

# 1 27mer

## 1.1 27mer Selection Sets

Symbol	Set	# Peptides	HLA-I Coverage	HLA-II Coverage	Total Coverage	# B-cell Epitope Regions
⊗	CD4+/CD8+	4	92.2%	88.5%	81.6%	0
⊗ <sup>d</sup>	CD4+/CD8+ (H2 <sup>d</sup> ligands)	4	93.8%	84.7%	79.5%	0
⊗ <sup>b</sup>	CD4+/CD8+ (H2 <sup>b</sup> ligands)	3	92.2%	84.7%	78.1%	0
⊗ <sup>bd</sup>	CD4+/CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> ligands)	4	92.1%	84.7%	78.0%	0
○	CD4+	3	91.3%	88.5%	80.8%	0
○ <sup>d</sup>	CD4+ (H2 <sup>d</sup> ligands)	3	91.3%	88.5%	80.8%	0
○ <sup>b</sup>	CD4+ (H2 <sup>b</sup> ligands)	3	76.8%	84.7%	65.0%	0
○ <sup>bd</sup>	CD4+ (H2 <sup>b</sup> and H2 <sup>d</sup> ligands)	3	92.2%	84.7%	78.1%	0
*	CD8+	3	95.8%	61.3%	58.7%	0
* <sup>d</sup>	CD8+ (H2 <sup>d</sup> ligands)	3	95.1%	76.2%	72.5%	0
* <sup>b</sup>	CD8+ (H2 <sup>b</sup> ligands)	3	95.8%	61.3%	58.7%	0
* <sup>bd</sup>	CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> 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
⊖ <sup>d</sup>	B-Cell/CD4+ (H2 <sup>d</sup> ligands)	1	66.2%	39.9%	26.4%	1
⊖ <sup>b</sup>	B-Cell/CD4+ (H2 <sup>b</sup> ligands)	2	64.8%	39.4%	25.5%	2
⊗	B-Cell/CD8+	3	90.8%	57.7%	52.4%	3
⊗ <sup>d</sup>	B-Cell/CD8+ (H2 <sup>d</sup> ligands)	1	81.8%	38.4%	31.4%	1
⊗ <sup>b</sup>	B-Cell/CD8+ (H2 <sup>b</sup> ligands)	2	89.4%	46.5%	41.5%	2
⊗ <sup>bd</sup>	B-Cell/CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> 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 Region	HLA-I Coverage	HLA-II Coverage	H2 <sup>b</sup> I	H2 <sup>b</sup> II	H2 <sup>d</sup> I	H2 <sup>d</sup> II	Selection Sets
1	LLQFAYANRNRFLYIIKLIFLWLLWPV	M	34	60		89.0%	36.0%	+	+	+	+	* * <sup>b</sup> * <sup>d</sup> * <sup>bd</sup> ○ ○ <sup>d</sup> ○ <sup>bd</sup> ⊗ ⊗ <sup>d</sup> ⊗ <sup>b</sup> ⊗ <sup>bd</sup>
2	PVTLACFVLAAYRINWITGGIAIAMA	M	59	85		42.0%	76.0%	+	+	-	+	○ <sup>b</sup>
3	YFIASFRLFARTRSMWSFNPETNILLN	M	95	121		78.0%	53.0%	+	+	+	+	⊗ <sup>bd</sup>
4	KDLSPRWYFYLLGTGPEAGLPYGANKD	N	102	128		49.0%	39.0%	+	+	+	-	* * <sup>b</sup> * <sup>d</sup>
5	WPQIAQFAPSASAFFGMSRIGMEVTPS	N	301	327		63.0%	61.0%	+	+	+	+	○ <sup>bd</sup> ⊗ <sup>d</sup> ⊗ <sup>bd</sup>
6	AQFAPSASAFFGMSRIGMEVTPSGTWL	N	305	331		71.0%	57.0%	+	+	+	-	⊗ ⊗ <sup>b</sup>
7	SASAFFGMSRIGMEVTPSGTWLTYTGA	N	310	336		76.0%	45.0%	+	-	+	-	* <sup>bd</sup>
8	VTPSGTWLTYTGAIKLDDKDPNFKDQV	N	324	350		50.0%	62.0%	+	+	-	-	○ <sup>b</sup>
9	PQRQKKQQTVTLLPAADLDDFSKQLQQ	N	383	409		11.0%	52.0%	-	-	-	+	○ ○ <sup>d</sup> ⊗
10	YDPKVFRSSVLHSTQDLFLPFFSNVTW	S	38	64		44.0%	52.0%	-	+	+	+	⊗ <sup>d</sup>
11	GAAAYYVGYLQPRTFLLKYNENGTITD	S	261	287		88.0%	38.0%	+	+	+	-	* <sup>bd</sup>
12	SETKCTLKSFTVEKGIYQTSNFRVQPT	S	297	323		54.0%	52.0%	-	-	+	-	* <sup>d</sup>
13	GLTVLPPLLTDEMIAQYTSALLAGTIT	S	857	883		66.0%	73.0%	+	+	+	+	⊗ ⊗ <sup>d</sup> ⊗ <sup>b</sup> ⊗ <sup>bd</sup>
14	SVLNDILSRDKVEAEVQIDRLITGRL	S	975	1001		72.0%	28.0%	+	-	-	-	* * <sup>b</sup>
15	RLQSLQTYVTQQLIRAAEIRASANLAA	S	1000	1026		54.0%	81.0%	-	+	+	+	○ ○ <sup>d</sup> ○ <sup>b</sup> ○ <sup>bd</sup>
16	GNYNLYRLFRKSNLKPFERDISTEIIY	S	447	473	456-FRKSNLKPFERDISTEIIY-473	82.0%	38.0%	+	-	+	-	⊗ ⊗ <sup>d</sup> ⊗ <sup>b</sup> ⊗ <sup>bd</sup>
17	YLYRLFRKSNLKPFERDISTEIIYQAGS	S	451	477	456-FRKSNLKPFERDISTEIIY-473	78.0%	46.0%	+	-	-	-	□ □ ⊗
18	FRKSNLKPFERDISTEIIYQAGSTPCNG	S	456	482	456-FRKSNLKPFERDISTEIIY-473	46.0%	30.0%	-	+	-	-	□ <sup>b</sup>
19	KFLPFQQFGRDIADTTDAVRDPQTLEI	S	558	584	580-QTLE-583	0.0%	0.0%	-	-	-	-	□
20	PQTLEILDITPCSFGGVSVITPGTNTS	S	579	605	580-QTLE-583	13.0%	21.0%	-	-	-	-	⊗ □ ⊗
21	IYKTPPIKDFGGFNFSQILPDPSKPSK	S	788	814	809-PSKP-812	35.0%	23.0%	-	+	-	-	□ □ <sup>b</sup>
22	PSKPSKRSFIEDLLFNKVTADAGFIK	S	809	835	809-PSKP-812	66.0%	40.0%	+	-	-	+	⊗ ⊗ <sup>b</sup> □ □ <sup>d</sup> ⊗

## 2 21mer

### 2.1 21mer Selection Sets

Symbol	Set	# Peptides	HLA-I Coverage	HLA-II Coverage	Total Coverage	# B-cell Epitope Regions
⊗	CD4+/CD8+	3	84.9%	84.7%	71.9%	0
⊗ <sup>d</sup>	CD4+/CD8+ (H2 <sup>d</sup> ligands)	4	90.2%	84.7%	76.4%	0
⊗ <sup>b</sup>	CD4+/CD8+ (H2 <sup>b</sup> ligands)	4	93.9%	84.7%	79.5%	0
⊗ <sup>bd</sup>	CD4+/CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> ligands)	4	92.1%	84.7%	78.0%	0
○	CD4+	3	92.2%	88.5%	81.6%	0
○ <sup>d</sup>	CD4+ (H2 <sup>d</sup> ligands)	3	92.2%	88.5%	81.6%	0
○ <sup>b</sup>	CD4+ (H2 <sup>b</sup> ligands)	3	69.5%	84.7%	58.9%	0
○ <sup>bd</sup>	CD4+ (H2 <sup>b</sup> and H2 <sup>d</sup> ligands)	3	93.8%	84.7%	79.4%	0
*	CD8+	3	95.1%	62.2%	59.1%	0
* <sup>d</sup>	CD8+ (H2 <sup>d</sup> ligands)	3	94.7%	68.9%	65.3%	0
* <sup>b</sup>	CD8+ (H2 <sup>b</sup> ligands)	3	94.7%	68.9%	65.3%	0
* <sup>bd</sup>	CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> 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
⊖ <sup>b</sup>	B-Cell/CD4+ (H2 <sup>b</sup> ligands)	2	37.2%	39.4%	14.6%	2
⊗	B-Cell/CD8+	3	88.9%	22.6%	20.1%	3
⊗ <sup>d</sup>	B-Cell/CD8+ (H2 <sup>d</sup> ligands)	1	77.2%	38.4%	29.7%	1
⊗ <sup>b</sup>	B-Cell/CD8+ (H2 <sup>b</sup> ligands)	2	87.2%	22.6%	19.7%	2
⊗ <sup>bd</sup>	B-Cell/CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> 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 Region	HLA-I Coverage	HLA-II Coverage	H2 <sup>b</sup> I	H2 <sup>b</sup> II	H2 <sup>d</sup> I	H2 <sup>d</sup> II	Selection Sets
1	LLQFAYANRNRFLYIIKLIFL	M	34	54		89.0%	36.0%	+	+	+	+	* * <sup>b</sup> * <sup>d</sup> * <sup>bd</sup> ○ ○ <sup>d</sup> ○ <sup>bd</sup> ⊗ <sup>d</sup> ⊗ <sup>b</sup> ⊗ <sup>bd</sup>
2	FVLAAYRINWITGGIAIAMA	M	65	85		42.0%	76.0%	+	+	-	+	○ <sup>b</sup> ⊗ <sup>b</sup> ⊗ <sup>b</sup>
3	LSYFIASFRLFARTRSMWSFN	M	93	113		78.0%	46.0%	+	+	+	+	⊗ <sup>bd</sup>
4	LSPRWYFYLG TGPEAGLPYG	N	104	124		49.0%	23.0%	+	+	+	-	*
5	GTRNPANNAIIVLQLPQGTTL	N	147	167		20.0%	55.0%	-	+	-	+	○ <sup>bd</sup>
6	IAQFAPSASAFFGMSRIGMEV	N	304	324		63.0%	51.0%	+	+	+	+	⊗ <sup>d</sup> ⊗ <sup>bd</sup>
7	SASAFFGMSRIGMEVTPSGTW	N	310	330		65.0%	37.0%	+	-	+	-	* <sup>b</sup> * <sup>d</sup> * <sup>bd</sup>
8	IGMEVTPSGTWLTYTGAIKLD	N	320	340		54.0%	52.0%	+	+	-	-	⊗ <sup>b</sup>
9	GTWLTYTGAIKLDDKDPNFKD	N	328	348		26.0%	62.0%	+	+	-	-	○ <sup>b</sup> ⊗
10	KQQTVTLLPAADLDDFSKQLQ	N	388	408		11.0%	52.0%	-	-	-	+	○ ○ <sup>d</sup>
11	LPFNDGVYFASTEKSNIIRGW	S	84	104		58.0%	41.0%	-	+	-	-	*
12	PLVDLPIGINITRFQTLLALH	S	225	245		65.0%	62.0%	+	-	+	+	⊗ ⊗ <sup>d</sup>
13	GAAAYYVGYLQPRTFLLKYNE	S	261	281		88.0%	38.0%	+	+	+	-	* <sup>b</sup> * <sup>d</sup> * <sup>bd</sup>
14	LTDEMIAQYTSALLAGTITSG	S	865	885		42.0%	73.0%	+	+	+	+	⊗ <sup>d</sup> ⊗ <sup>bd</sup>
15	LSSNFGAISSVLNDILSRLDK	S	966	986		59.0%	62.0%	+	+	-	+	⊗ <sup>b</sup>
16	VTQQLIRAAEIRASANLAATK	S	1008	1028		30.0%	81.0%	-	+	-	+	○ ○ <sup>d</sup> ○ <sup>b</sup> ○ <sup>bd</sup>
17	NYNLYRLFRKSNLKPFERDI	S	448	468	456-FRKSNLKPFERDISTEIIY-473	77.0%	38.0%	+	-	+	-	⊗ <sup>d</sup> ⊗ <sup>bd</sup> □ ⊗
18	YRLFRKSNLKPFERDISTEIIY	S	453	473	456-FRKSNLKPFERDISTEIIY-473	78.0%	23.0%	+	-	-	-	□ ⊗ ⊗ <sup>b</sup> □ ⊗
19	KPFERDISTEIIYQAGSTPCNG	S	462	482	456-FRKSNLKPFERDISTEIIY-473	20.0%	21.0%	-	+	-	-	□ <sup>b</sup>
20	QFGRDIADTTDAVRDPQTLEI	S	564	584	580-QTLE-583	0.0%	0.0%	-	-	-	-	□
21	PQTLEILDITPCSF GGVS VIT	S	579	599	580-QTLE-583	13.0%	0.0%	-	-	-	-	⊗
22	QTLEILDITPCSF GGVS VITP	S	580	600	580-QTLE-583	13.0%	21.0%	-	-	-	-	□ ⊗
23	GFNFSQILPDPSKPSKRSFIE	S	799	819	809-PSKP-812	21.0%	23.0%	-	+	-	-	□ □ □ <sup>b</sup> ⊗
24	PSKPSKRSFIEDLLFNKVTLA	S	809	829	809-PSKP-812	66.0%	0.0%	+	-	-	-	⊗ ⊗ <sup>b</sup>

### 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+	5	90.6%	88.5%	80.2%	0
⊗ <sup>d</sup>	CD4+/CD8+ (H2 <sup>d</sup> ligands)	3	81.1%	76.2%	61.8%	0
⊗ <sup>b</sup>	CD4+/CD8+ (H2 <sup>b</sup> ligands)	3	81.8%	62.5%	51.1%	0
⊗ <sup>bd</sup>	CD4+/CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> ligands)	2	77.2%	65.8%	50.8%	0
○	CD4+	3	83.9%	88.5%	74.3%	0
○ <sup>d</sup>	CD4+ (H2 <sup>d</sup> ligands)	3	86.7%	84.7%	73.4%	0
○ <sup>b</sup>	CD4+ (H2 <sup>b</sup> ligands)	3	83.9%	84.7%	71.1%	0
○ <sup>bd</sup>	CD4+ (H2 <sup>b</sup> and H2 <sup>d</sup> ligands)	3	86.7%	84.7%	73.4%	0
*	CD8+	3	95.8%	38.4%	36.8%	0
* <sup>d</sup>	CD8+ (H2 <sup>d</sup> ligands)	3	94.6%	22.6%	21.4%	0
* <sup>b</sup>	CD8+ (H2 <sup>b</sup> ligands)	3	91.2%	46.5%	42.4%	0
* <sup>bd</sup>	CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> 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
⊖ <sup>b</sup>	B-Cell/CD4+ (H2 <sup>b</sup> ligands)	2	0.0%	39.4%	0.0%	2
⊗	B-Cell/CD8+	6	84.2%	29.9%	25.2%	3
⊗ <sup>d</sup>	B-Cell/CD8+ (H2 <sup>d</sup> ligands)	1	77.2%	20.4%	15.8%	1
⊗ <sup>b</sup>	B-Cell/CD8+ (H2 <sup>b</sup> ligands)	2	72.5%	20.4%	14.8%	1
⊗ <sup>bd</sup>	B-Cell/CD8+ (H2 <sup>b</sup> and H2 <sup>d</sup> 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 Region	HLA-I Coverage	HLA-II Coverage	H2 <sup>b</sup> I	H2 <sup>b</sup> II	H2 <sup>d</sup> I	H2 <sup>d</sup> II	Selection Sets
1	LLQFAYANRNRFLYI	M	34	48		77.0%	36.0%	+	+	+	+	$\circ \circ^b \circ^d \circ^{bd}$ $\otimes \otimes^d \otimes^{bd}$
2	YANRNRFLYIIKLIF	M	39	53		78.0%	0.0%	+	-	+	-	$\ast^d$
3	ANRNRFLYIIKLIFL	M	40	54		81.0%	0.0%	+	-	+	-	$\ast^b \ast^{bd}$
4	YFIASFRLFARTRSM	M	95	109		78.0%	20.0%	+	-	+	+	$\ast$
5	SFRLFARTRSMWSFN	M	99	113		73.0%	46.0%	+	+	-	+	$\otimes^b$
6	LSPRWYFYLG TGPE	N	104	118		49.0%	0.0%	+	-	+	-	$\ast^d \ast^b \ast^{bd}$
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%	-	-	-	-	$\ast$
11	PSGTWLTYTGAIKLD	N	326	340		14.0%	52.0%	+	+	-	-	$\circ^b$
12	QQTVTLLPAADLDDF	N	389	403		11.0%	34.0%	-	-	-	-	$\circ \otimes$
13	IGINITRFQTLLALH	S	231	245		61.0%	62.0%	+	-	+	+	$\otimes \otimes^d$
14	YYVGYLQPRTFLLKY	S	265	279		88.0%	23.0%	-	+	+	-	$\ast \ast^d$
15	LTDEMIAQYTSALLA	S	865	879		42.0%	46.0%	+	+	+	+	$\ast^b \ast^{bd} \otimes^b \otimes^{bd}$
16	RAAEIRASANLAATK	S	1014	1028		30.0%	79.0%	-	+	-	+	$\circ \circ^b \circ^d \circ^{bd}$ $\otimes$
17	GGNYNYLYRLFRKSN	S	446	460	456-FRKS NLKP FERDISTE IY-473	37.0%	20.0%	+	-	+	-	$\otimes$
18	NYNYLYRLFRKSNLK	S	448	462	456-FRKS NLKP FERDISTE IY-473	77.0%	20.0%	+	-	+	-	$\otimes^d \otimes^{bd} \square \otimes$
19	YNYLYRLFRKSNLKP	S	449	463	456-FRKS NLKP FERDISTE IY-473	73.0%	20.0%	+	-	-	-	$\otimes^b$
20	YLYRLFRKSNLKPFE	S	451	465	456-FRKS NLKP FERDISTE IY-473	73.0%	20.0%	+	-	-	-	$\otimes$
21	YRLFRKSNLKPFERD	S	453	467	456-FRKS NLKP FERDISTE IY-473	73.0%	23.0%	+	-	-	-	$\square \otimes$
22	RLFRKSNLKPFERDI	S	454	468	456-FRKS NLKP FERDISTE IY-473	56.0%	0.0%	+	-	-	-	$\otimes^b$
23	FRKSNLKPFERDIST	S	456	470	456-FRKS NLKP FERDISTE IY-473	32.0%	0.0%	-	-	-	-	$\otimes$
24	KSNLKPFERDISTEI	S	458	472	456-FRKS NLKP FERDISTE IY-473	29.0%	0.0%	-	-	-	-	$\square$
25	LKPFERDISTEIYQA	S	461	475	456-FRKS NLKP FERDISTE IY-473	20.0%	12.0%	-	-	-	-	$\otimes$
26	ISTEIYQAGSTPCNG	S	468	482	456-FRKS NLKP FERDISTE IY-473	0.0%	21.0%	-	+	-	-	$\square \square^b$
27	ADTTDAVRDPQTLEI	S	570	584	580-QTLE-583	0.0%	0.0%	-	-	-	-	$\square \square \otimes$
28	PQTLEILDITPCSF	S	579	593	580-QTLE-583	13.0%	0.0%	-	-	-	-	$\otimes$
29	GFNFSQILPDPSKPS	S	799	813	809-PSKP-812	0.0%	23.0%	-	+	-	-	$\square \square^b$
30	FNFSQILPDPSKPSK	S	800	814	809-PSKP-812	21.0%	12.0%	-	-	-	-	$\square \otimes \otimes$