

**Table S1.** Relative abundance of peptides eluted from WT,  $\beta 2m^{-}$ , and  $\beta 2m^{+}$  EL4 cell lines

Gene ID	Gene symbol	Peptide	WT	Intensities from		Fold change WT/ $\beta 2m^{-}$
				$\beta 2m^{-}$	$\beta 2m^{+}$	
68523	<i>1110019N10Rik</i>	AALENTHLL	160364	12000	39986	13
66185	<i>1110037F02Rik</i>	RQILNADAM	364055	12000	227326	30
67463	<i>1200014M14Rik</i>	GALENAKAEI	191356	12000	381782	16
74174	<i>1700006H03Rik</i>	NSPANNIVM	68002	12000	1534480	6
100910	<i>2010209012Rik</i>	AQIRNLTVL	212465	12000	106874	18
76559	<i>2410024A21Rik</i>	AGPENSSKI	216979	12000	649743	18
75425	<i>2610036D13Rik</i>	QTVENVEHL	356744	52221	827933	7
67268	<i>2900073G15Rik</i>	SMGKNPTDEYL	4278255	12000	11467376	357
77877	<i>6030458C11Rik</i>	KVLDVLHSL	63278	12000	71265	5
338523	<i>A630082K20Rik</i>	SSIQNGKYTL	1351220	12000	480198	113
18671	<i>Abcb1a</i>	STVRNADVI	3232678	12000	12000	269
11307	<i>Abcg1</i>	VNIEFKDL	838637	12000	2348761	70
104112	<i>Acly</i>	SIANFTNV	59580	12000	225167	5
66713	<i>Actr2</i>	YAGSNFPEHI	5117498	12000	6554584	426
67019	<i>Actr6</i>	SGYSFTHI	428791	12000	996812	36
226747	<i>Ahctf1</i>	TSVENHEFL	676119	12000	1115879	56
223774	<i>Alg12</i>	AAMLNYTHI	121626	12000	450762	10
81702	<i>Ankrd17</i>	ASVLNVNHI	7537305	12000	14073365	628
11765	<i>Ap1g1</i>	FALVNGNNI	238448	12000	508707	20
71435	<i>Arhgap21</i>	TGVTNRDLI	421388	12000	194111	35
11984	<i>Atp6v0c</i>	SAMVFSAM	100221	12000	314743	8
328099	<i>AU021838</i>	VSYLFSHV	163732	12000	285904	14
66165	<i>Bccip</i>	KAPVNTAEL	1741908	12000	998607	145
213895	<i>Bms1l</i>	YQNQEIHNL	1272300	12000	1633700	106
12176	<i>Bnip3</i>	LSMRNTSVM	133906	12000	371093	11
12181	<i>Bop1</i>	EQVALVHRL	306162	12000	1219215	26
107976	<i>Bre</i>	ATQVYPKL	1147903	12000	3484401	96
224171	<i>C330027C09Rik</i>	AQNDIEHLF	1329747	12000	1373696	111
76740	<i>C920006C10Rik</i>	SAIINEDNL	899101	12000	1629693	75
69719	<i>Cad</i>	RQAENGYMI	92562	12000	1267863	8
12340	<i>Capza1</i>	ISFKFDHL	35372	12000	56253	3
26885	<i>Casp8ap2</i>	VTVLNVDDL	285120	12000	299518	24
12449	<i>Ccnf</i>	SOAVNKQOI	236020	68580	828654	3
12465	<i>Cct5</i>	SMMDVDHQI	1326343	12000	2363592	111
12468	<i>Cct7</i>	RAIKNDSVV	930640	12000	1300660	78
12576	<i>Cdkn1b</i>	FGPVNHEEL	11267481	12000	17543161	939
229841	<i>Cenpe</i>	SALQNAESDRL	1125746	12000	2349902	94
216859	<i>Centb1</i>	INQIYEARV	691884	12000	1065038	58
12649	<i>Chek1</i>	TGPSNVDKL	6545497	112308	14733333	58
214901	<i>Chtf18</i>	QLSDTLHSL	61094	12000	190594	5
80986	<i>Ckap2</i>	TLNDLIHNI	136301	12000	345332	11
234594	<i>Cnot1</i>	IAFIFNNL	46952	12000	74559	4
12847	<i>Copa</i>	SQLPVDHIL	404318	12000	676882	34
12877	<i>Cpeb1</i>	SMLQNPLGNVL	185198	12000	528268	15
68975	<i>Crsp8</i>	SGLLNQQL	978436	99069	1634916	10
71745	<i>Cul2</i>	VINSFVHV	67372	12000	244370	6
215821	<i>D10Bwg1379e</i>	AVLTNQETI	158503	12000	747537	13
52635	<i>D12Ertd551e</i>	RQLENGTTL	1477468	12000	1284587	123
218978	<i>D14Ertd436e</i>	SQHVNLDDL	322974	12000	690276	27
229473	<i>D930015E06Rik</i>	ASLVNSPSYL	160789	12000	1730981	13
208846	<i>Daam1</i>	AAKVMNTEL	2278053	12000	1980628	190
68087	<i>Dcakd</i>	VIQVFQQL	241295	12000	464584	20
67755	<i>Ddx47</i>	KTFLEFSATM	70060	12000	289017	6
13209	<i>Ddx6</i>	INFDFPKL	207697	12000	58611	17
72121	<i>Dennd2d</i>	VIYPFMQGL	507408	28423	12000	18
217207	<i>Dhx8</i>	QLYTLGAL	185369	12000	505758	15
94176	<i>Dock2</i>	SMVQNRVFL	895081	12000	671603	75
233115	<i>Dpy19l3</i>	SVWAFHNL	2131426	12000	1928879	178
76843	<i>Dtl</i>	SSPENKNWL	2840050	12000	10831315	237
13424	<i>Dync1h1</i>	ASYEFVQRL	2201922	33937	1946008	65
66967	<i>Edem3</i>	FMATNPEHL	255530	12000	303884	21
13669	<i>Eif3s10</i>	QSIEFSRL	3331791	12000	6269562	278
15569	<i>Elavl2</i>	GAVTNVKVI	120705	12000	327586	10
14791	<i>Emg1</i>	VSYEYTEKM	133779	12000	214864	11
66366	<i>Ergic3</i>	QQLDVEHNL	1458352	12000	807276	122
13877	<i>Erh</i>	YQPYNKDWI	108556	12000	29068	9
14050	<i>Eya3</i>	TIHIFHSL	465796	12000	216132	39
212377	<i>F730047E07Rik</i>	VGVTYRTL	84194	12000	462448	7
70611	<i>Fbxo33</i>	SSLSNPIANTM	127288	12000	69463	11
14137	<i>Fdft1</i>	ISLEFRNL	523739	12000	130109	44
57778	<i>Fmnl1</i>	LQYEFTHL	770529	12000	1208086	64
22379	<i>Fmnl3</i>	LQYEFTKL	642004	12000	934003	54
108655	<i>Foxp1</i>	QQLQQQHLL	705266	12000	1054408	59
239554	<i>Foxred2</i>	LGVTNFVHM	168986	12000	118096	14
56784	<i>Garnl1</i>	GAIVNGKVL	83646	12000	315141	7
14751	<i>Gpi1</i>	KNLVNKEVM	318694	12000	560091	27
14790	<i>Grcc10</i>	SAPENAVRM	3768572	12000	48595185	314

68153	<i>Gtf2e2</i>	SGYKFGVL	537587	12000	2451306	45
69237	<i>Gtpbp4</i>	QILSDFPKL	395416	12000	225758	33
15016	<i>H2-Q5</i>	AMAPRTLLL	5436819	12000	12941105	453
15201	<i>Hells</i>	KVLVFSQM	475943	12000	1183394	40
319189	<i>Hist2h2bb</i>	SVVYKVL	871990	12000	3175247	73
382522	<i>Hist3h2bb</i>	VNDIFERI	91065	12000	63614	8
15368	<i>Hmox1</i>	IQAENAEFM	531189	12000	12000	44
15387	<i>Hnrpk</i>	DQIQNAQYL	99408	12000	43071	8
23918	<i>Impdh2</i>	GGIQNVGHI	932864	90438	5379787	10
16867	<i>Lhcgr</i>	SILLNNAVAF	185982	12000	1613907	15
545270	<i>LOC545270</i>	YALYNNWEHM	118954	12000	102363	10
72416	<i>Lrpprc</i>	AAIENIEHL	384743	12000	385640	32
99470	<i>Magi3</i>	SGLTNRDTL	159958	12000	3688747	13
56692	<i>Map2k1ip1</i>	QVVQFNRL	114970	12000	140373	10
26413	<i>Mapk1</i>	VGPRYTNL	39166667	149969	45832060	261
212307	<i>Mapre2</i>	QLNEQVHSL	493384	12000	1547458	41
17168	<i>Mare</i>	SAVKNLQQL	4185921	12000	2766551	349
17169	<i>Mark3</i>	TSIAFKNI	57818	12000	289972	5
17427	<i>Mns1</i>	KIIEFANI	65858	12000	12000	5
17863	<i>Myb</i>	NAIKNHWNSTM	668372	12000	338244	56
67938	<i>Mylc2b</i>	SLGKNPTDAYL	503898	12000	4119401	42
74838	<i>Narg1</i>	SAVENLNEM	615625	12000	297903	51
17992	<i>Ndufa4</i>	VNVVYSKL	14338076	12000	29429606	1195
227197	<i>Ndufs1</i>	AKLVNQEVL	503868	12000	908787	42
64652	<i>Nisch</i>	TNQDFIQR	123915	12000	948264	10
68979	<i>Nol11</i>	TQLIQTHVL	515769	62667	1499186	8
66394	<i>Nosip</i>	TSVRFTQL	3518404	12000	7472080	293
18145	<i>Npc1</i>	VAVNKNVDI	243630	12000	356718	20
101706	<i>Numa1</i>	VSILNRQVL	365089	12000	799609	30
69482	<i>Nup35</i>	AQYGNILKHVM	78184	12000	610648	7
18519	<i>Pcaf</i>	VQYKFSHL	7220707	12000	5160299	602
14827	<i>Pdia3</i>	FAHTNIESL	7732607	107365	2392144	72
23986	<i>Peci</i>	SSYTFPKM	1349403	12000	12000	112
75725	<i>Phf14</i>	VNYFERNM	48515	12000	12000	4
236539	<i>Phgdh</i>	TGVVNAQAL	324963	12000	1003626	27
233489	<i>Picalm</i>	NGVINAAFM	265420	12000	438191	22
233489	<i>Picalm</i>	VAFDFTKV	622109	12000	1026908	52
224938	<i>Pja2</i>	SSVQNGIML	186205	33856	525538	5
59047	<i>Pnkp</i>	YVHVNRDTL	1160230	12000	178123	97
231329	<i>Polr2b</i>	IGPTYQRL	393502	12000	716661	33
218832	<i>Polr3a</i>	VTIQNSELM	206677	12000	12000	17
19015	<i>Ppard</i>	ASIVNKDGL	144953	12000	217899	12
170826	<i>Ppargc1b</i>	LSVRNGATL	218140	12000	267046	18
54397	<i>Ppt2</i>	SSYSFRHL	283225	12000	919892	24
106042	<i>Prickle1</i>	LNKYFPG	376026	12000	124373	31
23992	<i>Prkra</i>	ISPENHISL	84113	12000	1206217	7
16913	<i>Psmb8</i>	GGVVNMYHM	3322728	12000	185723	277
15170	<i>Ptpn6</i>	AQYKFIYV	1303118	12000	1598969	109
78697	<i>Pus7</i>	TSIKNQTL	84865	12000	160379	7
110816	<i>Pwp2</i>	FAYRFSNL	218474	12000	126002	18
70314	<i>Rabep2</i>	AQVQNSEQ	1384849	46060	843925	30
74734	<i>Rhoh</i>	YSVANHNSFL	1605054	82775	2637549	19
68477	<i>Rmnd5a</i>	WAVSNREML	79683	12000	116624	7
22644	<i>Rnf103</i>	KTIYNVEHL	54697	12000	148600	5
66480	<i>Rpl15</i>	STYKFEV	423190	12000	263479	35
19942	<i>Rpl27</i>	KTVWNKDFV	783897	12000	3144986	65
67891	<i>Rpl4</i>	VNFVHTNL	2514370	12000	1519392	210
267019	<i>Rps15a</i>	VIVRFLTV	514406	12000	12000	43
267019	<i>Rps15a</i>	VIVRFLTVM	388796	12000	57863	32
20115	<i>Rps7</i>	QQNNVEHKV	1979899	12000	2175109	165
20133	<i>Rrm1</i>	FQIVNPHLL	2977570	40671	1830528	7
20133	<i>Rrm1</i>	YGIRNSLLI	1677107	174840	647604	10
269254	<i>Setx</i>	SQLENKTI	204933	12000	137119	17
81898	<i>Sf3b1</i>	KAIVNVIGM	78160	12000	335976	7
170755	<i>Sgk3</i>	YSIVNASVL	255048	38491	151335	7
20425	<i>Shmt1</i>	RNLDYARL	147317	12000	921297	12
63959	<i>Slc29a1</i>	SAIFNNVMTL	61949	12000	295795	5
20527	<i>Slc2a3</i>	TGVINAPETI	6643529	12000	5706248	554
20586	<i>Smarca4</i>	TQVLNTHYV	276940	12000	121529	23
20740	<i>Spna2</i>	KALINADEL	4393266	12000	1485888	366
20815	<i>Srpk1</i>	ISGVNGTHI	1109459	12000	1330242	92
67437	<i>Ssr3</i>	VAFAYKNV	413665	12000	1416589	34
20448	<i>St6galnac4</i>	QVYFTERM	233788	12000	170957	19
20848	<i>Stat3</i>	ATLVFHNL	4023137	12000	6208130	335
58523	<i>Statip1</i>	SAPRNFVENF	7865121	248931	13541769	32
16430	<i>Stt3a</i>	AVLSFSTR	42362	12000	41291	4
21687	<i>Tek</i>	NDIKFQDV	43651	12000	142042	4
22042	<i>Tffc</i>	KAFTYINL	435591	12000	480537	36
21894	<i>Tln1</i>	SVMENSKVLGEAM	522658	12000	352355	44
70549	<i>Tln2</i>	SVMENSKVLGESM	52094	12000	41337	4
66074	<i>Tmem167</i>	SAIFNFQSL	56289	12000	320506	5
67878	<i>Tmem33</i>	QSIAFISRL	394668	12000	166467	33

21916	<i>Tmod1</i>	SSIVNKEGL	689429	12000	96959	57
217351	<i>Tnrc6c</i>	TSPINPQHM	341556	12000	1238666	28
22142	<i>Tuba1a</i>	DIERTYTNL	656598	157480	1267632	4
22142	<i>Tuba1a</i>	ERPTYTNL	816936	86447	698017	9
53382	<i>Txn1</i>	FQNVNSVTL	1199864	12000	1713670	100
67123	<i>Ubp1</i>	KSLSPKPL	255902	12000	697677	21
19704	<i>Upf1</i>	SGYIYHKL	1545046	12000	391481	129
326622	<i>Upf2</i>	SAVIFRTL	244247	12000	1102686	20
216825	<i>Usp22</i>	FAVNVHQGTL	711737	12000	12000	59
230895	<i>Vps13d</i>	INIHYYQL	188518	12000	90025	16
80743	<i>Vps16</i>	VSFTYRYL	794606	57587	689203	14
233405	<i>Vps33b</i>	ASLVNADKL	2323671	12000	2376572	194
65114	<i>Vps35</i>	FSEENHEPL	345757	12000	562939	29
241627	<i>Wdr76</i>	FSPTNPAHL	164815	12000	599612	14
22446	<i>Xlr3b</i>	VAAANREVL	1654355	12000	1362836	138
103573	<i>Xpo1</i>	TILEFSQNM	561596	12000	2010930	47
68090	<i>Yif1a</i>	SGYKYVGM	300842	12000	1171758	25
66980	<i>Zdhhc6</i>	SVIKFENL	863986	12000	734576	72
67187	<i>Zmynd19</i>	ESYSFEARM	132049	12000	253228	11

**Table S2.** Computed MHC binding affinity of MHC I-associated peptides eluted from EL4 cells

<b>MHC Ia-associated peptides</b>						
GeneID	Gene symbol	Peptide	Restriction size	SYFPEITHI	smm	smm-rank
68523	<i>1110019N10Rik</i>	AALENTLL	Db 9-mer	30	327	1/309
66185	<i>1110037F02Rik</i>	RQILNADAM	Db 9-mer	25	13	1/3705
67463	<i>1200014M14Rik</i>	GALENAKAEI	Db 10-mer	30	286	2/1099
74174	<i>1700006H03Rik</i>	NSPANNIVM	Db 9-mer	25	28	1/317
100910	<i>2010209012Rik</i>	AQIRNLTVL	Db 9-mer	30	20	1/713
76559	<i>2410024A21Rik</i>	AGPENSSKI	Db 9-mer	30	2402	110/4133
75425	<i>2610036D13Rik</i>	QTVENVEHL	Db 9-mer	27	635	15/2153
67268	<i>2900073G15Rik</i>	SMGKNPTDEYL	Db 11-mer	20	344	3/327
338523	<i>A630082K20Rik</i>	SSIQNGKYTL	Db 10-mer	29	273	9/1761
18671	<i>Abcb1a</i>	STVRNADVI	Db 9-mer	28	10	1/2535
11307	<i>Abcg1</i>	VNIEFKDL	Kb 8-mer	23	107	16/1177
104112	<i>Acly</i>	SIANFTNV	Kb 8-mer	20	198	33/2167
66713	<i>Actr2</i>	YAGSNFPEHI	Db 10-mer	29	386	4/771
67019	<i>Actr6</i>	SGYSFTHI	Kb 8-mer	25	39	4/777
226747	<i>Ahctf1</i>	TSVENHEFL	Db 9-mer	30	67	1/2235
223774	<i>Alg12</i>	AAMLNYTHI	Db 9-mer	28	4	1/753
81702	<i>Ankrd17</i>	ASVLNVNHI	Db 9-mer	27	87	5/5189
11765	<i>Ap1g1</i>	FALVNGNNI	Db 9-mer	29	23	1/1633
71435	<i>Arhgap21</i>	TGVTNRDLI	Db 9-mer	29	392	7/3875
11984	<i>Atp6v0c</i>	SAMVFSAM	Kb 8-mer	19	84	3/295
328099	<i>AU021838</i>	VSYLFSHV	Kb 8-mer	24	3	1/487
66165	<i>Bccip</i>	KAPVNTAEL	Db 9-mer	31	43	1/615
12176	<i>Bnip3</i>	LSMRNTSVM	Db 9-mer	24	14	1/357
107976	<i>Bre</i>	ATQVYPKL	Kb 8-mer	22	67	7/751
76740	<i>C920006C10Rik</i>	SAIINEDNL	Db 9-mer	29	19	1/1621
69719	<i>Cad</i>	RQAENGMVI	Db 9-mer	24	732	26/4433
12340	<i>Capza1</i>	ISFKFDHL	Kb 8-mer	23	6	1/557
26885	<i>Casp8ap2</i>	VTVLNVDDL	Db 9-mer	26	30	1/3907
12449	<i>Ccnf</i>	SQAVNKQOI	Db 9-mer	26	588	4/1537
12468	<i>Cct7</i>	RAIKNSDVV	Db 9-mer	22	27	1/1071
12576	<i>Cdkn1b</i>	FGPVNHEEL	Db 9-mer	33	77	1/377
229841	<i>Cenpe</i>	SALQNAESDRL	Db 11-mer	22	76	1/4925
216859	<i>Centb1</i>	INQIYEARV	Kb 9-mer	13	268	243/1265
12649	<i>Chek1</i>	TGPSNVDKL	Db 9-mer	29	784	7/935
234594	<i>Cnot1</i>	IAFIFNNL	Kb 8-mer	23	5	1/4751
12877	<i>Cpeb1</i>	SMLQNPLGNVL	Db 11-mer	23	456	10/1105
68975	<i>Crsp8</i>	SGLLNQOQL	Db 9-mer	28	118	1/605
71745	<i>Cul2</i>	VINSFVHV	Kb 8-mer	17	527	92/1397
215821	<i>D10Bwg1379e</i>	AVLTNQETI	Db 9-mer	28	73	4/4323
52635	<i>D12Ert551e</i>	RQLENGTTL	Db 9-mer	28	33	1/1673
218978	<i>D14Ert436e</i>	SQHVNLDDL	Db 9-mer	29	61	1/967
229473	<i>D930015E06Rik</i>	ASLVNSPSYL	Db 10-mer	31	730	48/3177
208846	<i>Daam1</i>	AAKVNMTL	Db 9-mer	30	171	4/2137
68087	<i>Dcald</i>	VIQVFOQL	Kb 8-mer	22	33	2/447
67755	<i>Ddx47</i>	KTFLFSATM	Kb 9-mer	11	33	14/755
13209	<i>Ddx6</i>	INFDFPKL	Kb 8-mer	24	7	1/811
72121	<i>Dennd2d</i>	VIYPFMQGL	Kb 9-mer	18	4	4/923
217207	<i>Dhx8</i>	QLYTLGAL	Kb 8-mer	16	1953	332/2473
94176	<i>Dock2</i>	SMVQNRVFL	Db 9-mer	29	7	2/3639
233115	<i>Dpy19l3</i>	SVVAFHNL	Kb 8-mer	22	44	6/1417
76843	<i>Dtl</i>	SSPENKNWL	Db 9-mer	29	291	2/1441
13424	<i>Dync1h1</i>	ASYEFVQRL	Kb 9-mer	20	18	4/9133
66967	<i>Edem3</i>	FMATNPEHL	Db 9-mer	28	32	1/1845
22446	<i>Xlr3b</i>	VAAANREVL	Db 9-mer	26	111	1/435
13669	<i>Eif3s10</i>	QSIIEFSL	Kb 8-mer	24	28	1/1267
15569	<i>Elavl2</i>	GAVTNVKVI	Db 9-mer	26	42	1/703
14791	<i>Emg1</i>	VSVEYTEKM	Kb 9-mer	13	58	8/473
13877	<i>Erh</i>	YQPYNKDWI	Db 9-mer	26	48	1/191
14050	<i>Eya3</i>	TIIEFHSL	Kb 8-mer	22	45	4/1005
212377	<i>F730047E07Rik</i>	VGVTYRTL	Kb 8-mer	23	28	2/1911
70611	<i>Fbxo33</i>	SLSLNPIANTM	Db 11-mer	17	107	1/575
14137	<i>Fdft1</i>	ISLEFRNL	Kb 8-mer	25	3	1/677
57778	<i>Fmnl1</i>	LQYEFTHL	Kb 8-mer	29	19	1/2173
22379	<i>Fmnl3</i>	LQYEFTKL	Kb 8-mer	30	25	2/2011
239554	<i>Foxred2</i>	LGVTNFVHM	Db 9-mer	28	247	3/1313
56784	<i>Garnl1</i>	GAIVNGKVL	Db 9-mer	27	27	2/4149
14751	<i>Gpi1</i>	KNLVNKEVM	Db 9-mer	27	198	2/1099
14790	<i>Grcc10</i>	SAPENAVRM	Db 9-mer	33	165	2/235
68153	<i>Gtf2e2</i>	SGYKFGVL	Kb 8-mer	29	18	1/569
69237	<i>Gtpbp4</i>	QILSDFPKL	Kb 9-mer	23	231	19/1253
15201	<i>Hells</i>	KVLVFSQM	Kb 8-mer	18	254	22/1627
319189	<i>Hist2h2bb</i>	SVVYKVL	Kb 8-mer	27	46	1/237
382522	<i>Hist3h2bb</i>	VNDIFERI	Kb 8-mer	18	1748	43/293
15368	<i>Hmox1</i>	IQAENAEFM	Db 9-mer	27	308	3/561
15387	<i>Hnrpk</i>	DQIQNAQYL	Db 9-mer	28	52	1/909
23918	<i>Impdh2</i>	GGIQNVGHI	Db 9-mer	26	291	5/1011

16867	<i>Lhcgr</i>	SILLNAVAF	Db 10-mer	22	2815	564/1383
545270	<i>LOC545270</i>	YALYNNWEHM	Db 10-mer	28	45	2/165
72416	<i>Lrpprc</i>	AAIENIEHL	Db 9-mer	32	64	4/2595
99470	<i>Magi3</i>	SGLTNRDTL	Db 9-mer	31	14	1/2235
56692	<i>Map2k1ip1</i>	QVQVFNRL	Kb 8-mer	20	368	14/233
26413	<i>Mapk1</i>	VGPRYTNL	Kb 8-mer	25	12	2/701
17168	<i>Mare</i>	SAVKNLQQL	Db 9-mer	31	85	1/1121
17169	<i>Mark3</i>	TSIAFKNI	Kb 8-mer	19	88	5/1473
17427	<i>Mns1</i>	KIIEFANI	Kb 8-mer	20	20	1/967
17863	<i>Myb</i>	NAIKNHWNSTM	Db 11-mer	17	309	2/1255
67938	<i>Mylc2b</i>	SLGKNPTDAYL	Db 11-mer	16	13242	31/327
74838	<i>Narg1</i>	SAVENLNEM	Db 9-mer	33	94	2/1713
17992	<i>Ndufa4</i>	VNVVDSKLL	Kb 8-mer	24	40	1/149
227197	<i>Ndufs1</i>	AKLVNQEVL	Db 9-mer	28	175	1/1437
64652	<i>Nisch</i>	TNQDFIQRL	Kb 9-mer	14	358	98/3171
66394	<i>Nosip</i>	TSVRFTQL	Kb 8-mer	24	33	1/447
18145	<i>Npc1</i>	VAVWNKVDI	Db 9-mer	29	73	3/2537
101706	<i>Numa1</i>	VSILNRQVL	Db 9-mer	26	14	1/4171
69482	<i>Nup35</i>	AQYGNILKHVM	Db 11-mer	20	1543	42/633
18519	<i>Pcaf</i>	VQYKFSHL	Kb 8-mer	28	4	1/1611
14827	<i>Pdia3</i>	FAHTNIESL	Db 9-mer	29	19	1/993
23986	<i>Peci</i>	SSYTFPKM	Kb 8-mer	25	8	1/561
75725	<i>Phf14</i>	VNYFFERNM	Kb 9-mer	18	18	6/1603
236539	<i>Phgdh</i>	TGVVNAQAL	Db 9-mer	29	203	2/1049
233489	<i>Picalm</i>	NGVINAAMF	Db 9-mer	26	192	4/1303
233489	<i>Picalm</i>	VAFDFTKV	Kb 8-mer	20	45	6/1305
224938	<i>Pja2</i>	SSVQNGIML	Db 9-mer	26	15	1/1397
59047	<i>Pnkp</i>	YVHVNRDTL	Db 9-mer	25	9	1/1027
231329	<i>Polr2b</i>	IGPTYQRL	Kb 9-mer	20	23	15/2319
218832	<i>Polr3a</i>	VTIQNSELM	Db 9-mer	27	503	13/2763
19015	<i>Ppard</i>	ASIVNKDGL	Db 9-mer	30	117	3/863
170826	<i>Ppargc1b</i>	LSVRNGATL	Db 9-mer	27	41	1/2011
54397	<i>Ppt2</i>	SSYSFRHL	Kb 8-mer	29	4	1/589
106042	<i>Prickle1</i>	LNKFFPGL	Kb 8-mer	29	5	1/1509
23992	<i>Prkra</i>	ISPENHISL	Db 9-mer	28	109	2/609
16913	<i>Psmb8</i>	GGVWNYMHM	Db 9-mer	27	135	2/535
15170	<i>Ptpn6</i>	AQYKFIYV	Kb 8-mer	25	23	1/1039
78697	<i>Pus7</i>	TSIKNQTL	Db 9-mer	28	159	2/1303
110816	<i>Pwp2</i>	FAYRFSNL	Kb 8-mer	30	2	1/1823
70314	<i>Rabep2</i>	AQVQNSEQL	Db 9-mer	28	382	2/1005
74734	<i>Rhoh</i>	YSVANHNSFL	Db 10-mer	26	767	7/365
68477	<i>Rmnd5a</i>	WAVSNREML	Db 9-mer	27	158	1/765
22644	<i>Rnf103</i>	KTIYNVEHL	Db 9-mer	26	308	4/1349
66480	<i>Rpl15</i>	STYKFFEV	Kb 8-mer	24	51	3/393
19942	<i>Rpl27</i>	KTVVNDKDF	Db 9-mer	25	54	1/255
67891	<i>Rpl4</i>	VNFVHTNL	Kb 8-mer	13	51	1/823
267019	<i>Rps15a</i>	VIVRFLTV	Kb 8-mer	19	33	1/245
267019	<i>Rps15a</i>	VIVRFLTVM	Kb 9-mer	19	33	9/245
20133	<i>Rrm1</i>	FQIVNPHLL	Db 9-mer	28	71	2/1567
20133	<i>Rrm1</i>	YGIRNSLLI	Db 9-mer	26	452	7/1567
269254	<i>Setx</i>	SQLENKTII	Db 9-mer	28	61	2/5275
81898	<i>Sf3b1</i>	KAIVNVIGM	Db 9-mer	28	70	2/2591
170755	<i>Sgk3</i>	YSIVNASVL	Db 9-mer	28	6	1/975
20425	<i>Shmt1</i>	RNLDYARL	Kb 8-mer	23	22	2/941
63959	<i>Slc29a1</i>	SAIFNNVMTL	Db 10-mer	29	886	16/899
20527	<i>Slc2a3</i>	TGVINAPETI	Db 10-mer	30	2873	57/969
20586	<i>Smarca4</i>	TQVLNTHYV	Db 9-mer	22	94	3/3211
20740	<i>Spna2</i>	KALINADEL	Db 9-mer	31	19	1/4817
20815	<i>Srpk1</i>	ISGVNGTHI	Db 9-mer	28	55	1/1279
67437	<i>Ssr3</i>	VAFAYKNV	Kb 8-mer	18	18	1/355
20448	<i>St6galnac4</i>	QVYFTFERM	Kb 9-mer	17	137	13/589
20848	<i>Stat3</i>	ATLVFHNL	Kb 8-mer	22	23	1/1429
58523	<i>Statip1</i>	SAPRNFVENF	Db 10-mer	30	315	11/1645
16430	<i>Stt3a</i>	AVLSFSTRL	Kb 9-mer	13	154	66/1695
21687	<i>Tek</i>	NDIKFQDV	Kb 8-mer	18	4583	645/2231
22042	<i>Tfrc</i>	KAFTYINL	Kb 8-mer	23	11	2/1371
21894	<i>Tln1</i>	SVMENSKVLGEAM	Db 13-mer	23	60	5/5065
70549	<i>Tln2</i>	SVMENSKVLGESM	Db 13-mer	23	60	5/5069
66074	<i>Tmem167</i>	SAIFNFQSL	Db 9-mer	30	48	1/127
67878	<i>Tmem33</i>	QSIAFISRL	Kb 9-mer	13	75	28/479
21916	<i>Tmod1</i>	SSIVNKEGL	Db 9-mer	30	228	3/701
217351	<i>Tnrc6c</i>	TSPINPQHM	Db 9-mer	28	158	5/3783
22142	<i>Tuba1a</i>	ERPTYTNL	Kb 8-mer	23	1759	134/889
22142	<i>Tuba1a</i>	DIERPTYTNL	Kb 10-mer	23	849	134/889
53382	<i>Txn1</i>	FQNVNSVTL	Db 9-mer	28	27	1/561
67123	<i>Ubap1</i>	KSLSFPKL	Kb 8-mer	22	42	3/867
19704	<i>Upf1</i>	SGYIYHKL	Kb 8-mer	29	18	2/2211
326622	<i>Upf2</i>	SAVIFRTL	Kb 8-mer	24	57	4/2523
216825	<i>Usp22</i>	FAVWNHQTL	Db 10-mer	31	985	7/1033
230895	<i>Vps13d</i>	INIHYTQL	Kb 8-mer	25	39	10/8753
80743	<i>Vps16</i>	VSFTYRYL	Kb 8-mer	22	3	1/1663
233405	<i>Vps33b</i>	ASLVNADKL	Db 9-mer	31	25	1/1217

65114	<i>Vps35</i>	FSEENHEPL	Db 9-mer	27	33	3/1575
241627	<i>Wdr76</i>	FSPTNPAHL	Db 9-mer	29	18	1/1031
103573	<i>Xpo1</i>	TILEFSQNM	Kb 9-mer	14	88	81/2127
68090	<i>Yif1a</i>	SGYKYVGM	Kb 8-mer	25	17	1/571
66980	<i>Zdhhc6</i>	SVIKFENL	Kb 8-mer	25	44	3/811
67187	<i>Zmynd19</i>	ESYSFEARM	Kb 9-mer	18	386	2/439

MHC Ib-associated peptides

GeneID	Gene symbol	Peptides	Restriction size	Rankpep
77877	<i>6030458C11Rik</i>	KVLDVLHSL	Qa2 9-mer	228
213895	<i>Bms1l</i>	YQNQEIHNL	Qa2 9-mer	131
12181	<i>Bop1</i>	EQVALVHRL	Qa2 9-mer	199
224171	<i>C330027C09Rik</i>	AQNDIEHLF	Qa2 9-mer	155
12465	<i>Cct5</i>	SMMDVDHQI	Qa2 9-mer	223
214901	<i>Chtf18</i>	QLSDTLHSL	Qa2 9-mer	184
80986	<i>Ckap2</i>	TLNDLIHNI	Qa2 9-mer	192
12847	<i>Copa</i>	SQLPVDHIL	Qa2 9-mer	196
66366	<i>Ergic3</i>	QQLDVEHNL	Qa2 9-mer	212
108655	<i>Foxp1</i>	QQLQQHLL	Qa2 9-mer	148
15016	<i>H2-Q5</i>	AMAPRLLL	Qa1 9-mer	
212307	<i>Mapre2</i>	QLNEQVHSL	Qa2 9-mer	176
68979	<i>Nol11</i>	TQLIQTHVL	Qa2 9-mer	150
20115	<i>Rps7</i>	QQNNVEHKV	Qa2 9-mer	180

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**Table S3.** Computed MHC binding affinity of MHC I-associated peptides eluted from primary mouse thymocytes

<b>MHC Ia-associated peptides</b>					
GeneID	Gene symbol	Peptides	Restriction size	smm	SYFPEITHI
68295	<i>0610011L14Rik</i>	ISILYHQL	Kb 8-mer	20	24
68523	<i>1110019N10Rik</i>	AALENTLL	Db 9-mer	327	30
72368	<i>2310045N01Rik</i>	SSVYFRSV	Kb 8-mer	51	19
75425	<i>2610036D13Rik</i>	QTVENVEHL	Db 9-mer	635	27
72722	<i>2810405J04Rik</i>	ASPEFTKL	Kb 8-mer	60	26
72747	<i>2810439F02Rik</i>	SGYDFENRL	Kb 9-mer	19	21
67268	<i>2900073G15Rik</i>	SMGKNPTDEYL	Db 11-mer	344	20
67392	<i>4833420G17Rik</i>	FVISNYREQL	Db 11-mer	1238	26
218989	<i>6720456H20Rik</i>	TGIRNLEWL	Db 9-mer	574	30
11307	<i>Abcg1</i>	VNIEFKDL	Kb 8-mer	107	23
66713	<i>Actr2</i>	YAGSNFPEHI	Db 10-mer	386	29
67019	<i>Actr6</i>	SGYSFTHI	Kb 8-mer	39	25
57869	<i>Adck2</i>	SGPTYIKL	Kb 8-mer	78	25
81702	<i>Ankrd17</i>	ASVLNVNHI	Db 9-mer	87	27
329154	<i>Ankrd44</i>	ASVINGHTL	Db 9-mer	60	28
73341	<i>Arhgef6</i>	AIIAFKTL	Kb 8-mer	45	24
54208	<i>Arl6ip1</i>	IILKYIGM	Kb 8-mer	11	20
192195	<i>Ash11</i>	VGLINKDSV	Db 9-mer	412	24
11906	<i>Atbf1</i>	VAIGNPVHL	Db 9-mer	292	28
Q9JJK8	<i>Atr</i>	FQALNAEKL	Db 9-mer	208	26
54138	<i>Atxn10</i>	NSIRNLDTI	Db 9-mer	13	31
328099	<i>AU021838</i>	VSYLFSHV	Kb 8-mer	3	24
213550	<i>AV340375</i>	FSNKNLEEL	Db 9-mer	53	31
235461	<i>B230380D07Rik</i>	VNVRFTGV	Kb 8-mer	36	19
224727	<i>Bot3</i>	SIAAFIQL	Kb 9-mer	199	14
66165	<i>Bccip</i>	KAPVNTAEL	Db 9-mer	43	31
107976	<i>Bre</i>	ATQVYPKL	Kb 8-mer	67	22
26885	<i>Casp8ap2</i>	VTVLNVDHL	Db 9-mer	30	26
76041	<i>Ccdc125</i>	NAVLNQRYL	Db 9-mer	32	27
77048	<i>Ccdc41</i>	AQVENVQRI	Db 9-mer	498	29
12445	<i>Ccnd3</i>	AAVIAHDFL	Db 9-mer	46	20
12449	<i>Ccnf</i>	SQAVNKQQI	Db 9-mer	588	26
12450	<i>Ccng1</i>	TAFQFLQL	Kb 8-mer	80	22
12501	<i>Cd3e</i>	YSGLNQRAV	Db 9-mer	406	19
26364	<i>Cd97</i>	KLLSNINSVF	Db 10-mer	9292	23
12576	<i>Cdkn1b</i>	FGPVNHEEL	Db 9-mer	77	33
229841	<i>Cenpe</i>	SALQNAESDRL	Db 12-mer	76	22
216859	<i>Centb1</i>	INQIYEARV	Kb 9-mer	268	13
12649	<i>Chek1</i>	TGPSNVDKL	Db 9-mer	784	29
243764	<i>Chrm2</i>	TVIGYWPL	Kb 8-mer	196	21
70349	<i>Copb1</i>	IALRYVAL	Kb 8-mer	22	23
67876	<i>Coq10b</i>	ISFEFRSL	Kb 8-mer	2	24
68975	<i>Crsp8</i>	SGLLNQOSL	Db 9-mer	118	28
71745	<i>Cul2</i>	VINSFVHV	Kb 8-mer	527	17
12767	<i>Cxcr4</i>	WFQFOHI	Kb 8-mer	56	16
52635	<i>D12Erttd551e</i>	RQLENGTTL	Db 9-mer	33	28
218978	<i>D14Erttd436e</i>	SQHVNLDQL	Db 9-mer	61	29
71919	<i>D15Erttd682e</i>	TNVLFNHL	Kb 8-mer	169	21
69601	<i>Dab2ip</i>	VSPTNPTKL	Db 9-mer	98	29
67755	<i>Ddx47</i>	KTLFASATM	Kb 9-mer	33	11
13207	<i>Ddx5</i>	NQAINPKLLQL	Db 11-mer	4239	22
13209	<i>Ddx6</i>	INFDFPKL	Kb 8-mer	7	24
76131	<i>Depdc1a</i>	FSQENTEKI	Db 9-mer	231	28
13433	<i>Dnmt1</i>	LSLENGHTL	Db 10-mer	758	28
94176	<i>Dock2</i>	SMVQNRVFL	Db 9-mer	7	29
233115	<i>Dpy19l3</i>	SVAFHNL	Kb 8-mer	44	22
13424	<i>Dync1h1</i>	ASYEFVQRL	Kb 9-mer	18	20
13669	<i>Eif3s10</i>	QSIEFSRL	Kb 8-mer	28	24
73830	<i>Eif3s12</i>	VGITYQHI	Kb 8-mer	100	18
170439	<i>Elovl6</i>	KSFLFSAL	Kb 8-mer	10	22
10436	<i>EMG1</i>	VSVEYTEKM	Kb 9-mer	58	13
13819	<i>Epas1</i>	SNYLFTKL	Kb 8-mer	10	30
212377	<i>F730047E07Rik</i>	VGVTYRTL	Kb 8-mer	28	23
107035	<i>Fbxo38</i>	SAFSFRTL	Kb 8-mer	22	24
14137	<i>Fdft1</i>	ISLEFRNL	Kb 8-mer	3	25
57778	<i>Fmn11</i>	LQYEFTHL	Kb 8-mer	19	29
22379	<i>Fmn13</i>	LQYEFTKL	Kb 8-mer	25	30
14359	<i>Fxr1h</i>	EIVTFERL	Kb 8-mer	464	22
14790	<i>Grcc10</i>	SAPENAVRM	Db 9-mer	165	33
68153	<i>Gtf2e2</i>	SGYKFGVL	Kb 8-mer	18	29
69237	<i>Gtpbp4</i>	QILSDFPKL	Kb 9-mer	231	23
14976	<i>H2-Ke2</i>	SNVVFKLL	Kb 9-mer	145	22
15019	<i>H2-Q8</i>	FAYEGRDYI	Db 9-mer	12	21
15201	<i>Hells</i>	KVLVFSQM	Kb 8-mer	254	18
15257	<i>Hipk1</i>	SLLTNHVTL	Db 9-mer	167	28
319189	<i>Hist2h2bb</i>	SVVYKVL	Kb 8-mer	46	27
98758	<i>Hnrpf</i>	FSPLNPVRV	Db 9-mer	127	25

15441	<i>Hp1bp3</i>	VSQYYPKL	Kb 8-mer	29	22
16145	<i>Igtp</i>	IVAENTKTSL	Db 10-mer	3059	24
23918	<i>Impdh2</i>	GGIQNVGHI	Db 9-mer	291	26
16329	<i>Inpp1</i>	YMGNTIHS	Db 9-mer	84	25
76582	<i>Ipo11</i>	TIILFTKV	Kb 8-mer	95	20
338523	<i>Jhdm1d</i>	SSIQNGKYTL	Db 10-mer	273	29
16211	<i>Kpnb1</i>	AALQNLVKI	Db 9-mer	77	31
110308	<i>Krt5</i>	AAYMNKVEL	Db 9-mer	63	28
110310	<i>Krt7</i>	AAYTNKVEL	Db 9-mer	66	28
72416	<i>Lrpprc</i>	AAIENIEHL	Db 9-mer	64	32
26413	<i>Mapk1</i>	VGPRYTNL	Kb 8-mer	12	25
17168	<i>Mare</i>	SAVKNLQQL	Db 9-mer	85	31
13728	<i>Mark2</i>	ASIQNGKDSL	Db 10-mer	1344	30
217615	<i>Mgea6</i>	RNQVYTQL	Kb 8-mer	224	24
67014	<i>Mina</i>	VVYIYHSL	Kb 8-mer	9	26
17427	<i>Mns1</i>	KIIEFANI	Kb 8-mer	20	20
121022	<i>Mrps6</i>	SAVENILEHL	Db 10-mer	178	32
219135	<i>Mtmr6</i>	VGIENIHVM	Db 9-mer	150	27
17886	<i>Myh9</i>	RVAEFTTNL	Kb 9-mer	228	14
67938	<i>Mylc2b</i>	SLGKNPTDAYL	Db 11-mer	344	16
67608	<i>Narf</i>	AAYGFRNI	Kb 8-mer	32	26
17992	<i>Ndufa4</i>	VNVDYSKL	Kb 8-mer	40	24
227197	<i>Ndufs1</i>	AKLVNQEV	Db 9-mer	175	28
18034	<i>Nfkb2</i>	AALQNLQQL	Db 9-mer	98	32
64652	<i>Nisch</i>	TNQDFIQR	Kb 9-mer	358	14
97895	<i>Nlrp4f</i>	TPVKNIDTV	Db 9-mer	509	24
68979	<i>Nol11</i>	IAVSFREL	Kb 8-mer	48	23
211548	<i>Nomo1</i>	SSLVNKEDV	Db 9-mer	99	26
66394	<i>Nosip</i>	TSVRFTQL	Kb 8-mer	33	24
18145	<i>Npc1</i>	VAVWNKV	Db 9-mer	73	29
101706	<i>Numa1</i>	VSILNRQVL	Db 9-mer	14	26
70699	<i>Nup205</i>	VNNEFEKL	Kb 8-mer	1138	24
66923	<i>Pbrm1</i>	SQVYNDAHI	Db 9-mer	111	26
18538	<i>Pcna</i>	RAEDNADTLAL	Db 11-mer	59	27
56426	<i>Pcd10</i>	ILQTFKTV	Kb 9-mer	5	18
207728	<i>Pde2a</i>	IKNENQEV	Db 9-mer	1260	24
23986	<i>Peci</i>	SSYTFPKM	Kb 8-mer	8	25
73739	<i>Pgea1</i>	ASLSNLHSL	Db 9-mer	218	30
233489	<i>Picalm</i>	VAFDFTKV	Kb 8-mer	45	20
83490	<i>Pik3ap1</i>	YGLKNLTAL	Db 9-mer	40	29
18950	<i>Pnp</i>	SLITNKWVM	Db 9-mer	104	26
231329	<i>Polr2b</i>	IGPTYQRL	Kb 9-mer	23	20
66385	<i>Ppp1r7</i>	RAIENIDTL	Db 9-mer	7	30
51792	<i>Ppp2r1a</i>	IIPMFSNL	Kb 8-mer	4	25
73699	<i>Ppp2r1b</i>	VADKFS	Kb 8-mer	375	23
214572	<i>Prmt7</i>	VIVEFRDL	Kb 8-mer	28	23
19167	<i>Psma3</i>	KAVENSSTAI	Db 10-mer	517	30
16913	<i>Psmb8</i>	GGVWNMYHM	Db 9-mer	135	27
15170	<i>Ptpn6</i>	AQYKFIYV	Kb 8-mer	23	25
19696	<i>Rel</i>	TTLIFQKL	Kb 8-mer	58	21
26374	<i>Rfwd2</i>	YVVDNIDHL	Db 9-mer	156	25
74734	<i>Rhoh</i>	YSVANHNSFL	Db 10-mer	767	26
68477	<i>Rmnd5a</i>	WAVSNREML	Db 9-mer	158	27
20054	<i>Rps15</i>	VGVYNGKTF	Db 9-mer	3132	25
267019	<i>Rps15a</i>	ISPRFDVQL	Kb 9-mer	172	14
267019	<i>Rps15a</i>	VIVRFLTV	Kb 8-mer	33	19
20115	<i>Rps7</i>	VNFEFPEF	Kb 8-mer	24	12
20133	<i>Rrm1</i>	FQIVNPHLL	Db 9-mer	71	28
20133	<i>Rrm1</i>	YGIRNSLLI	Db 9-mer	452	26
235623	<i>Scap</i>	SGYDFSRL	Kb 8-mer	5	30
13722	<i>Scye1</i>	SGLVNHVPL	Db 9-mer	59	29
20338	<i>Sel1l</i>	QALKYFNL	Kb 8-mer	171	23
20393	<i>Sgk</i>	STLTYSRM	Kb 8-mer	38	18
20740	<i>Spna2</i>	KALINADEL	Db 9-mer	19	31
20815	<i>Srpk1</i>	ISGVNGTHI	Db 9-mer	55	28
20443	<i>St3gal4</i>	GAVKNLTYF	Db 9-mer	81	30
20848	<i>Stat3</i>	ATLVFHNL	Kb 8-mer	23	22
71728	<i>Stk11ip</i>	SALRFLNL	Kb 8-mer	23	24
16430	<i>Stt3a</i>	AVLSFSTRL	Kb 9-mer	154	13
108143	<i>Taf9</i>	SGLKYVNV	Kb 8-mer	45	20
216198	<i>Tcp11l2</i>	KATTNIVEM	Db 9-mer	225	27
217353	<i>Tmc6</i>	ASYLFRGL	Kb 8-mer	3	29
67511	<i>Tmed9</i>	VIGNYRTQL	Kb 9-mer	271	14
72759	<i>Tmem135</i>	KGFTFSAL	Kb 8-mer	23	22
66074	<i>Tmem167</i>	AIFNFQSL	Kb 8-mer	8	22
67878	<i>Tmem33</i>	QSIAFISRL	Kb 9-mer	75	13
21916	<i>Tmod1</i>	SSIVNKEGL	Db 9-mer	228	30
22057	<i>Tob1</i>	ISYLYNKL	Kb 8-mer	4	29
21990	<i>Tph1</i>	FSENEVGG	Db 10-mer	728	28
21990	<i>Tph1</i>	WGTFREL	Kb 8-mer	309	22
12751	<i>Tpp1</i>	IQRVNTFEM	Db 9-mer	100	25
100683	<i>Trrap</i>	QDPVFQKL	Kb 8-mer	885	22



73710	<i>Tubb2b</i>	VNMVFPRL	Kb 9-mer	252	20
56085	<i>Ubqln1</i>	RALSNLESI	Db 9-mer	87	30
224826	<i>Ubr2</i>	VAYKFPPELL	Kb 9-mer	6	28
59025	<i>Usp14</i>	VKYLFTGL	Kb 8-mer	20	27
216825	<i>Usp22</i>	FAVWNHOGTL	Db 10-mer	985	31
271564	<i>Vps13a</i>	VSIQFYHL	Kb 8-mer	3	22
230895	<i>Vps13d</i>	INIHYTQL	Kb 8-mer	39	25
80743	<i>Vps16</i>	VSFYRYL	Kb 8-mer	3	22
77573	<i>Vps33a</i>	GSLANHTSI	Db 9-mer	161	27
233405	<i>Vps33b</i>	ASLVNADKL	Db 9-mer	25	31
65114	<i>Vps35</i>	FSEENHEPL	Db 9-mer	33	27
22375	<i>Wars</i>	YTVENAKDII	Db 10-mer	492	26
69544	<i>Wdr5b</i>	AALENDKTI	Db 9-mer	56	31
74781	<i>Wipi2</i>	SGYKFFSL	Kb 8-mer	14	29
68090	<i>Yif1a</i>	SGYKYVGM	Kb 8-mer	17	25
66980	<i>Zdhhc6</i>	SVIKFENL	Kb 8-mer	44	25

MHC Ib-associated peptides

GeneID	Gene symbol	Peptides	Restriction size	Rankpep
319236	<i>9230105E10Rik</i>	FISDVEHQL	Qa2 9-mer	181
12014	<i>Bach2</i>	EQLFEIHDI	Qa2 9-mer	183
224171	<i>C330027C09Rik</i>	AQNDIEHLF	Qa2 9-mer	155
75565	<i>Ccdc101</i>	ELLTELHQL	Qa2 9-mer	198
13204	<i>Dhx15</i>	TLLNVYHAF	Qa2 9-mer	215
66366	<i>Ergic3</i>	QQLDVEHNL	Qa2 9-mer	212
108655	<i>Foxp1</i>	QQLQQHLL	Qa2 9-mer	148
15016	<i>H2-Q5</i>	AMAPRTLLL	Qa1 9-mer	
212307	<i>Mapre2</i>	QLNEQVHSL	Qa2 9-mer	176
68979	<i>Nol11</i>	TQLIQTHVL	Qa2 9-mer	150
69608	<i>Sec24d</i>	ESQSVIHNL	Qa2 9-mer	185
319565	<i>Syne2</i>	DLIQTIHEL	Qa2 9-mer	213
50875	<i>Tmod3</i>	AAILGMHNL	Qa2 9-mer	134
320938	<i>Tnpo3</i>	GLLEIAHSL	Qa2 9-mer	237

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**Table S4.** Computed MHC binding affinity of MHC I-associated peptides eluted from in vivo grown EL4 cells

<b>MHC Ia-associated peptides</b>					
GeneID	Gene symbol	Peptides	Restriction size	smm	SYFPEITHI
68295	<i>O610011L14Rik</i>	ISILYHQL	Kb 8-mer	20	24
68523	<i>1110019N10Rik</i>	AALENTHLL	Db 9-mer	327	30
72368	<i>2310045N01Rik</i>	SSVYFRSV	Kb 8-mer	51	19
75425	<i>2610036D13Rik</i>	QTVENVEHL	Db 9-mer	635	27
72722	<i>2810405J04Rik</i>	ASPEFTKL	Kb 8-mer	60	26
72747	<i>2810439F02Rik</i>	SGYDFENRL	Kb 9-mer	19	21
67268	<i>2900073G15Rik</i>	SMGKNPTDEYL	Db 11-mer	344	20
67392	<i>4833420G17Rik</i>	FVISNYREQL	Db 11-mer	1238	26
218989	<i>6720456H20Rik</i>	TGIRNLEWL	Db 9-mer	574	30
11307	<i>Abcg1</i>	VNIEFKDL	Kb 8-mer	107	23
66713	<i>Actr2</i>	YAGSNFPEHI	Db 10-mer	386	29
67019	<i>Actr6</i>	SGYSFTHI	Kb 8-mer	39	25
57869	<i>Adck2</i>	SGPTYIKL	Kb 8-mer	78	25
81702	<i>Ankrd17</i>	ASVLNVNHI	Db 9-mer	87	27
329154	<i>Ankrd44</i>	ASVINGHTL	Db 9-mer	60	28
75415	<i>Arhgap12</i>	YGLLNVTKI	Db 9-mer	60	26
73341	<i>Arhgef6</i>	AIIAFKTL	Kb 8-mer	45	24
54208	<i>Arl6ip1</i>	IILKYIGM	Kb 8-mer	11	20
192195	<i>Ash1l</i>	VGLINKDSV	Db 9-mer	412	24
11906	<i>Atbf1</i>	VAIGNPVHL	Db 9-mer	292	28
Q9JJK8	<i>Atr</i>	FOALNAEKL	Db 9-mer	208	26
54138	<i>Atxn10</i>	NSIRNLDTI	Db 9-mer	13	31
328099	<i>AU021838</i>	VSYLFSHV	Kb 8-mer	3	24
213550	<i>AV340375</i>	FSNKNLEEL	Db 9-mer	53	31
235461	<i>B230380D07Rik</i>	VNVRFTGV	Kb 8-mer	36	19
224727	<i>Bat3</i>	SIAAFIQL	Kb 9-mer	199	14
66165	<i>Bccip</i>	KAPVNTAEL	Db 9-mer	43	31
107976	<i>Bre</i>	ATQVYPKL	Kb 8-mer	67	22
26885	<i>Casp8ap2</i>	VTVLNVDHL	Db 9-mer	30	26
76041	<i>Ccdc125</i>	NAVLNQRYL	Db 9-mer	32	27
77048	<i>Ccdc41</i>	AQVENVQRI	Db 9-mer	498	29
12445	<i>Ccnd3</i>	AAVIAHDFL	Db 9-mer	46	20
12449	<i>Ccnf</i>	SQAVNKQOI	Db 9-mer	588	26
12450	<i>Ccng1</i>	TAFQFLQL	Kb 8-mer	80	22
12501	<i>Cd3e</i>	YSGLNQRAV	Db 9-mer	406	19
26364	<i>Cd97</i>	KLLSNINSVF	Db 10-mer	9292	23
12576	<i>Cdkn1b</i>	FGPVNHEEL	Db 9-mer	77	33
229841	<i>Cenpe</i>	SALQNAESDRL	Db 12-mer	76	22
216859	<i>Centb1</i>	INQIYEARV	Kb 9-mer	268	13
12649	<i>Chek1</i>	TGPSNVDKL	Db 9-mer	784	29
243764	<i>Chrm2</i>	TVIGYWPL	Kb 8-mer	196	21
70349	<i>Copb1</i>	IALRYVAL	Kb 8-mer	22	23
67876	<i>Coq10b</i>	ISFEFRSL	Kb 8-mer	2	24
68975	<i>Crsp8</i>	SGLLNQQSL	Db 9-mer	118	28
71745	<i>Cul2</i>	VINSFVHV	Kb 8-mer	527	17
12767	<i>Cxcr4</i>	VVFQFQHI	Kb 8-mer	56	16
52635	<i>D12Erttd551e</i>	RQLENGTTL	Db 9-mer	33	28
218978	<i>D14Erttd436e</i>	SQHVNLDQL	Db 9-mer	61	29
71919	<i>D15Erttd682e</i>	TNVLFNHL	Kb 8-mer	169	21
69601	<i>Dab2ip</i>	VSPTNPTKL	Db 9-mer	98	29
67755	<i>Ddx47</i>	KTFLFSATM	Kb 9-mer	33	11
13209	<i>Ddx6</i>	INFDFPKL	Kb 8-mer	7	24
76131	<i>Depdc1a</i>	FSQENTEKI	Db 9-mer	231	28
13433	<i>Dnmt1</i>	LSLENGHTL	Db 10-mer	758	28
94176	<i>Dock2</i>	SMVQNRVFL	Db 9-mer	7	29
233115	<i>Dpy19l3</i>	SVAFHNL	Kb 8-mer	44	22
13424	<i>Dync1h1</i>	ASYEFVQRL	Kb 9-mer	18	20
13669	<i>Eif3s10</i>	QSIEFSRL	Kb 8-mer	28	24
73830	<i>Eif3s12</i>	VGITYQHI	Kb 8-mer	100	18
54709	<i>Eif3s2</i>	FGPINSVAF	Db 9-mer	1976	26
170439	<i>Elovl6</i>	KSFLFSAL	Kb 8-mer	10	22
10436	<i>EMG1</i>	VSVEYTEKM	Kb 9-mer	58	13
13819	<i>Epas1</i>	SNYLFKTL	Kb 8-mer	10	30
212377	<i>F730047E07Rik</i>	VGVTYRTL	Kb 8-mer	28	23
14104	<i>Fasn</i>	TALENLSTL	Db 9-mer	48	33
107035	<i>Fbxo38</i>	SAFSFRTL	Kb 8-mer	22	24
14137	<i>Fdft1</i>	ISLEFRNL	Kb 8-mer	3	25
57778	<i>Fmnl1</i>	LQYEFTHL	Kb 8-mer	19	29
22379	<i>Fmnl3</i>	LQYEFKTL	Kb 8-mer	25	30
14359	<i>Fxr1h</i>	EIVTFERL	Kb 8-mer	464	22
14790	<i>Grcc10</i>	SAPENAVRM	Db 9-mer	165	33
68153	<i>Gtf2e2</i>	SGYKFGVL	Kb 8-mer	18	29
69237	<i>Gtpbp4</i>	QILSDFFPKL	Kb 9-mer	231	23
14976	<i>H2-Ke2</i>	SNVVFKLL	Kb 9-mer	145	22
15019	<i>H2-Q8</i>	FAYEGRDYI	Db 9-mer	12	21
15201	<i>Hells</i>	KVLVFSQM	Kb 8-mer	254	18
15257	<i>Hipk1</i>	SLLTNHVTL	Db 9-mer	167	28
319189	<i>Hist2h2bb</i>	SVVYKVL	Kb 8-mer	46	27

20585	<i>Hltf</i>	SGFVFTRL	Kb 8-mer	7	23
98758	<i>Hnrpf</i>	FSPLNPVRV	Db 9-mer	127	25
15441	<i>Hp1bp3</i>	VSQYYPKL	Kb 8-mer	29	22
23918	<i>Impdh2</i>	GGIQNVGHI	Db 9-mer	291	26
16329	<i>Inpp1</i>	YMGNTIHSL	Db 9-mer	84	25
76582	<i>Ipo11</i>	TIILFTKV	Kb 8-mer	95	20
338523	<i>Jhdm1d</i>	SSIQNGKYTL	Db 10-mer	273	29
16211	<i>Kpnb1</i>	AALQNLVKI	Db 9-mer	77	31
76130	<i>Las1l</i>	ALVRFVNL	Kb 8-mer	74	23
72416	<i>Lrpprc</i>	AAIENIEHL	Db 9-mer	64	32
26413	<i>Mapk1</i>	VGPRYTNL	Kb 8-mer	12	25
17168	<i>Mare</i>	SAVKNLQQL	Db 9-mer	85	31
13728	<i>Mark2</i>	ASIQNGKDSL	Db 10-mer	1344	30
217615	<i>Mgea6</i>	RNQVYTQL	Kb 8-mer	224	24
67014	<i>Mina</i>	VVYIYHSL	Kb 8-mer	9	26
121022	<i>Mrps6</i>	SAVENILEHL	Db 10-mer	178	32
219135	<i>Mtmr6</i>	VGIENIHVM	Db 9-mer	150	27
17886	<i>Myh9</i>	RVAEFTNL	Kb 9-mer	228	14
67938	<i>Mylc2b</i>	SLGKNPTDAYL	Db 11-mer	344	16
67608	<i>Narf</i>	AAYGFRNI	Kb 8-mer	32	26
67563	<i>Narf1</i>	VAYGFRNI	Kb 8-mer	15	25
17992	<i>Ndufa4</i>	VNVDYSKL	Kb 8-mer	40	24
227197	<i>Ndufs1</i>	AKLVNQEVL	Db 9-mer	175	28
18034	<i>Nfkb2</i>	AALQNLEQL	Db 9-mer	98	32
64652	<i>Nisch</i>	TNQDFIQL	Kb 9-mer	358	14
97895	<i>Nlrp4f</i>	TPVKNIDTV	Db 9-mer	509	24
68979	<i>Nol11</i>	IAVSFREL	Kb 8-mer	48	23
211548	<i>Nomo1</i>	SSLVNKEDV	Db 9-mer	99	26
66394	<i>Nosip</i>	TSVRFTQL	Kb 8-mer	33	24
18145	<i>Npc1</i>	VAVVNKVDI	Db 9-mer	73	29
101706	<i>Numa1</i>	VSILNRQVL	Db 9-mer	14	26
70699	<i>Nup205</i>	VNNEFEKL	Kb 8-mer	1138	24
18813	<i>Pa2g4</i>	AQKFFTVL	Kb 8-mer	59	23
66923	<i>Pbrm1</i>	SQVYNDAHI	Db 9-mer	111	26
18538	<i>Pcna</i>	RAEDNADTLAL	Db 11-mer	59	27
56426	<i>Pdcd10</i>	ILQTFKTV	Kb 9-mer	5	18
207728	<i>Pde2a</i>	IKNENQEVI	Db 9-mer	1260	24
23986	<i>Peci</i>	SSYTFPKM	Kb 8-mer	8	25
18626	<i>Per1</i>	YTLRNQDTF	Db 9-mer	55	25
56612	<i>Pfdn5</i>	SMYVPGKL	Kb 8-mer	293	18
73739	<i>Pgea1</i>	ASLSNLHSL	Db 9-mer	218	30
233489	<i>Picalm</i>	VAFDFTKV	Kb 8-mer	45	20
83490	<i>Pik3ap1</i>	YGLKNLTAL	Db 9-mer	40	29
18950	<i>Pnp</i>	SLITNKVVM	Db 9-mer	104	26
231329	<i>Polr2b</i>	IGPTYQRL	Kb 9-mer	23	20
18985	<i>Pou2af1</i>	SGPQFVQL	Kb 8-mer	172	24
66385	<i>Ppp1r7</i>	RAIENIDTL	Db 9-mer	7	30
51792	<i>Ppp2r1a</i>	IIPMFSNL	Kb 8-mer	4	25
73699	<i>Ppp2r1b</i>	VADKFSSEL	Kb 8-mer	375	23
106042	<i>Prickle1</i>	LNYKFPGL	Kb 8-mer	5	29
214572	<i>Prrt7</i>	VIVEFRDL	Kb 8-mer	28	23
19167	<i>Psm3</i>	KAVENSSTAI	Db 10-mer	517	30
16913	<i>Psm8</i>	GGVNMVYHM	Db 9-mer	135	27
15170	<i>Ptpn6</i>	AQYKFIYV	Kb 8-mer	23	25
108911	<i>Rcc2</i>	AAYRNLGQNL	Db 10-mer	924	29
19696	<i>Rel</i>	TTLIFQKL	Kb 8-mer	58	21
26374	<i>Rfwd2</i>	YVVDNIDHL	Db 9-mer	156	25
74734	<i>Rhoh</i>	YSVANHNSFL	Db 10-mer	767	26
20054	<i>Rps15</i>	VGYYNGKTF	Db 9-mer	3132	25
267019	<i>Rps15a</i>	VIVRFLTV	Kb 8-mer	33	19
267019	<i>Rps15a</i>	ISPRFDVQL	Kb 9-mer	172	14
20115	<i>Rps7</i>	VNFEFPEF	Kb 8-mer	24	12
20133	<i>Rrm1</i>	FQIVNPHLL	Db 9-mer	71	28
20133	<i>Rrm1</i>	YGIRNSLLI	Db 9-mer	452	26
235623	<i>Scap</i>	SGYDFSRL	Kb 8-mer	5	30
13722	<i>Scye1</i>	SGLVNHVPL	Db 9-mer	59	29
20338	<i>Sel1l</i>	QALKYFNL	Kb 8-mer	171	23
20393	<i>Sgk</i>	STLYSRM	Kb 8-mer	38	18
432572	<i>Specc1</i>	TSLAFESRL	Kb 9-mer	97	12
20740	<i>Spna2</i>	KALINADEL	Db 9-mer	19	31
20815	<i>Srp1</i>	ISGVNGTHI	Db 9-mer	55	28
20443	<i>St3gal4</i>	GAVKNLTYF	Db 9-mer	81	30
20848	<i>Stat3</i>	ATLVFHNL	Kb 8-mer	23	22
71728	<i>Stk11ip</i>	SALRFLNL	Kb 8-mer	23	24
16430	<i>Stt3a</i>	AVLSFSTRL	Kb 9-mer	154	13
108143	<i>Taf9</i>	SGLKYVNV	Kb 8-mer	45	20
245638	<i>Tbc1d8b</i>	TAFRFSEL	Kb 8-mer	23	23
216198	<i>Tcp11l2</i>	KATTNIVEM	Db 9-mer	225	27
217353	<i>Tmc6</i>	ASYLFRGL	Kb 8-mer	3	29
72759	<i>Tmem135</i>	KGFTFSAL	Kb 8-mer	23	22
66074	<i>Tmem167</i>	AIFNFQSL	Kb 8-mer	8	22
67878	<i>Tmem33</i>	QSIAFISRL	Kb 9-mer	75	13

21916	<i>Tmod1</i>	SSIVNKEGL	Db 9-mer	228	30
22057	<i>Tob1</i>	ISYLYNKL	Kb 8-mer	4	29
21973	<i>Top2a</i>	NSMVLFDHV	Db 9-mer	228	14
21990	<i>Tph1</i>	FSLENEVGGL	Db 10-mer	728	28
21990	<i>Tph1</i>	WGTIFREL	Kb 8-mer	309	22
12751	<i>Tpp1</i>	IQRVNTEFM	Db 9-mer	100	25
100683	<i>Trrap</i>	QDPVFQKL	Kb 8-mer	885	22
73710	<i>Tubb2b</i>	VNMVPPRL	Kb 9-mer	252	20
56085	<i>Ubqln1</i>	RALSNLESI	Db 9-mer	87	30
224826	<i>Ubr2</i>	VAYKFPELL	Kb 9-mer	6	28
59025	<i>Usp14</i>	VKYLFTGL	Kb 8-mer	20	27
216825	<i>Usp22</i>	FAVVNHQGTI	Db 10-mer	985	31
271564	<i>Vps13a</i>	VSIQFYHL	Kb 8-mer	3	22
230895	<i>Vps13d</i>	INIHYTQL	Kb 8-mer	39	25
80743	<i>Vps16</i>	VSFTYRYL	Kb 8-mer	3	22
77573	<i>Vps33a</i>	GSLANHTSI	Db 9-mer	161	27
233405	<i>Vps33b</i>	ASLVNADKL	Db 9-mer	25	31
65114	<i>Vps35</i>	FSEENHEPL	Db 9-mer	33	27
218035	<i>Vps41</i>	IGLAYVNHL	Kb 9-mer	17	13
22375	<i>Wars</i>	YTVENAKDII	Db 10-mer	492	26
69544	<i>Wdr5b</i>	AALENDKTI	Db 9-mer	56	31
74781	<i>Wipi2</i>	SGYKFFSL	Kb 8-mer	14	29
22446	<i>Xlr3b</i>	VAAANREVL	Db 9-mer	111	26
68090	<i>Yif1a</i>	SGYKYVGM	Kb 8-mer	17	25
66980	<i>Zdhc6</i>	SVIKFENL	Kb 8-mer	44	25

MHC Ib-associated peptides

GeneID	Gene symbol	Peptides	Restriction size	Rankpep
224171	<i>C330027C09Rik</i>	AQNDIEHLF	Qa2 9-mer	155
75565	<i>Ccdc101</i>	ELLTELHQL	Qa2 9-mer	198
13204	<i>Dhx15</i>	TLLNVYHAF	Qa2 9-mer	215
66366	<i>Ergic3</i>	QQLDVEHNL	Qa2 9-mer	212
108655	<i>Foxp1</i>	QQLQQQHLL	Qa2 9-mer	148
15016	<i>H2-Q5</i>	AMAPRTLLL	Qa1 9-mer	
212307	<i>Mapre2</i>	QLNEQVHSL	Qa2 9-mer	176
68979	<i>Nol11</i>	TQLIQTHVL	Qa2 9-mer	150
69608	<i>Sec24d</i>	ESQSVIHNL	Qa2 9-mer	185
319565	<i>Syne2</i>	DLIQTIHEL	Qa2 9-mer	213
50875	<i>Tmod3</i>	AAILGMHNL	Qa2 9-mer	134

Table S5. List of genes coding for MHC I peptides differentially expressed in neoplastic (EL4) versus normal thymocytes and involved in carcinogenesis

Functional classification	Gene symbol	Gene ID	Sequence	P values	EL4/Thy
Transcription	<i>Pa2g4</i> (1–4)	18813	AQFKFTVL	0.018	4.6
	<i>Top2a</i> (5)	21973	NSMVLFDHV	0.020	15.6
	<i>Dnmt1</i> (6, 7)	13433	LSLENGHTL	0.022	8.9
	<i>Pfdn5</i> (8, 9)	56612	SMYVPGKL	0.036	16.6
	<i>Per1</i> (10, 11)	18626	YTLRNQDTF	0.036	5.0
	<i>Foxp1</i> (12, 13)	108655	QQLQQQHLL	0.010	−4.3
	<i>Bach2</i> (14, 15)	12014	EQLEFIHDI	0.015	−20.2
	<i>Ddx5</i> (16, 17)	13207	NQAINPKLLQL	0.021	−5.7
	Cell differentiation	<i>Ptpn6</i> (18, 19)	15170	AQYKFIYV	0.028
<i>RhoH</i> (20, 21)		74734	YSVANHNSFL	0.019	−3.1
<i>Pi3kap1</i> (22, 23)		83490	YSVANHNSFL	0.001	−21.8
Cell cycle	<i>Cdkn1b</i> (24–26)	12576	FGPVNHEEL	0.003	−3.1
Apoptosis	<i>Sgk</i> (27–29)	20393	STLTYSRM	0.022	9.7
	<i>Pdcd10</i> (30)	56426	ILQTFKTV	0.001	−4.3
Signal transduction	<i>Cxcr4</i> (31, 32)	12767	VVWFQFQHI	0.003	2.6
	<i>CD97</i> (33, 34)	26364	KLLSNINSVF	0.033	−4.6
Translation	<i>Eif3s10</i> (35, 36)	13669	QSIEFSRL	0.015	3.2
	<i>Eif3s2</i> (35, 36)	54709	FGPINSVAF	0.035	5.3
Miscellaneous	<i>Dhx15</i> (37)	13204	TLLNVYHAF	0.017	−11.5
	<i>Gtpbp4</i> (38)	69237	QILSDFPKL	0.034	2.6
	<i>Igtp</i> (39)	16145	IVAENTKTSL	0.001	−15.5

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**Table S6.** Relative abundance of MHC I-associated peptides eluted from primary thymocytes versus in vivo grown EL4

GeneID	Gene symbol	Peptide	Average intensities from			EL4/Thy
			EL4	Thymocytes	P values	
68295	<i>O610011L14Rik</i>	ISILYHQL	810647	1248361	0.10	-1.5
68523	<i>1110019N10Rik</i>	AALENTHLL	116372	145359	0.63	-1.2
72368	<i>2310045N01Rik</i>	SSVYFRSV	94609	42165	0.09	2.2
75425	<i>2610036D13Rik</i>	QTVENVEHL	268223	422026	0.20	-1.6
72722	<i>2810405J04Rik</i>	ASPEFTKL	1928424	879573	0.07	2.2
72747	<i>2810439F02Rik</i>	SGYDFENRL	55031	123324	0.13	-2.2
67268	<i>2900073G15Rik</i>	SMGKNPTDEYL	2911106	762807	0.05	3.8
218989	<i>6720456H20Rik</i>	TGIRNLEWL	197157	149305	0.56	1.3
319236	<i>9230105E10Rik</i>	FISDVEHQL	12000	278323	0.01	-23.2
11307	<i>Abcg1</i>	VNIEFKDL	2074080	1805346	0.54	1.1
66713	<i>Actr2</i>	YAGSNFPEHI	2319817	1277449	0.04	1.8
67019	<i>Actr6</i>	SGYSFTHI	436804	141915	0.06	3.1
57869	<i>Adck2</i>	SGPTYIKL	86469	161672	0.26	-1.9
81702	<i>Ankrd17</i>	ASVLNVNHI	5882733	5485733	0.65	1.1
329154	<i>Ankrd44</i>	ASVINGHTL	385034	353775	0.79	1.1
54208	<i>Arl6ip1</i>	IILKYIGM	246911	127103	0.16	1.9
192195	<i>Ash1l</i>	VGLINKDSV	241257	132489	0.28	1.8
Q9JKK8	<i>Atr</i>	FQALNAEKL	60707	89418	0.20	-1.5
54138	<i>Atnx10</i>	NSIRNLDTI	11787170	22819844	0.03	-1.9
328099	<i>AU021838</i>	VSYLFSHV	432991	356073	0.63	1.2
235461	<i>B230380D07Rik</i>	VNVRFQGV	54488	74969	0.31	-1.4
12014	<i>Bach2</i>	EQLEFIHDI	12000	242371	0.01	-20.2
224727	<i>Bat3</i>	SIAAFIQRL	133395	93668	0.45	1.4
66165	<i>Bccip</i>	KAPVNTAEL	210648	387950	0.17	-1.8
107976	<i>Bre</i>	ATQVYPKL	626010	343031	0.21	1.8
224171	<i>C330027C09Rik</i>	AQNDIEHLF	296259	355661	0.61	-1.2
26885	<i>Casp8ap2</i>	VTVLNVDDL	112568	295624	0.06	-2.6
75565	<i>Ccdc101</i>	ELLTELHQL	109977	377688	0.06	-3.4
76041	<i>Ccdc125</i>	NAVLNQRYL	53422	80693	0.05	-1.5
77048	<i>Ccdc41</i>	AQVENVQRI	77635	214892	0.005	-2.8
12445	<i>Ccnd3</i>	AAVIAHDFL	195002	116726	0.31	1.7
12449	<i>Ccnf</i>	SQAVNKQVI	46629	75687	0.48	-1.6
12501	<i>Cd3e</i>	YSGLNQRAV	92673	193576	0.05	-2.1
26364	<i>Cd97</i>	KLLSNINSVF	177758	812560	0.03	-4.6
12576	<i>Cdkn1b</i>	FGPVNHHEEL	2765989	8474581	0.003	-3.1
216859	<i>Centb1</i>	INQIYEARV	242126	288600	0.58	-1.2
12649	<i>Chek1</i>	TGPSNVDKL	5073167	2489307	0.02	2.0
243764	<i>Chrm2</i>	TVIGYWPL	57092	112673	0.17	-2.0
70349	<i>Copb1</i>	IALRYVAL	579237	197990	0.01	2.9
67876	<i>Coq10b</i>	ISFEFRSL	46870	41415	0.74	1.1
71745	<i>Cul2</i>	VINSFVHV	163398	55024	0.06	3.0
12767	<i>Cxcr4</i>	VVFQFOHI	165482	63047	0.003	2.6
52635	<i>D12Ertd551e</i>	RQLENGTTL	405701	580254	0.28	-1.4
218978	<i>D14Ertd436e</i>	SQHVNLQDL	274085	752598	0.04	-2.7
69601	<i>Dab2ip</i>	VSPTNPTKL	148633	180896	0.52	-1.2
67755	<i>Ddx47</i>	KTFLFSATM	76238	60088	0.50	1.3
13207	<i>Ddx5</i>	NQAINPKLLQL	20171	115009	0.02	-5.7
13209	<i>Ddx6</i>	INFDFPKL	867416	2016311	0.02	-2.3
13204	<i>Dhx15</i>	TLLNVYHAF	72069	827769	0.01	-11.5
13433	<i>Dnmt1</i>	LSENGHTHL	1108884	124482	0.02	8.9
94176	<i>Dock2</i>	SMVQNRVFL	182029	261777	0.56	-1.4
233115	<i>Dpy19l3</i>	SWAFHNL	114097	81273	0.53	1.4
13424	<i>Dync1h1</i>	ASYEFVQRL	2301414	1013239	0.08	2.3
13669	<i>Eif3s10</i>	QSIEFSRL	3422637	1081266	0.02	3.2
73830	<i>Eif3s12</i>	VGITYQHI	1223275	1317577	0.88	-1.1
54709	<i>Eif3s2</i>	FGPINSVAF	63523	12000	0.03	5.3
10436	<i>Emg1</i>	VSVEYTEKM	82838	67514	0.30	1.2
13819	<i>Epas1</i>	SNYLFTEL	704947	1387353	0.05	-2.0
66366	<i>Ergic3</i>	QLLDVEHNL	193740	378788	0.07	-2.0
212377	<i>F730047E07Rik</i>	VGVTYRTL	152126	70387	0.12	2.2
107035	<i>Fbxo38</i>	SAFSFRTL	270808	192573	0.34	1.4
14137	<i>Fdft1</i>	ISLEFRNL	198436	214993	0.81	-1.1
57778	<i>Fmn1</i>	LQYEFTHL	1190978	933913	0.45	1.3
22379	<i>Fmn3</i>	LQYEFTEL	1171553	1937711	0.05	-1.7
108655	<i>Foxp1</i>	QQLQQQHLL	518392	2217859	0.01	-4.3
14359	<i>Fxr1h</i>	EIVTFERL	336814	132963	0.08	2.5
14790	<i>Grcc10</i>	SAPENAVRM	3734208	2535151	0.66	1.5
68153	<i>Gtf2e2</i>	SGYKFGVL	972201	381917	0.06	2.5
69237	<i>Gtpbp4</i>	QILSDFPKL	1361649	526685	0.03	2.6
15016	<i>H2-Q5</i>	AMAPRLLLL	2156626	5661232	0.06	-2.6
15019	<i>H2-Q8</i>	FAYEGRDYI	2248785	1616977	0.29	1.4
15201	<i>Hells</i>	KVLVFSQM	263746	52922	0.06	5.0
15257	<i>Hipk1</i>	SLLTNHVTL	504676	412123	0.63	1.2
319189	<i>Hist2h2bb</i>	SVVYKVL	5932574	2470423	0.02	2.4
98758	<i>Hnrpf</i>	FSPLNPVRV	101312	82387	0.49	1.2
16145	<i>Igtp</i>	IVAENTKLSL	12000	185606	0.001	-15.5
23918	<i>Impdh2</i>	GGIQNVGHI	29380844	17244971	0.01	1.7
16329	<i>Inpp1</i>	YMGTDNIHSL	37800	259193	0.09	-6.9

76582	<i>Ipo11</i>	TIILFTKV	99616	76723	0.41	1.3
338523	<i>Jhdm1d</i>	SSIQNGKYTL	182192	886026	0.02	-4.9
110308	<i>Krt5</i>	AAYMNKVEL	12000	1280013	0.04	-106.7
110310	<i>Krt7</i>	AAYTNKVEL	12000	1458071	0.00	-121.5
72416	<i>Lrp4</i>	AAIENIEHL	159927	163843	0.95	-1.0
26413	<i>Mapk1</i>	VGPRYTNL	15419971	25982309	0.02	-1.7
212307	<i>Mapre2</i>	QLNEQVHSL	130503	225894	0.28	-1.7
17168	<i>Mare</i>	SAVKNLQQL	2084131	2315130	0.64	-1.1
13728	<i>Mark2</i>	ASIQNGKDSL	358351	132344	0.03	2.7
217615	<i>Mgea6</i>	RNQVYTQL	179246	186263	0.89	-1.0
67014	<i>Mina</i>	VVYIYHSL	86825	230698	0.10	-2.7
17427	<i>Mns1</i>	KIIEFANI	12000	149382	0.01	-12.4
219135	<i>Mtmr6</i>	VGIENIHVM	46307	499479	0.06	-10.8
17886	<i>Myh9</i>	RVAEFTNL	469290	706492	0.28	-1.5
67938	<i>Mylc2b</i>	SLGKNPTDAYL	4571127	1100520	0.01	4.2
67608	<i>Narf</i>	AAYGFRNI	141414	67434	0.11	2.1
67563	<i>Narfl</i>	VAYGFRNI	104022	12000	0.01	8.7
17992	<i>Ndufa4</i>	VNVDYSKL	6565000	10705177	0.06	-1.6
227197	<i>Ndufs1</i>	AKLVNQEVL	502906	132505	0.07	3.8
18034	<i>Nfkb2</i>	AALQNLEQL	275269	482669	0.53	-1.8
64652	<i>Nisch</i>	TNQDFIQL	395004	137997	0.12	2.9
97895	<i>Nlrp4f</i>	TPVKNIIDTV	44098	40329	0.72	1.1
68979	<i>Nol11</i>	TQLIQTHVL	344889	793732	0.04	-2.3
211548	<i>Nomo1</i>	SSLVNKEDV	45468	76970	0.07	-1.7
66394	<i>Nosip</i>	TSVRFTQL	3233929	3880050	0.30	-1.2
18145	<i>Npc1</i>	VAVWNKVDI	337841	629999	0.13	-1.9
101706	<i>Numa1</i>	VSILNRQVL	678568	917089	0.33	-1.4
70699	<i>Nup205</i>	VNNEFEKL	109609	505624	0.01	-4.6
18813	<i>Pa2g4</i>	AQKFTVL	55142	12000	0.02	4.6
66923	<i>Pbrm1</i>	SQVYNDAAHI	70006	242803	0.02	-3.5
18538	<i>Pcna</i>	RAEDNADTLAL	49024	73938	0.24	-1.5
56426	<i>Pdcd10</i>	ILQTFKTVA	71543	309466	0.001	-4.3
207728	<i>Pde2a</i>	IKNENQEV	308207	19230	0.02	16.0
23986	<i>Peci</i>	SSYTFPKM	274504	246774	0.82	1.1
18626	<i>Per1</i>	YTLRNQDTF	59957	12000	0.04	5.0
56612	<i>Pfdn5</i>	SMYVPGKL	199322	12000	0.04	16.6
73739	<i>Pgea1</i>	ASLSNLHSL	284222	107706	0.13	2.6
233489	<i>Picalm</i>	VAFDFTKV	1026391	970576	0.78	1.1
83490	<i>Pik3ap1</i>	YGLKNLTAL	74055	1614342	0.001	-21.8
231329	<i>Polr2b</i>	IGPTYQRL	152006	456565	0.06	-3.0
66385	<i>Ppp1r7</i>	RAIENIDTL	1371985	2449039	0.06	-1.8
73699	<i>Ppp2r1b</i>	VADKFSEL	123409	43924	0.10	2.8
214572	<i>Prmt7</i>	VIVEFRDL	127033	144217	0.65	-1.1
16913	<i>Psmb8</i>	GGVWNYHM	312549	367796	0.77	-1.2
15170	<i>Ptpn6</i>	AQYKFIYV	2532589	774524	0.03	3.3
108911	<i>Rcc2</i>	AAAYRNLGQNL	323760	12000	0.04	27.0
19696	<i>Rel</i>	TTLIFQKL	52627	69335	0.46	-1.3
26374	<i>Rfwd2</i>	YVVDNIDHL	103204	182323	0.17	-1.8
74734	<i>Rhoh</i>	YSVANHNSFL	257883	790683	0.02	-3.1
68477	<i>Rmnd5a</i>	WAVSNREML	12000	74507	0.02	-6.2
20054	<i>Rps15</i>	VGYYNGKTF	94776	119204	0.32	-1.3
267019	<i>Rps15a</i>	VIVRFLTV	561265	225633	0.15	2.5
267019	<i>Rps15a</i>	ISPRFDVQL	487134	141860	0.08	3.4
20115	<i>Rps7</i>	VNFEFPEF	315064	460959	0.42	-1.5
20133	<i>Rrm1</i>	YGIRNSLLI	2099554	1995074	0.76	1.1
20133	<i>Rrm1</i>	FQIVNPHLL	8238219	6013528	0.18	1.4
235623	<i>Scap</i>	SGYDFSRL	215152	296647	0.35	-1.4
13722	<i>Scye1</i>	SGLVNHVPL	121736	137771	0.81	-1.1
69608	<i>Sec24d</i>	ESQSVIHNL	154217	185515	0.71	-1.2
20338	<i>Sel1l</i>	QALKYFNL	342436	120117	0.06	2.9
20393	<i>Sgk</i>	STLYSRM	301908	67793	0.02	9.7
432572	<i>Specc1</i>	TSLAFESRL	84991	12000	0.005	7.1
20740	<i>Spna2</i>	KALINADEL	4367025	7898847	0.05	-1.8
20815	<i>Srp1</i>	ISGVNGTHI	1498558	1233136	0.46	1.2
20443	<i>St3gal4</i>	GAVKNLTYF	84768	217591	0.12	-2.6
20848	<i>Stat3</i>	ATLVFHNL	8702796	6298873	0.13	1.4
71728	<i>Stk11ip</i>	SALRFLNL	64125	250911	0.01	-3.9
319565	<i>Syne2</i>	DLIQTIHEL	64700	102995	0.25	-1.6
108143	<i>Taf9</i>	SGLKYVNV	1888511	964010	0.04	2.0
216198	<i>Tcp11l2</i>	KATTNIVEM	39337	92718	0.19	-2.4
217353	<i>Tmc6</i>	ASYLFRGL	42599	104982	0.01	-2.5
67511	<i>Tmed9</i>	VIGNYRTQL	12000	82097	0.01	-6.8
67878	<i>Tmem33</i>	QSIAFISRL	312693	175900	0.23	1.8
21916	<i>Tmod1</i>	SSIVNKEGL	676206	64142	0.004	10.5
320938	<i>Tnpo3</i>	GLLEIAHSL	12000	40153	0.10	-3.3
22057	<i>Tob1</i>	ISYLYNKL	137897	149667	0.87	-1.1
21973	<i>Top2a</i>	NSMVLFDHV	187186	12000	0.02	15.6
21990	<i>Tph1</i>	WGTFREL	57225	54992	0.90	1.0
21990	<i>Tph1</i>	FSENEVGGL	614142	228500	0.07	2.7
12751	<i>Tpp1</i>	IQRVNTEFM	56506	48388	0.66	1.2
100683	<i>Trrap</i>	QDPVFQKL	63687	47544	0.41	1.3
56085	<i>Ubqln1</i>	RALSNLESI	402950	278602	0.31	1.4



224826	<i>Ubr2</i>	VAYKFPPELL	36262	33865	0.62	1.1
216825	<i>Usp22</i>	FAVWNHQGTL	264021	179805	0.52	1.5
230895	<i>Vps13d</i>	INIHYTQL	81820	133304	0.41	-1.6
80743	<i>Vps16</i>	VSFTYRYL	1178420	1298769	0.70	-1.1
77573	<i>Vps33a</i>	GSLANHTSI	235063	137938	0.23	1.7
233405	<i>Vps33b</i>	ASLVNADKL	1141391	750579	0.41	1.5
65114	<i>Vps35</i>	FSEENHEPL	100228	72330	0.36	1.4
22375	<i>Wars</i>	YTVENAKDII	164659	97161	0.18	1.7
69544	<i>Wdr5b</i>	AALENDKTI	995387	846431	0.64	1.2
74781	<i>Wipi2</i>	SGYKFFSL	108304	60742	0.28	1.8
22446	<i>Xlr3b</i>	VAAANREVL	1019171	12000	0.02	84.9
68090	<i>Yif1a</i>	SGYKYVGM	172942	68389	0.14	2.5
66980	<i>Zdhhc6</i>	SVIKFENL	57125	76621	0.59	-1.3

**Table S7.** List of primers for quantitative real-time PCR analyses

Gene symbol	Ref seq	Gene ID	Primer_A	Primer_B	Probe
2900073G15RIK	NM_026064	67268	CGCTTGCTTTGATGAGGAA	GTCAGCAGTCCCTCAGGT	Universal Library probe: #79
9230105E10RIK	NM_175677	319236	GGCCACAAAACAGCTCTCAT	CAGCCTTTGCAGAACTACCTG	Universal Library probe: #68
Atxn10	NM_016843.2	54138	GAGCCTCACACCGAGGATAA	TGGACGTCATTTACACAAGA	Universal Library probe: #92
Bach2	NM_007521	12014	CATCTCTCCTCTGCCAGT	AGACATGCCGTTCAAACCAT	Universal Library probe: #89
Cend3	NM_007632.2	12445	GCATACTGGATGCTGGAGGT	GGTAGCGATCCAGGTAGTTCA	Universal Library probe: #88
Ccnf	NM_007634.2	12449	CGGAAACACAGGGACTACG	TCCACCTGCACAGGCTTT	Universal Library probe: #3
Cd97	NM_011925	26364	ATCCAGCCACGGTCAACTAC	TTGTTGGGTTTGAGTCTCCAT	Universal Library probe: #11
Cdkn1b	NM_009875	12576	GAGCAGTGTCCAGGGATGAG	TCTGTTGGCCCTTTTGTTTT	Universal Library probe: #62
Chek1	NM_007691.2	12649	GAGGGAAGGCCATATCCAGT	TTGTTCAAGGCATCCCTATGTC	Universal Library probe: #25
Copb1	NM_033370.3	70349	CCGCTTGGTGAATTAAGAG	GGATGTCCATGACCAGATCC	Universal Library probe: #15
Cxcr4	NM_009911.3	12767	TGGAACCGATCAGTGTGAGT	GGGCAGGAAGATCCTATTGA	Universal Library probe: #38
Ddx47	NM_026360	67755	TGGGAAGGCCATTACTTTTG	AGCTTCTTCCAATCAAAGTCT	Universal Library probe: #11
Ddx5	NM_007840	13207	AGAGGTGATGGGCCTATTTG	CAAGCGACAAGCTCGACA	Universal Library probe: #66
Ddx6	NM_007841.3	13209	CAAAAAGTGCCTGCTCAA	GGAGTTGCAGAAAATGATGGA	Universal Library probe: #80
Dhx15	NM_007839.2	13204	TCGACAGTGTCCAAATACAT	CAGGCCTCATCAATTTCTCTC	Universal Library probe: #12
Dnmt1	NM_010066.3	13433	CTCATTGGCTTCTCCACTGC	GCCCAAATATTGGCTCATACTC	Universal Library probe: #107
Eif3s10	NM_010123	13669	GATTCAAGGACCTGGAG	CATCCCAGTCTCTCGTCTC	Universal Library probe: #93
Eif3s12	NM_028659	73830	GCTCAAGGGTATCGACAGGT	TTTGGCTTGTCTCCACAT	Universal Library probe: #1
Eif3s2	NM_018799	54709	GAAAGCCATGGATGACCA	TCAAAAGCCAAATGGAAGAAC	Universal Library probe: #22
Gtpbp4	NM_027000.2	69237	TGGGAGATGATTACATTTTGA	GCCTTCCCAAATTTCTGGTAT	Universal Library probe: #95
Igtp	NM_018738	16145	CGGAGAGCTGTGGAGAGAGA	TGCCATGTTTATGAAAAGTGAATA	Universal Library probe: #108
Krt5	NM_027011.2	110308	CCTTCGAAACACCAAGCAC	GTTCTGGAGTTGGCACACT	Universal Library probe: #110
Krt7	NM_033073	110310	GGAGATGGCCAACCACAG	GGCCTGGAGTGTCTCAAACCT	Universal Library probe: #41
Mapk1	NM_011949.3	26413	GACAGAGTACGTAGCCACACGTT	AGCCCAAGACCAATATCAA	Universal Library probe: #50
Mark2	NM_007928.2	13728	GAAAGGGACACGGAGCAG	AGCAGAGGTGGCTGAGTTG	Universal Library probe: #3
Mns1	NM_008613	17427	GAGGCAGAGACCCATCCTG	GCTCAAAGCTCTTTTTGGTC	Universal Library probe: #63
Mylc2b	NM_023402	67938	AGGAGGACCTGCACGACA	GTCCAGGTAGGCATCAGTGG	Universal Library probe: #60
Narf1	NM_026238	67563	GCAAGTACTTCCAAGTGAACCAA	GCAGTCATTCAAGGAGACCT	Universal Library probe: #78
Pa2g4	NM_011119	18813	GGTCGTGACCAAGTATAAGATGG	CAGACACACCTGAGCTGGAA	Universal Library probe: #22
Pcna	NM_011045.2	18538	CTAGCCATGGGCGTGAAC	GAATACTAGTGCTAAGGTGTCTGCAT	Universal Library probe: #41
Pdcd10	NM_019745.2	56426	TGGCAGCTGATGACGTAGAA	TGCCTTTTCATTTAGGTCCTG	Universal Library probe: #21
Pde2a	NM_001008548	207728	TCGGACCTACTGGGAAAAGC	CAGGGGTATGACCAGCACTT	Universal Library probe: #64
Per1	NM_011065	18626	TGGACTTGACACCTCTTCTGTG	TGCTTTAGATCGGCAGTGGT	Universal Library probe: #71
Pfdn5	NM_027044	56612	AGGAGAAGCATGCCATGAAG	AGTGCACTCTCAGGCTTTGAC	Universal Library probe: #100
Pik3ap1	NM_031376	83490	CACGGTCTCTGTGAAAGCAC	CCAGGTCACCAAGATAGACC	Universal Library probe: #91
Psmb8	NM_010724	16913	GTTGGCCAAGGAGTGACAG	CAGCATCATGTTGGAAAGCA	Universal Library probe: #89
Ptpn6	NM_013545.2	15170	TCTGGATGCCACAGTCAATG	GGCCAGTATGGGACACATTT	Universal Library probe: #51
Rcc2	NM_173867	108911	CTATCAGTTGGGTCATCG	AGAAGATGCCATCCAGAGTCTT	Universal Library probe: #79
Rmnd5a	NM_024288	68477	TTCTCCGACAAGGAATGCT	TTGGGTCTACAGACAGACCAGA	Universal Library probe: #73
Specc1	NM_001029936.2	432572	AAATGCCAGGCTGCAGAA	CTCTGGCTCTTCAATCACAGG	Universal Library probe: #33
Stat3	NM_213659.2	20848	AGTCTCGCCTCCTCCAGAC	GCTGCTTCTGTCACTACGG	Universal Library probe: #26
Stk11ip	NM_027886.2	71728	GGTGCCCCAGTTTTTCTACC	AACAGGGACACAGGACAGGT	Universal Library probe: #41
Tmed9	NM_026211	67511	TAAAAGACCCGAGGACAAG	TGTGGGAGGTGAAGGTGAAC	Universal Library probe: #21
Tmod1	NM_021883	21916	CTGGTCGAGCTGAAAATCG	TCTCCATTTCCACTTTGTTGC	Universal Library probe: #21
Top2a	NM_011623	21973	AATGGAAATATGTCGCCAGTG	CCTGTTTATGTATCACCTTCAGTG	Universal Library probe: #48
Tpp1	NM_009906.2	12751	CGGATCCTAGCTCCTCAA	GTCAGGGGTGATGGTTGAA	Universal Library probe: #88
Ubr2	NM_146078.2	224826	CAGCAGCTCTGAAGTTGTGG	TGTAAGTTCTGGCGATCACATC	Universal Library probe: #101