8%	52.8%	43.2%	3
23	□^{bd}	B-Cell (H2^b and H2^d ligands)	3	81.8%	52.8%	43.2%	3

1.2 27mer Vaccine Peptides

	Sequence	Protein	Start	End	B-cell Epitope Region	HLA-I Coverage	HLA-II Coverage	H2^b I	H2^b II	H2^d I	H2^d II	Selection Sets
1	LLQFAYANRNRFLYIIKLIFLWLLWPV	M	34	60		89.0%	36.0%	+	+	+	+	$*$ $*^b$ $*^d$ $*^{bd}$ ∘ ∘^{d} ∘^{bd} ⊛ ⊛^{d} ⊛^{b} ⊛^{bd}
2	PVTLACFVLAAVYRINWITGGIAIAMA	M	59	85		42.0%	76.0%	+	+	−	+	∘^{b}
3	YFIASFRLFARTRSMWSFNPETNILLN	M	95	121		78.0%	53.0%	+	+	+	+	⊛^{bd}
4	KDLSPRWYFYYLGTGPEAGLPYGANKD	N	102	128		49.0%	39.0%	+	+	+	−	$*$ $*^b$ $*^d$
5	WPQIAQFAPSASAFFGMSRIGMEVTPS	N	301	327		63.0%	61.0%	+	+	+	+	∘^{bd} ⊛^{d} ⊛^{bd}
6	AQFAPSASAFFGMSRIGMEVTPSGTWL	N	305	331		71.0%	57.0%	+	+	+	−	⊛⊛^{b}
7	SASAFFGMSRIGMEVTPSGTWLTYTGA	N	310	336		76.0%	45.0%	+	−	+	−	$*^{bd}$
8	VTPSGTWLTYTGAIKLDDKDPNFKDQV	N	324	350		50.0%	62.0%	+	+	−	−	∘^{b}
9	PQRQKKQQTVTLLPAADLDDFSKQLQQ	N	383	409		11.0%	52.0%	−	−	−	+	∘ ∘^{d} ⊛
10	YPDKVFRSSVLHSTQDLFLPFFSNVTW	S	38	64		44.0%	52.0%	−	+	+	+	⊛^{d}
11	GAAAYYVGYLQPRTFLLKYNENGTITD	S	261	287		88.0%	38.0%	+	+	+	−	$*^{bd}$
12	SETKCTLKSFTVEKGIYQTSNFRVQPT	S	297	323		54.0%	52.0%	−	−	+	−	$*^d$
13	GLTVLPPLLTDEMIAQYTSALLAGTIT	S	857	883		66.0%	73.0%	+	+	+	+	⊛ ⊛^{d} ⊛^{b} ⊛^{bd}
14	SVLNDILSRLDKVEAEVQIDRLITGRL	S	975	1001		72.0%	28.0%	+	−	−	−	$**^b$
15	RLQSLQTYVTQQLIRAAEIRASANLAA	S	1000	1026		54.0%	81.0%	−	+	+	+	∘ ∘^{d} ∘^{b} ∘^{bd}
16	GNYNYLYRLFRKSNLKPFERDISTEIY	S	447	473	456-FRKSNLKPFERDISTEIY-456	82.0%	38.0%	+	−	+	−	⊞ ⊞^{d} ⊞^{b} ⊞^{bd}
17	YLYRLFRKSNLKPFERDISTEIYQAGS	S	451	477	456-FRKSNLKPFERDISTEIY-456	78.0%	46.0%	+	−	−	−	□ □^{b} □^{d} □^{bd} ◉ ⊛
18	FRKSNLKPFERDISTEIYQAGSTPCNG	S	456	482	456-FRKSNLKPFERDISTEIY-456	46.0%	30.0%	−	+	−	−	◉^{b}
19	KFLPFQQFGRDIADTTDAVRDPQTLEI	S	558	584	580-QTLE-580	0.0%	0.0%	−	−	−	−	□ □^{b} □^{d} □^{bd}
20	PQTLEILDITPCSFGGVSVITPGTNTS	S	579	605	580-QTLE-580	13.0%	21.0%	−	−	−	−	⊞ ◉ ⊛
21	IYKTPPIKDFGGFNFSQILPDPSKPSK	S	788	814	809-PSKP-809	35.0%	23.0%	−	+	−	−	□ □^{b} □^{d} □^{bd} ◉^{b}
22	PSKPSKRSFIEDLLFNKVTLADAGFIK	S	809	835	809-PSKP-809	66.0%	40.0%	+	−	−	+	⊞ ⊞^{b} ◉ ◉^{d} ⊛

2 21mer

2.1 21mer Selection Sets

	Symbol	Set	# Peptides	HLA-I Coverage	HLA-II Coverage	Total Coverage	# B-cell Epitope Regions
0	⊛	CD4+/CD8+	3	84.9%	84.7%	71.9%	0
1	⊛^{d}	CD4+/CD8+ (H2^d ligands)	4	90.2%	84.7%	76.4%	0
2	⊛^{b}	CD4+/CD8+ (H2^b ligands)	4	93.9%	84.7%	79.5%	0
3	⊛^{bd}	CD4+/CD8+ (H2^b and H2^d ligands)	4	92.1%	84.7%	78.0%	0
4	○	CD4+	3	92.2%	88.5%	81.6%	0
5	○^{d}	CD4+ (H2^d ligands)	3	92.2%	88.5%	81.6%	0
6	○^{b}	CD4+ (H2^b ligands)	3	69.5%	84.7%	58.9%	0
7	○^{bd}	CD4+ (H2^b and H2^d ligands)	3	93.8%	84.7%	79.4%	0
8	∗	CD8+	3	95.1%	62.2%	59.1%	0
9	∗^{d}	CD8+ (H2^d ligands)	3	94.7%	68.9%	65.3%	0
10	∗^{b}	CD8+ (H2^b ligands)	3	94.7%	68.9%	65.3%	0
11	∗^{bd}	CD8+ (H2^b and H2^d ligands)	3	94.7%	68.9%	65.3%	0
12	⊛	B-Cell/CD4+/CD8+	4	84.2%	62.7%	52.8%	3
13	⊡	B-Cell/CD4+	4	84.2%	62.7%	52.8%	3
14	⊡^{b}	B-Cell/CD4+ (H2^b ligands)	2	37.2%	39.4%	14.6%	2
15	⊞	B-Cell/CD8+	3	88.9%	22.6%	20.1%	3
16	⊞^{d}	B-Cell/CD8+ (H2^d ligands)	1	77.2%	38.4%	29.7%	1
17	⊞^{b}	B-Cell/CD8+ (H2^b ligands)	2	87.2%	22.6%	19.7%	2
18	⊞^{bd}	B-Cell/CD8+ (H2^b and H2^d ligands)	1	77.2%	38.4%	29.7%	1
19	□	B-Cell	3	78.0%	40.7%	31.8%	3
20	□^{d}	B-Cell (H2^d ligands)	3	78.0%	40.7%	31.8%	3
21	□^{b}	B-Cell (H2^b ligands)	3	78.0%	40.7%	31.8%	3
22	□^{bd}	B-Cell (H2^b and H2^d ligands)	3	78.0%	40.7%	31.8%	3

2.2 21mer Vaccine Peptides

	Sequence	Protein	Start	End	B-cell Epitope Region	HLA-I Coverage	HLA-II Coverage	H2^b I	H2^b II	H2^d I	H2^d II	Selection Sets
1	LLQFAYANRNRFLYIIKLIFL	M	34	54		89.0%	36.0%	+	+	+	+	* *^{b} *^{d} *^bd ○ ○^{d} ○^{bd} ⊛^{d} ⊛^{b} ⊛^{bd}
2	FVLAAVYRINWITGGIAIAMA	M	65	85		42.0%	76.0%	+	+	-	+	○^{b} ⊛ ⊛^{b}
3	LSYFIASFRLFARTRSMWSFN	M	93	113		78.0%	46.0%	+	+	+	+	⊛^{bd}
4	LSPRWYFYYLGTGPEAGLPYG	N	104	124		49.0%	23.0%	+	+	+	-	*
5	GTRNPANNAAIVLQLPQGTTL	N	147	167		20.0%	55.0%	-	+	-	+	○^{bd}
6	IAQFAPSASAFFGMSRIGMEV	N	304	324		63.0%	51.0%	+	+	+	+	⊛^{d} ⊛^{bd}
7	SASAFFGMSRIGMEVTPSGTW	N	310	330		65.0%	37.0%	+	-	+	-	*^{b} *^{d} *^{bd}
8	IGMEVTPSGTWLTYTGAIKLD	N	320	340		54.0%	52.0%	+	+	-	-	⊛^{b}
9	GTWLTYTGAIKLDDKDPNFKD	N	328	348		26.0%	62.0%	+	+	-	-	○^{b} ⊛
10	KQQTVTLLPAADLDDFSKQLQ	N	388	408		11.0%	52.0%	-	-	-	+	○○^{d}
11	LPFNDGVYFASTEKSNIIRGW	S	84	104		58.0%	41.0%	-	+	-	-	*
12	PLVDLPIGINITRFQTLLALH	S	225	245		65.0%	62.0%	+	-	+	+	⊛⊛^{d}
13	GAAAYYVGYLQPRTFLLKYNE	S	261	281		88.0%	38.0%	+	+	+	-	*^{b} *^{d} *^{bd}
14	LTDEMIAQYTSALLAGTITSG	S	865	885		42.0%	73.0%	+	+	+	+	⊛^{d} ⊛^{bd}
15	LSSNFGAISSVLNDILSRLDK	S	966	986		59.0%	62.0%	+	+	-	+	⊛^{b}
16	VTQQLIRAAEIRASANLAATK	S	1008	1028		30.0%	81.0%	-	+	-	+	○ ○^{d} ○^{b} ○^{bd}
17	NYNYLYRLFRKSNLKPFERDI	S	448	468	456-FRKSNLKPFERDISTEIY-456	77.0%	38.0%	+	-	+	-	⌗^{d} ⌗^{bd} ⊡⊛ □ □^{b} □^{d} □^{bd}
18	YRLFRKSNLKPFERDISTEIY	S	453	473	456-FRKSNLKPFERDISTEIY-456	78.0%	23.0%	+	-	-	-	⌗ ⌗^{b} ⊡⊛
19	KPFERDISTEIYQAGSTPCNG	S	462	482	456-FRKSNLKPFERDISTEIY-456	20.0%	21.0%	-	+	-	-	⊡^{b}
20	QFGRDIADTTDAVRDPQTLEI	S	564	584	580-QTLE-580	0.0%	0.0%	-	-	-	-	□ □^{b} □^{d} □^{bd}
21	PQTLEILDITPCSFGGVSVIT	S	579	599	580-QTLE-580	13.0%	0.0%	-	-	-	-	⌗
22	QTLEILDITPCSFGGVSVITP	S	580	600	580-QTLE-580	13.0%	21.0%	-	-	-	-	⊡⊛
23	GFNFSQILPDPSKPSKRSFIE	S	799	819	809-PSKP-809	21.0%	23.0%	-	+	-	-	□ □^{b} □^{d} □^{bd} ⊡ ⊡^{b} ⊛
24	PSKPSKRSFIEDLLFNKVTLA	S	809	829	809-PSKP-809	66.0%	0.0%	+	-	-	-	⌗⌗^{b}

3 15mer vaccine peptides

3.1 15mer Selection Sets

	Symbol	Set	# Peptides	HLA-I Coverage	HLA-II Coverage	Total Coverage	# B-cell Epitope Regions
0	⊛	CD4+/CD8+	5	90.6%	88.5%	80.2%	0
1	⊛^{d}	CD4+/CD8+ (H2^d ligands)	3	81.1%	76.2%	61.8%	0
2	⊛^{b}	CD4+/CD8+ (H2^b ligands)	3	81.8%	62.5%	51.1%	0
3	⊛^{bd}	CD4+/CD8+ (H2^b and H2^d ligands)	2	77.2%	65.8%	50.8%	0
4	○	CD4+	3	83.9%	88.5%	74.3%	0
5	○^{d}	CD4+ (H2^d ligands)	3	86.7%	84.7%	73.4%	0
6	○^{b}	CD4+ (H2^b ligands)	3	83.9%	84.7%	71.1%	0
7	○^{bd}	CD4+ (H2^b and H2^d ligands)	3	86.7%	84.7%	73.4%	0
8	∗	CD8+	3	95.8%	38.4%	36.8%	0
9	∗^{d}	CD8+ (H2^d ligands)	3	94.6%	22.6%	21.4%	0
10	∗^{b}	CD8+ (H2^b ligands)	3	91.2%	46.5%	42.4%	0
11	∗^{bd}	CD8+ (H2^b and H2^d ligands)	3	91.2%	46.5%	42.4%	0
12	⊛	B-Cell/CD4+/CD8+	4	77.2%	45.8%	35.3%	3
13	⊙	B-Cell/CD4+	5	77.2%	62.7%	48.4%	3
14	⊙^{b}	B-Cell/CD4+ (H2^b ligands)	2	0.0%	39.4%	0.0%	2
15	⊞	B-Cell/CD8+	6	84.2%	29.9%	25.2%	3
16	⊞^{d}	B-Cell/CD8+ (H2^d ligands)	1	77.2%	20.4%	15.8%	1
17	⊞^{b}	B-Cell/CD8+ (H2^b ligands)	2	72.5%	20.4%	14.8%	1
18	⊞^{bd}	B-Cell/CD8+ (H2^b and H2^d ligands)	1	77.2%	20.4%	15.8%	1
19	□	B-Cell	3	44.0%	11.9%	5.2%	3
20	□^{d}	B-Cell (H2^d ligands)	3	44.0%	11.9%	5.2%	3
21	□^{b}	B-Cell (H2^b ligands)	3	44.0%	11.9%	5.2%	3
22	□^{bd}	B-Cell (H2^b and H2^d ligands)	3	44.0%	11.9%	5.2%	3

3.2 15mer Vaccine Peptides

	Sequence	Protein	Start	End	B-cell Epitope Region	HLA-I Coverage	HLA-II Coverage	H2^b I	H2^b II	H2^d I	H2^d II	Selection Sets
1	LLQFAYANRNRFLYI	M	34	48		77.0%	36.0%	+	+	+	+	○ ○^{b} ○^{d}○^{bd} ⊛ ⊛^{d} ⊛^{bd}
2	YANRNRFLYIIKLIF	M	39	53		78.0%	0.0%	+	-	+	-	*^{d}
3	ANRNRFLYIIKLIFL	M	40	54		81.0%	0.0%	+	-	+	-	*^{b}*^{bd}
4	YFIASFRLFARTRSM	M	95	109		78.0%	20.0%	+	-	+	+	*
5	SFRLFARTRSMWSFN	M	99	113		73.0%	46.0%	+	+	-	+	⊛^{b}
6	LSPRWYFYYLGTGPE	N	104	118		49.0%	0.0%	+	-	+	-	*^{d} *^{b} *^{bd}
7	ATKAYNVTQAFGRRG	N	264	278		24.0%	46.0%	+	+	+	-	⊛^{b}
8	PQIAQFAPSASAFFG	N	302	316		17.0%	39.0%	-	+	+	+	○^{d} ○^{bd} ⊛^{d}
9	SASAFFGMSRIGMEV	N	310	324		56.0%	37.0%	+	-	+	-	⊛
10	MEVTPSGTWLTYTGA	N	322	336		46.0%	0.0%	-	-	-	-	*
11	PSGTWLTYTGAIKLD	N	326	340		14.0%	52.0%	+	+	-	-	○^{b}
12	QQTVTLLPAADLDDF	N	389	403		11.0%	34.0%	-	-	-	-	○⊛
13	IGINITRFQTLLALH	S	231	245		61.0%	62.0%	+	-	+	+	⊛⊛^{d}
14	YYVGYLQPRTFLLKY	S	265	279		88.0%	23.0%	-	+	+	-	**^{d}
15	LTDEMIAQYTSALLA	S	865	879		42.0%	46.0%	+	+	+	+	*^{b} *^{bd} ⊛^{b}⊛^{bd}
16	RAAEIRASANLAATK	S	1014	1028		30.0%	79.0%	-	+	-	+	○ ○^{b} ○^{d}○^{bd} ⊛
17	GGNYNYLYRLFRKSN	S	446	460	456-FRKSNLKPFERDISTEIY-456	37.0%	20.0%	+	-	+	-	⊞
18	NYNYLYRLFRKSNLK	S	448	462	456-FRKSNLKPFERDISTEIY-456	77.0%	20.0%	+	-	+	-	⊞^{d} ⊞^{bd} ⊡⊛
19	YNYLYRLFRKSNLKP	S	449	463	456-FRKSNLKPFERDISTEIY-456	73.0%	20.0%	+	-	-	-	⊞^{b}
20	YLYRLFRKSNLKPFE	S	451	465	456-FRKSNLKPFERDISTEIY-456	73.0%	20.0%	+	-	-	-	⊞
21	YRLFRKSNLKPFERD	S	453	467	456-FRKSNLKPFERDISTEIY-456	73.0%	23.0%	+	-	-	-	⊡⊛
22	RLFRKSNLKPFERDI	S	454	468	456-FRKSNLKPFERDISTEIY-456	56.0%	0.0%	+	-	-	-	⊞^{b}
23	FRKSNLKPFERDIST	S	456	470	456-FRKSNLKPFERDISTEIY-456	32.0%	0.0%	-	-	-	-	⊞
24	KSNLKPFERDISTEI	S	458	472	456-FRKSNLKPFERDISTEIY-456	29.0%	0.0%	-	-	-	-	□ □^{d} □^{b}□^{bd}
25	LKPFERDISTEIYQA	S	461	475	456-FRKSNLKPFERDISTEIY-456	20.0%	12.0%	-	-	-	-	⊞
26	ISTEIYQAGSTPCNG	S	468	482	456-FRKSNLKPFERDISTEIY-456	0.0%	21.0%	-	+	-	-	⊡⊡^{b}
27	ADTTDAVRDPQTLEI	S	570	584	580-QTLE-580	0.0%	0.0%	-	-	-	-	□ □^{d} □^{b}□^{bd} ⊡⊛
28	PQTLEILDITPCSFG	S	579	593	580-QTLE-580	13.0%	0.0%	-	-	-	-	⊞
29	GFNFSQILPDPSKPS	S	799	813	809-PSKP-809	0.0%	23.0%	-	+	-	-	⊡⊡^{b}
30	FNFSQILPDPSKPSK	S	800	814	809-PSKP-809	21.0%	12.0%	-	-	-	-	□ □^{d} □^{b}□^{bd} ⊞⊛