

1 27mer

1.1 27mer Selection Sets

Symbol	Set	# Peptides	HLA-I Coverage	HLA-II Coverage	Total Coverage	# B-cell Epitope Regions
⊗	CD4+/CD8+	5	95.8%	89.7%	85.9%	0
⊗ ^d	CD4+/CD8+ (H2 ^d ligands)	4	92.3%	88.5%	81.6%	0
⊗ ^b	CD4+/CD8+ (H2 ^b ligands)	5	95.1%	89.7%	85.3%	0
⊗ ^{bd}	CD4+/CD8+ (H2 ^b and H2 ^d ligands)	4	92.3%	88.5%	81.6%	0
○	CD4+	4	85.4%	89.7%	76.6%	0
○ ^d	CD4+ (H2 ^d ligands)	4	93.0%	89.7%	83.5%	0
○ ^b	CD4+ (H2 ^b ligands)	5	81.5%	89.7%	73.1%	0
○ ^{bd}	CD4+ (H2 ^b and H2 ^d ligands)	5	93.8%	89.7%	84.2%	0
*	CD8+	3	95.8%	36.2%	34.6%	0
* ^d	CD8+ (H2 ^d ligands)	3	95.1%	65.8%	62.6%	0
* ^b	CD8+ (H2 ^b ligands)	3	95.8%	36.2%	34.6%	0
* ^{bd}	CD8+ (H2 ^b and H2 ^d ligands)	3	94.7%	72.6%	68.8%	0
⊗	B-Cell/CD4+/CD8+	3	88.9%	62.7%	55.7%	3
⊖	B-Cell/CD4+	3	88.9%	62.7%	55.7%	3
⊖ ^d	B-Cell/CD4+ (H2 ^d ligands)	1	66.2%	39.9%	26.4%	1
⊖ ^b	B-Cell/CD4+ (H2 ^b ligands)	2	64.8%	39.4%	25.5%	2
⊗	B-Cell/CD8+	3	90.8%	57.7%	52.4%	3
⊗ ^d	B-Cell/CD8+ (H2 ^d ligands)	1	81.8%	38.4%	31.4%	1
⊗ ^b	B-Cell/CD8+ (H2 ^b ligands)	2	89.4%	46.5%	41.5%	2
⊗ ^{bd}	B-Cell/CD8+ (H2 ^b and H2 ^d ligands)	1	81.8%	38.4%	31.4%	1
□	B-Cell	3	81.8%	52.8%	43.2%	3

1.2 27mer Vaccine Peptides

	Sequence	Protein	Start	End	B-cell Epitope	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	PVTLACFVLAAYRINWITGGIAIAMA	M	59	85		42.0%	76.0%	+	+	-	+	○ ^b
3	VQMFHLVDFQVTIAEILLIIMRTFKVS	M	221	247		64.0%	72.0%	+	-	+	-	○
4	WPQIAQFAPSASAFFGMSRIGMEVTPS	N	301	327		63.0%	61.0%	+	+	+	+	○ ^{bd} ⊗ ^d ⊗ ^{bd}
5	AQFAPSASAFFGMSRIGMEVTPSGTWL	N	305	331		71.0%	57.0%	+	+	+	-	⊗ ⊗ ^b
6	SASAFFGMSRIGMEVTPSGTWLTYTGA	N	310	336		76.0%	45.0%	+	-	+	-	* ^{bd}
7	VTPSGTWLTYTGAIKLDDKDPNFKDQV	N	324	350		50.0%	62.0%	+	+	-	-	○ ○ ^b
8	PQRQKKQQTVTLLPAADLDDFSKQLQQ	N	383	409		11.0%	52.0%	-	-	-	+	○ ^d
9	MSSADSTQAMGYINVFAFPFTIYSLLL	N	411	437		78.0%	0.0%	+	-	+	-	* * ^b * ^d
10	ATPSDFVRATATIPIQASLPFGWLIVG	ORF3a	-327	-301		39.0%	78.0%	+	+	-	+	○ ○ ^d ○ ^b ○ ^{bd}
11	DFVRATATIPIQASLPFGWLIVGVALL	ORF3a	-323	-297		65.0%	73.0%	+	+	-	+	⊗ ⊗ ^b
12	GAAAYYVGYLQPRTFLLKYNENGTITD	S	261	287		88.0%	38.0%	+	+	+	-	* ^{bd}
13	SETKCTLKSFTVEKGIYQTSNFRVQPT	S	297	323		54.0%	52.0%	-	-	+	-	* ^d
14	GLTVLPPLLTDEMIAQYTSALLAGTIT	S	857	883		66.0%	73.0%	+	+	+	+	⊗ ⊗ ^d ⊗ ^b ⊗ ^{bd}
15	SVLNDILSRDLKVEAEVQIDRLITGRL	S	975	1001		72.0%	28.0%	+	-	-	-	* * ^b
16	RLQSLQTYVTQQLIRAAEIRASANLAA	S	1000	1026		54.0%	81.0%	-	+	+	+	○ ○ ^d ○ ^b ○ ^{bd}
17	LVSDIDITFLKKDAPYIVGDVVQEGVL	orflab	1270	1296		78.0%	64.0%	+	-	-	-	⊗
18	IASEFSSLPSYAAFATAQEAYEQAVAN	orflab	3944	3970		48.0%	84.0%	+	+	+	+	○ ^b ○ ^{bd}
19	RLSFKELLVYAADPAMHAASGNLLLDK	orflab	4757	4783		76.0%	80.0%	-	+	+	+	⊗ ^d
20	TLMIERFVSLAIDAYPLTKHPNQEYAD	orflab	5245	5271		81.0%	71.0%	+	+	+	+	⊗ ^b ⊗ ^{bd}
21	GNYNLYRLFRKSNLKPFERDISTEIIY	S	447	473	S ₄₅₆₋₄₇₃	82.0%	38.0%	+	-	+	-	⊗ ⊗ ^d ⊗ ^b ⊗ ^{bd}
22	YLYRLFRKSNLKPFERDISTEIIYQAGS	S	451	477	S ₄₅₆₋₄₇₃	78.0%	46.0%	+	-	-	-	□ □ ⊗
23	FRKSNLKPFERDISTEIIYQAGSTPCNG	S	456	482	S ₄₅₆₋₄₇₃	46.0%	30.0%	-	+	-	-	□ ^b
24	KFLPFQQFGRDIADTTDAVRDPQTLEI	S	558	584	S ₅₈₀₋₅₈₃	0.0%	0.0%	-	-	-	-	□
25	PQTLEILDITPCSFGGVSVITPGTNTS	S	579	605	S ₅₈₀₋₅₈₃	13.0%	21.0%	-	-	-	-	⊗ □ ⊗
26	IYKTPPIKDFGGFNFSQILPDPSKPSK	S	788	814	S ₈₀₉₋₈₁₂	35.0%	23.0%	-	+	-	-	□ □ ^b
27	PSKPSKRSFIEDLLFNKVTLADAGFIK	S	809	835	S ₈₀₉₋₈₁₂	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
⊗	CD4+/CD8+	5	95.1%	89.7%	85.3%	0
⊗ ^d	CD4+/CD8+ (H2 ^d ligands)	4	93.9%	88.5%	83.1%	0
⊗ ^b	CD4+/CD8+ (H2 ^b ligands)	6	95.1%	89.7%	85.3%	0
⊗ ^{bd}	CD4+/CD8+ (H2 ^b and H2 ^d ligands)	4	93.8%	88.5%	83.0%	0
○	CD4+	4	93.8%	89.7%	84.2%	0
○ ^d	CD4+ (H2 ^d ligands)	4	93.8%	89.7%	84.2%	0
○ ^b	CD4+ (H2 ^b ligands)	5	83.5%	89.7%	74.9%	0
○ ^{bd}	CD4+ (H2 ^b and H2 ^d ligands)	5	93.8%	89.7%	84.2%	0
*	CD8+	3	95.1%	62.2%	59.1%	0
* ^d	CD8+ (H2 ^d ligands)	3	94.7%	68.9%	65.3%	0
* ^b	CD8+ (H2 ^b ligands)	3	94.7%	68.9%	65.3%	0
* ^{bd}	CD8+ (H2 ^b and H2 ^d ligands)	3	94.7%	68.9%	65.3%	0
⊗	B-Cell/CD4+/CD8+	4	84.2%	62.7%	52.8%	3
⊖	B-Cell/CD4+	4	84.2%	62.7%	52.8%	3
⊖ ^b	B-Cell/CD4+ (H2 ^b ligands)	2	37.2%	39.4%	14.6%	2
⊗	B-Cell/CD8+	3	88.9%	22.6%	20.1%	3
⊗ ^d	B-Cell/CD8+ (H2 ^d ligands)	1	77.2%	38.4%	29.7%	1
⊗ ^b	B-Cell/CD8+ (H2 ^b ligands)	2	87.2%	22.6%	19.7%	2
⊗ ^{bd}	B-Cell/CD8+ (H2 ^b and H2 ^d ligands)	1	77.2%	38.4%	29.7%	1
□	B-Cell	3	78.0%	40.7%	31.8%	3

2.2 21mer Vaccine Peptides

	Sequence	Protein	Start	End	B-cell Epitope	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
2	FVLAAYRINWITGGIAIAMA	M	65	85		42.0%	76.0%	+	+	-	+	○ ^b
3	LSYFIASFRLFARTRSMWSFN	M	93	113		78.0%	46.0%	+	+	+	+	⊗ ^{bd}
4	GTRNPANNAIIVLQLPQGTTL	N	147	167		20.0%	55.0%	-	+	-	+	○ ^{bd} ⊗
5	IAQFAPSASAFFGMSRIGMEV	N	304	324		63.0%	51.0%	+	+	+	+	⊗ ^d ⊗ ^{bd}
6	SASAFFGMSRIGMEVTPSGTW	N	310	330		65.0%	37.0%	+	-	+	-	* ^b * ^d * ^{bd}
7	IGMEVTPSGTWLTYTGAIKLD	N	320	340		54.0%	52.0%	+	+	-	-	⊗ ^b
8	GTWLTYTGAIKLDDKDPNFKD	N	328	348		26.0%	62.0%	+	+	-	-	○ ^b
9	KQQTVTLTPAADLDDFSKQLQ	N	388	408		11.0%	52.0%	-	-	-	+	○ ○ ^d
10	TQAMGYINVFAFPFTIYSLLL	N	417	437		78.0%	0.0%	+	-	+	-	*
11	SDFVRATATIPIQASLPFGWL	ORF3a	-324	-304		39.0%	78.0%	+	+	-	+	○ ○ ^d ○ ^b ○ ^{bd} ⊗ ⊗ ^b
12	LPFNDGVYFASTEKSNIIRGW	S	84	104		58.0%	41.0%	-	+	-	-	*
13	GAAAYYVGYLQPRTFLLKYNE	S	261	281		88.0%	38.0%	+	+	+	-	* ^b * ^d * ^{bd}
14	LTDEMIAQYTSALLAGTITSG	S	865	885		42.0%	73.0%	+	+	+	+	⊗ ^{bd}
15	LSSNFGAISSVLNDILSRDLK	S	966	986		59.0%	62.0%	+	+	-	+	⊗ ^b
16	VTQQLIRAAEIRASANLAATK	S	1008	1028		30.0%	81.0%	-	+	-	+	○ ○ ^d ○ ^b ○ ^{bd}
17	TMDLFMRIFTIGTVTLKQGEI	S	1273	1293		82.0%	58.0%	-	-	+	+	⊗ ⊗ ^d
18	LATNNLVVMAYITGGVQLTS	orflab	590	610		76.0%	76.0%	+	+	-	+	⊗ ^b
19	VPMEKLKTLVATAEAEAKNV	orflab	2604	2624		60.0%	70.0%	-	+	-	+	⊗
20	ASEFSSLPSYAAFATAQEAYE	orflab	3945	3965		48.0%	84.0%	+	+	+	+	○ ^b ○ ^{bd} ⊗ ^d
21	TLMIERFVSLAIDAYPLTKHP	orflab	5245	5265		81.0%	71.0%	+	+	+	+	⊗ ^b ⊗ ^{bd}
22	NYNLYRLFRKSNLKPFERDI	S	448	468	S ₄₅₆₋₄₇₃	77.0%	38.0%	+	-	+	-	⊗ ^d ⊗ ^{bd} □ ⊗
23	YRLFRKSNLKPFERDISTEY	S	453	473	S ₄₅₆₋₄₇₃	78.0%	23.0%	+	-	-	-	□ ⊗ ⊗ ^b □ ⊗
24	KPFERDISTEYQAGSTPCNG	S	462	482	S ₄₅₆₋₄₇₃	20.0%	21.0%	-	+	-	-	□ ^b
25	QFGRDIADTTDAVRDPQTLEI	S	564	584	S ₅₈₀₋₅₈₃	0.0%	0.0%	-	-	-	-	□
26	PQTLEILDITPCSFGGVSVIT	S	579	599	S ₅₈₀₋₅₈₃	13.0%	0.0%	-	-	-	-	⊗
27	QTLEILDITPCSFGGVSVITP	S	580	600	S ₅₈₀₋₅₈₃	13.0%	21.0%	-	-	-	-	□ ⊗
28	GFNFSQILPDPSKPSKRSFIE	S	799	819	S ₈₀₉₋₈₁₂	21.0%	23.0%	-	+	-	-	□ □ □ ^b ⊗
29	PSKPSKRSFIEDLLFNKVTLA	S	809	829	S ₈₀₉₋₈₁₂	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
⊗	CD4+/CD8+	7	95.3%	89.7%	85.5%	0
⊗ ^d	CD4+/CD8+ (H2 ^d ligands)	6	91.3%	88.5%	80.8%	0
⊗ ^b	CD4+/CD8+ (H2 ^b ligands)	8	91.7%	89.7%	82.2%	0
⊗ ^{bd}	CD4+/CD8+ (H2 ^b and H2 ^d ligands)	4	92.3%	84.7%	78.1%	0
○	CD4+	4	83.9%	89.7%	75.3%	0
○ ^d	CD4+ (H2 ^d ligands)	5	86.7%	89.7%	77.8%	0
○ ^b	CD4+ (H2 ^b ligands)	5	83.9%	89.7%	75.3%	0
○ ^{bd}	CD4+ (H2 ^b and H2 ^d ligands)	5	86.7%	89.7%	77.8%	0
*	CD8+	3	95.8%	38.4%	36.8%	0
* ^d	CD8+ (H2 ^d ligands)	3	94.6%	22.6%	21.4%	0
* ^b	CD8+ (H2 ^b ligands)	3	91.2%	46.5%	42.4%	0
* ^{bd}	CD8+ (H2 ^b and H2 ^d ligands)	3	91.2%	46.5%	42.4%	0
⊗	B-Cell/CD4+/CD8+	4	77.2%	45.8%	35.3%	3
⊖	B-Cell/CD4+	5	77.2%	62.7%	48.4%	3
⊖ ^b	B-Cell/CD4+ (H2 ^b ligands)	2	0.0%	39.4%	0.0%	2
⊗	B-Cell/CD8+	6	84.2%	29.9%	25.2%	3
⊗ ^d	B-Cell/CD8+ (H2 ^d ligands)	1	77.2%	20.4%	15.8%	1
⊗ ^b	B-Cell/CD8+ (H2 ^b ligands)	2	72.5%	20.4%	14.8%	1
⊗ ^{bd}	B-Cell/CD8+ (H2 ^b and H2 ^d ligands)	1	77.2%	20.4%	15.8%	1
□	B-Cell	3	44.0%	11.9%	5.2%	3

3.2 15mer Vaccine Peptides

	Sequence	Protein	Start	End	B-cell Epitope	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%	+	+	+	+	$\circ \circ^b \circ^d \circ^{bd}$ $\otimes \otimes^b \otimes^d \otimes^{bd}$
2	YANRNRFLYIIKLIF	M	39	53		78.0%	0.0%	+	-	+	-	$*^d$
3	ANRNRFLYIIKLIFL	M	40	54		81.0%	0.0%	+	-	+	-	$*^b *^{bd}$
4	YFIASFRLFARTSRM	M	95	109		78.0%	20.0%	+	-	+	+	$*$
5	SFRLFARTSRMWSFN	M	99	113		73.0%	46.0%	+	+	-	+	\otimes^b
6	LSPRWYFYLG TGPE	N	104	118		49.0%	0.0%	+	-	+	-	$*^d *^b *^{bd}$
7	ATKAYNVTQAFGRRG	N	264	278		24.0%	46.0%	+	+	+	-	\otimes^b
8	PQIAQFAPSASAFFG	N	302	316		17.0%	39.0%	-	+	+	+	$\circ^d \circ^{bd} \otimes^d$
9	SASAFFGMSRIGMEV	N	310	324		56.0%	37.0%	+	-	+	-	\otimes
10	MEVTPSGTWLTYTGA	N	322	336		46.0%	0.0%	-	-	-	-	$*$
11	PSGTWLTYTGAIKLD	N	326	340		14.0%	52.0%	+	+	-	-	\circ^b
12	QQTVTLLPAADLDDF	N	389	403		11.0%	34.0%	-	-	-	-	\circ
13	DFVRATATIPIQASL	ORF3a	-323	-309		14.0%	73.0%	+	+	-	+	$\circ \circ^b \circ^d \circ^{bd}$ $\otimes \otimes^b$
14	IGINITRFQTLALH	S	231	245		61.0%	62.0%	+	-	+	+	$\otimes \otimes^d$
15	YYVGYLQPRTFLLKY	S	265	279		88.0%	23.0%	-	+	+	-	$**^d$
16	LTDEMIAQYTSALLA	S	865	879		42.0%	46.0%	+	+	+	+	$*^b *^{bd} \otimes^b$
17	MIAQYTSALLAGTIT	S	869	883		14.0%	73.0%	+	+	+	+	$\otimes^d \otimes^{bd}$
18	RAAEIRASANLAATK	S	1014	1028		30.0%	79.0%	-	+	-	+	$\circ \circ^b \circ^d \circ^{bd}$
19	FASEAARVRSIFSR	orflab	536	550		63.0%	42.0%	-	+	-	+	\otimes
20	AAIFYLITPVHVMSK	orflab	2784	2798		80.0%	62.0%	+	+	+	+	\otimes^{bd}
21	IGALDISASIVAGGI	orflab	3038	3052		13.0%	56.0%	-	+	-	+	\otimes
22	TTFTYASALWEIQV	orflab	4087	4101		52.0%	49.0%	-	+	+	-	\otimes
23	KELLVYAADPAMHAA	orflab	4761	4775		24.0%	80.0%	-	+	-	+	$\circ^b \circ^d \circ^{bd}$
24	TLMIERFVSLAIDAY	orflab	5245	5259		72.0%	59.0%	+	-	+	+	\otimes^d
25	MIERFVSLAIDAYPL	orflab	5247	5261		26.0%	47.0%	+	+	-	+	\otimes^b
26	FKLSYGIATVREVLS	orflab	5469	5483		61.0%	66.0%	+	+	+	+	$\otimes^b \otimes^d \otimes^{bd}$
27	IQQKLALGGSVAIKI	orflab	6955	6969		33.0%	67.0%	+	+	-	+	\otimes^b
28	GGNYNYLYRLFRKSN	S	446	460	S ₄₅₆₋₄₇₃	37.0%	20.0%	+	-	+	-	\boxtimes
29	NYNYLYRLFRKSNLK	S	448	462	S ₄₅₆₋₄₇₃	77.0%	20.0%	+	-	+	-	$\boxtimes^d \boxtimes^{bd} \square \boxtimes$
30	YNYLYRLFRKSNLKP	S	449	463	S ₄₅₆₋₄₇₃	73.0%	20.0%	+	-	-	-	\boxtimes^b
31	YLYRLFRKSNLKPFE	S	451	465	S ₄₅₆₋₄₇₃	73.0%	20.0%	+	-	-	-	\boxtimes
32	YRLFRKSNLKPFERD	S	453	467	S ₄₅₆₋₄₇₃	73.0%	23.0%	+	-	-	-	$\square \boxtimes$
33	RLFRKSNLKPFERDI	S	454	468	S ₄₅₆₋₄₇₃	56.0%	0.0%	+	-	-	-	\boxtimes^b
34	FRKSNLKPFERDIST	S	456	470	S ₄₅₆₋₄₇₃	32.0%	0.0%	-	-	-	-	\boxtimes
35	KSNLKPFERDISTEI	S	458	472	S ₄₅₆₋₄₇₃	29.0%	0.0%	-	-	-	-	\square
36	LKPFERDISTEIYQA	S	461	475	S ₄₅₆₋₄₇₃	20.0%	12.0%	-	-	-	-	\boxtimes
37	ISTEIYQAGSTPCNG	S	468	482	S ₄₅₆₋₄₇₃	0.0%	21.0%	-	+	-	-	$\square \square^b$
38	ADTTDAVRDPQTLEI	S	570	584	S ₅₈₀₋₅₈₃	0.0%	0.0%	-	-	-	-	$\square \square \boxtimes$