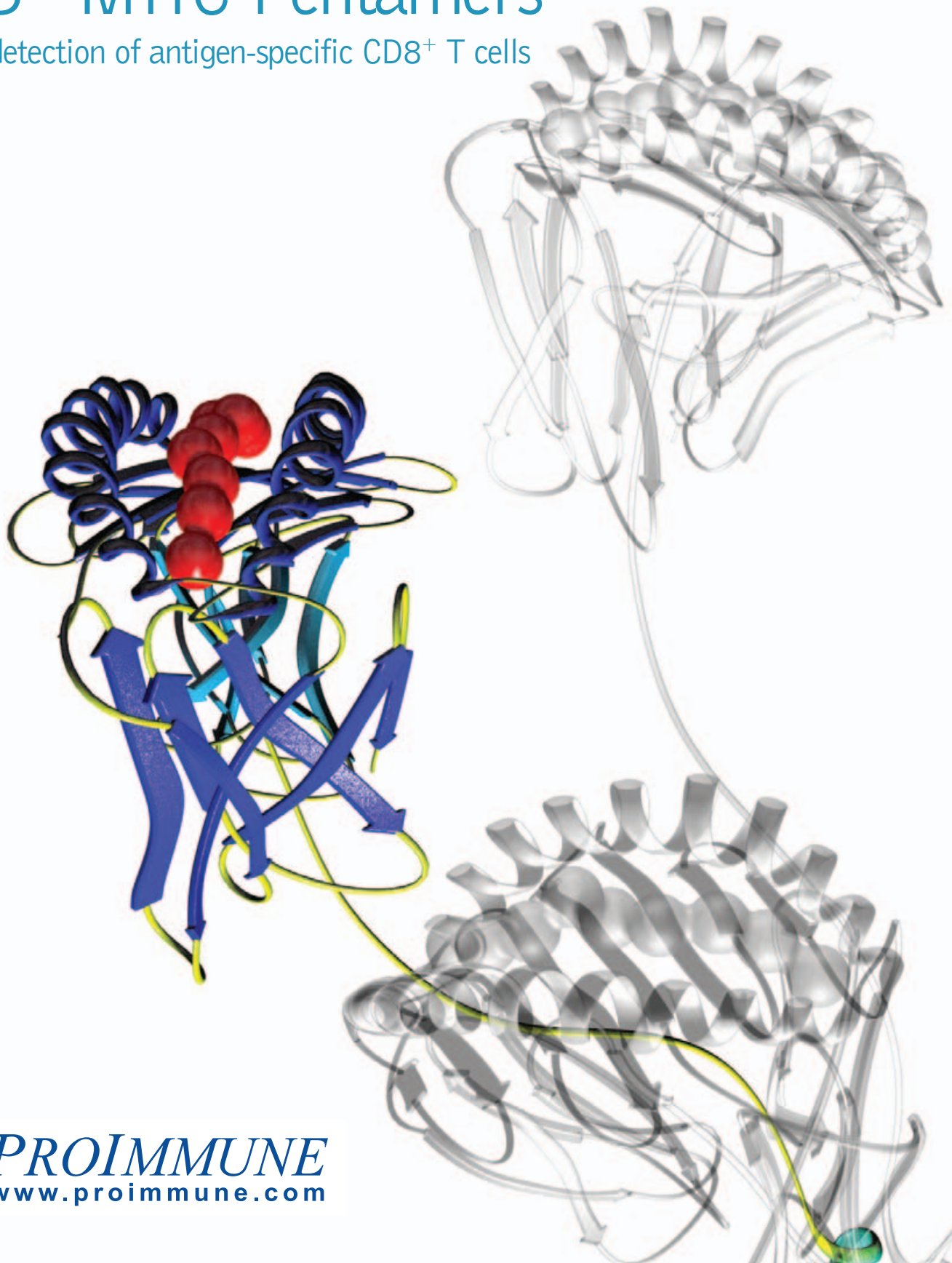
Mastering Immunity

Pro5® MHC Pentamers

for the detection of antigen-specific $CD8^+$ T cells



PROIMMUNE

www.proimmune.com

Pro5® MHC Class I Pentamers

The most consistent technology for detecting antigen-specific T cells

Over 800 publications and 70 new specificities show Pro5® Pentamers are the foremost MHC multimer product

Pro5® MHC Class I Pentamers are a unique, proprietary and proven technology, used by leaders in the fields of immune monitoring, antigen-specific T cell characterization and epitope validation. ProImmune has the fastest growing number of MHC multimer publications of any commercial provider worldwide. There are now over 800 publications citing the use of Pro5® Pentamers, with articles in top impact journals such as Nature, Journal of Immunology, Journal of Experimental Medicine and Blood. Customers rely on our detailed protocols and technical experience to support and enhance their research.

If you are trying to detect a rare population of antigen-specific T cells you will understand the importance of having a research tool that is sensitive, accurate and gives reproducible results. Pro5® Pentamers provide the answer. They bind directly to T cell receptors of a particular specificity, determined by the Major Histocompatibility Complex (MHC) allele and peptide combination. Pentamers can be used to detect and separate antigen-specific $CD8^+$ T cell populations as rare as 0.02% of lymphocytes. They are also suitable for detailed epitope characterization and further immune monitoring.

Unlike tetramers from academic and non-profit sources, which may be of variable quality and stability, Pentamers benefit from a superior design and are made to a professional standard including many stringent quality control steps. Using the Pentamer technology enables you to achieve accurate and reproducible results.

Pro5® Pentamers comprise five MHC-peptide complexes assembled through a coiled-coil domain. Due to their planar configuration, all five MHC-peptide complexes in the Pentamer are available for binding to complementary T cell receptors (TCRs). Each Pentamer also comprises up to five fluorescent or biotin tags for bright and efficient labeling. In contrast, the MHC tetramer technology relies on MHC-peptide complexes held in a tetrahedral complex where due to spatial organization no more than three MHC-peptide complexes are available for TCR-binding.

ProImmune has a large range of MHC class I multimer complexes available. Our product list now numbers over 290, with 100 Pentamers just for detecting cancer epitopes, plus specificities for a wide range of infectious diseases such as Influenza, CMV, Hepatitis B and C, HIV, EBV, model antigens and more. Custom Pentamers are also available.

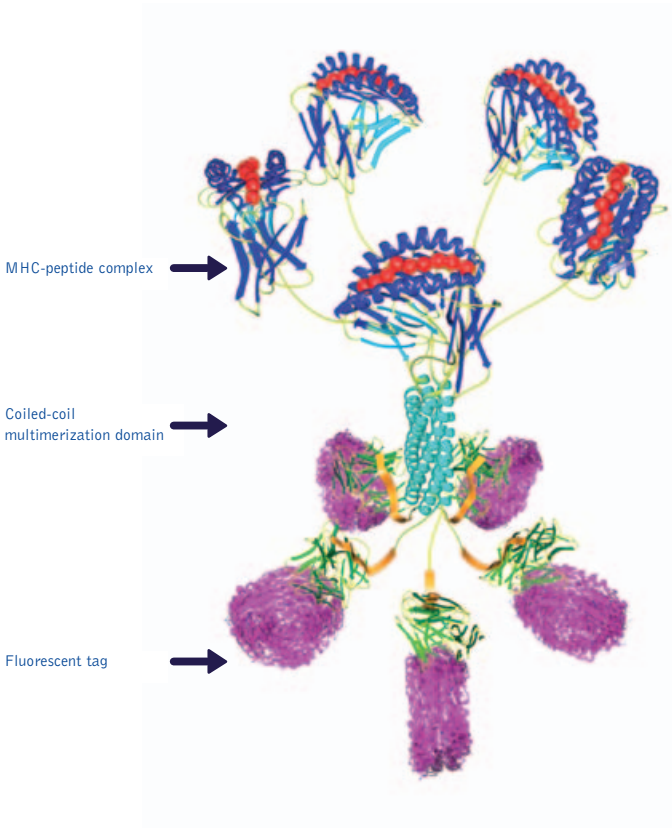
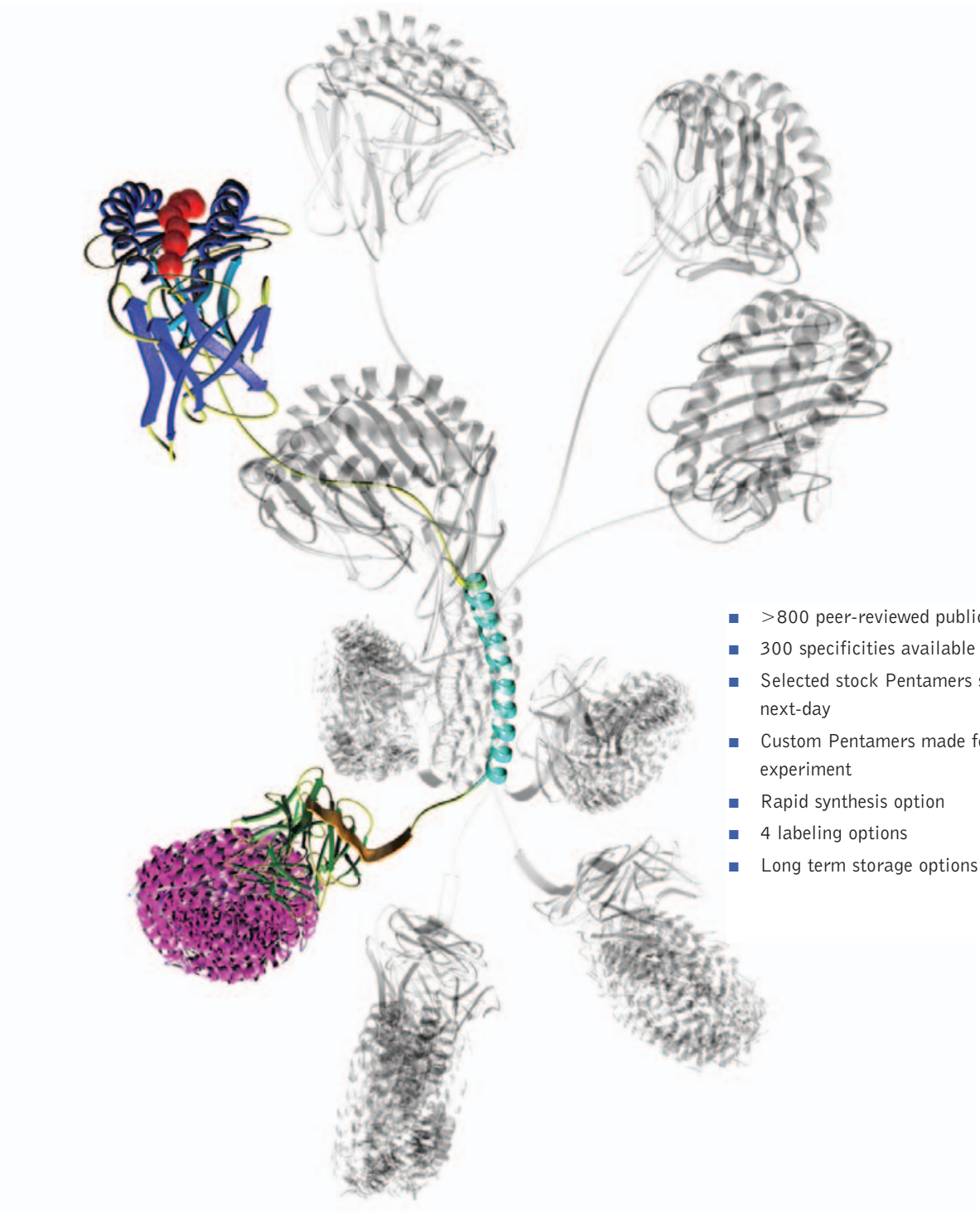


Figure 1: Image of Pro5® MHC Class I Pentamer, showing MHC-peptide complex (red, dark blue), coiled-coil domain (light blue), fluorescent tag (pink).

Pro5® MHC Class I Pentamers

The most consistent technology for the detection of antigen-specific CD8+ T cells



- >800 peer-reviewed publications
- 300 specificities available
- Selected stock Pentamers shipped next-day
- Custom Pentamers made for your experiment
- Rapid synthesis option
- 4 labeling options
- Long term storage options

Figure 2: Pro5® MHC Class I Pentamers contain 5 peptide-MHC complexes for high avidity binding to TCR, linked to 5 fluorescent tags for bright staining.

Pro5® MHC Class I Pentamers

In Detail

Pro5® Pentamers can be used to achieve bright, specific and reproducible staining of antigen-specific T CD8+ cells.

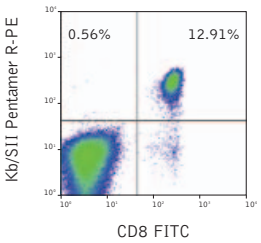


Figure 3: H-2Kb/SIINFEKL (Ovalbumin) Pro5® Pentamer staining of splenocytes from an OT-1 transgenic mouse.

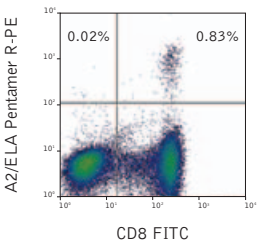


Figure 4: A*02:01/ELAGIGILTV (MelanA/MART-1) Pro5® Pentamer staining of human PBMC.

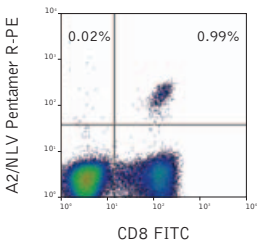


Figure 5: A*02:01/NLVPMVATV (CMV pp65) Pro5® Pentamer staining of human PBMC.

Pentamers can be used to detect and separate antigen specific CD8+ T cell populations as rare as 0.02% of lymphocytes. They are highly suitable for detailed epitope characterization and immune monitoring. Pentamers give excellent batch-to-batch reproducibility due to the quality control processes we operate.

Alongside the option to have your peptide/MHC combination of choice synthesized to order, we offer a catalog range including 100 Pentamers just for detecting cancer epitopes, plus specificities for a wide range of infectious diseases such as Influenza, CMV, Hepatitis B and C,HIV, EBV, model antigens and many more.

Pentamers have the fastest growing number of MHC multimer publications of any commercial provider. There are currently more than 800 publications citing the use of Pro5® Pentamers, with articles in top impact factor journals such as Nature, Science, Journal of Experimental Medicine and Blood.

Pentamer users can rely on our detailed protocols and technical experience to support and enhance their research.

Labeling options

- R-PE
- APC
- Biotin
- Unlabeled (for long-term –80°C storage) +Tag

Applications

- Flow cytometry: identification, phenotypic characterization, and sorting of antigen-specific T cells
- Bead separation
- Intracellular cytokine staining
- Tissue staining

Pro5® MHC Class I Pentamer Specificities

Key:

S = Stock Pentamer, dispatched in 1-2 working days

A = Available Pentamer, may or may not require additional preparation, dispatched in 5-10 working days

Model Antigens

Code	Allele	Sequence	Origin	
908	H-2Kb	KVVRFDKL	Ovalbumin (subdominant) 55-62	A
562	H-2Kb	LTFNYRNL	Histocompatibility antigen 60 39-46	A
093	H-2Kb	SIINFEKL	Ovalbumin 257-264	S
1803	H-2Kb	SIYRYYGL	Synthetic variant of VSV Nucleoprotein 498–505	A
198	H-2Kd	HYLSTQSAL	Enhanced Green Fluorescent Protein (eGFP) 200-208	A
074	H-2Ld	TPHPARIGL	E. coli beta-galactosidase 876-884	S

Negative Control

Code	Allele	Sequence	Origin	
N01	A*02:01	Negative	Negative Control	S

Adenovirus

Code	Allele	Sequence	Origin	
686	A*01:01	TDLGQNLLY	Adenovirus 5 Hexon 886-894	A
684	A*24:02	TYFSLNNKF	Adenovirus 5 Hexon 37-45	A
989	B*07:02	KPYSGTAYNAL	Adenovirus Hexon 114-124	A

Autoimmunity

Code	Allele	Sequence	Origin	
851	A*02:01	HLVEALYLV	Insulin B chain 10-18	A
151	A*02:01	KLQVFLIVL	T1D Diabetes human preproinsulin IAPP 5-13	A
954	A*02:01	LNIDLLWSV	T1D Diabetes IGRP 228–236	A
470	A*02:01	SLSRFSWGA	Myelin basic protein 110-118	A
1904	A*02:01	VLFGLGFAI	T1D Diabetes IGRP 265-273	A
393	A*02:01	VMNILLQYV	GAD65 114-123	A

Cancer

Code	Allele	Sequence	Origin	
307	A*01:01	KSDICTDEY	Tyrosinase 243-251 (244S)	A
2291	A*02:01	AILALLPAL	Prostate Stem Cell Antigen (PSCA) 105-133	A
1920	A*02:01	ALLTSRLRFI	Telomerase Reverse Transcriptase (hTRT) 615-624	A
599	A*02:01	ALDVYNGLL	Prostatic Acid Phosphatase Precursor (PAP) 299-307	A
600	A*02:01	ALFDIESKV	PSM P2 (prostate)	A
086	A*02:01	ALQPGTALL	Prostate Stem Cell Antigen (PSCA) 14-22	S
527	A*02:01	ALYVDSLFFL	PRAME PRA 300–309	A
082	A*02:01	ELAGIGILTV	MelanA / MART-1 26-35	S
2083	A*02:01	FLAEDALNTV	Epithelial Discoidin Domain Receptor 1 (EDDR1) 867-876	A
1013	A*02:01	FLGYLILGV	Prostatic Acid Phosphatase (PAP-3)	A
404	A*02:01	FLTPKKLQCV	Prostate Specific Antigen-1 (PSA-1) 141-150	A
034	A*02:01	FLWGPRALV	MAGEA3 271-279	A
2079	A*02:01	FLYDDNQRV	Topoisomerase II-alpha-b 828-836	A
813	A*02:01	FVGEFFTDV	GPC3 144-152 (overexpressed in hepatocellular carcinoma)	A
1386	A*02:01	GLAPPQHLIRV	p53 187-197	A
1786	A*02:01	GLLGASVLGL	Telomerase Reverse Transcriptase (hTRT) 674-683	A
560	A*02:01	GLMEEMSAL	Human Mena protein (overexpressed in breast cancer)	A
2293	A*02:01	GLQHWVPEL	BA46 (Lactadherin) 97-106	A
389	A*02:01	GLYDGMEHL	MAGEA10 254-262	A
2294	A*02:01	GVRGRVEEI	BCR-ABL	A
125	A*02:01	GVLVGVALI	Carcinogenic Embryonic Antigen (CEA) 694-702	A
249	A*02:01	HLSTAFARV	G250 (renal cell carcinoma) 217-225	A
085	A*02:01	ILAKFLHWL	Telomerase 540-548	S
210	A*02:01	ILHNGAYSL	HER-2/neu 435-443	A
329	A*02:01	ILLWQPIPV	Prostatic Acid Phosphatase (PAP-3) 135-143	A
468	A*02:01	ILSLELMKL	Receptor for hyaluronic acid–mediated motility (RHAMM) 165-173	A
046	A*02:01	IMDQVPFSV	gp100 (pmel17) 209-217	S
2296	A*02:01	ITDQVPFSV	gp100 (pmel) 209-217	A
214	A*02:01	KIFGSLAFL	HER-2/neu 348-356	S
2297	A*02:01	KLCPVQLWV	p53 139-147	A
646	A*02:01	KLFGTSGQKT	EGF-R-479 350-359	A
405	A*02:01	KLQCVDLHV	Prostate Specific Antigen 146-154	A
859	A*02:01	KLQDASAEV	HM1.24-aa 126-134	A
057	A*02:01	KTWGQYWQV	gp100 (pmel17) 154-162	A
2298	A*02:01	KVAEELVHFL	MAGEA3 112-120 (alternative version)	A
302	A*02:01	KVAELVHFL	MAGEA3 112-120	A
171	A*02:01	KVLEYVIKV	MAGEA1 278-286	A
810	A*02:01	LIAHNQVRQV	HER-2/neu 85–94	A
205	A*02:01	LLGRNSFEV	p53 264-272	A
690	A*02:01	LLHETDSAV	PSMA/PSM-P1 4-12	A
208	A*02:01	LLLLTVLTV	MUC-1 12-20	A
381	A*02:01	LLLTVLTVV	Tumor Mucin Antigen 13-21	A
391	A*02:01	LMLGEFLKL	Survivin 96-104	S
1464	A*02:01	LTLGEFLKL	Survivin-3A 96-104	A
338	A*02:01	QLCPICRAPV	Livin/ML-IAP280 175-184	A
212	A*02:01	RLLQETELV	HER-2/neu 689-697	S
1787	A*02:01	RLTSRVKAL	Telomerare Reverse Transcriptase (hTRT) 653-661	A
117	A*02:01	RLVDDFLLV	Telomerase Reverse Transcriptase 865-873	A
654	A*02:01	RMPEAAPPV	p53 65-73	A
1056	A*02:01	SLFLGILSV	CD20 188-196 (B cell malignancies)	A
049	A*02:01	SLLMWITQC	NY-ESO-1 157-165 (9C)	A

Cancer (continued)

Code	Allele	Sequence	Origin	
390	A*02:01	SLLMWITQV	NY-ESO-1 157-165	A
2299	A*02:01	SLPPPGTRV	p53 149-157	A
1181	A*02:01	SLSEKTVLL	CD59 glycoprotein precursor 106-114	A
958	A*02:01	SLVDVMPWL	Cytochrome p450 1B1 239-248	A
915	A*02:01	TLPGYPPHV	PAX-5 311-319	A
561	A*02:01	TMNGSKSPV	Human Mena protein 502-510	A
1403	A*02:01	VIMPCSWWV	Chondromodulin-I 319-327	A
097	A*02:01	VISNDVCAQV	Prostate Specific Antigen-1 (PSA-1) 154-163	A
689	A*02:01	VLAGGFFLL	PSMA 27-38	A
781	A*02:01	VLDGLDVLL	PRAME 100-108	A
250	A*02:01	VLQELNVTV	Leukocyte Proteinase-3 (Wegener's autoantigen) 169-177	S
157	A*02:01	VLYRYGSFSV	gp100 (pmel17) 476-485	A
058	A*02:01	YLEPGPVTA	gp100 (pmel17) 280-288	S
047	A*02:01	YLEPGPVTV	gp100 (pmel) 280-288 (288V)	A
394	A*02:01	YLFFYRKSV	mTERT 572-580	A
2300	A*02:01	YLGSYGFRL	p53 103-111	A
645	A*02:01	YLNTVQPTCV	EGF-R 1138-1147	A
2301	A*02:01	YLQLVFGIEV	MAGEA2 157-166	A
447	A*02:01	YLQVNSLQTV	Telomerase Reverse Transcriptase (hTRT) 988-997	A
048	A*02:01	YLSGADLNL	Carcinoembryonic antigen (CEA)-derived peptide CAP1-6D	A
075	A*02:01	YLSGANLNL	Carcinogenic Embryonic Antigen (CEA) 571-579	S
1201	A*02:01	YMCSFLFNL	Ewing Tumor EZH2 666-674	A
061	A*02:01	YMDGTMSQV	Tyrosinase 369-377 (371D)	A
118	A*03:01	ALLAVGATK	gp100 (pmel17) 17-25	A
264	A*03:01	ATGFKQSSK	bcr-abl 210 kDa fusion protein 259-269	A
087	A*03:01	KQSSKALQR	bcr-abl 210 kDa fusion protein 21-29	S
541	A*03:01	RISTFKNWPK	Survivin-3A 18-27 (27K)	A
230	A*24:02	AFLPWHRLF	Tyrosinase 188-196	A
2302	A*24:02	AYACNTSTL	Survivin 80-88	A
2303	A*24:02	CYASGWGSI	Prostate Specific Antigen-1 153-161	A
416	A*24:02	EYLQLVFGI	MAGEA2 156-164	A
1806	A*24:02	RYCNLEGPPI	Lymphocyte antigen 6 complex locus K (LY6K) 177-186	A
421	A*24:02	TFPDLESEF	MAGEA3 97-105	A
209	A*24:02	TYACFVSNL	Carcinogenic Embryonic Antigen (CEA) 652-660	A
417	A*24:02	TYLPTNASL	HER-2/neu 63-71	A
238	A*24:02	VYFFLPDHL	gp100-intron 4 (170-178)	A
418	A*24:02	VYGFVRACL	Telomerase Reverse Transcriptase (hTRT) 461-469	A
094	B*08:01	GFKQSSKAL	bcr-abl 210 kDa fusion protein 19-27	A
2304	B*07:02	LPWHRLFLL	Tyrosinase 208-216	A
2307	B*35:01	MPFATPMEA	NY-ESO-1 94-102	A
695	H-2Db	Abu-Abu-L-Abu-LTVFL	Moloney murine sarcoma virus (MoMSV) GagL 85–93	A
1103	H-2Db	ATFKNWPFL	Murine Survivin 20-28	A
2199	H-2Db	FSNSTNDILI	VEGFR2/KDR fragment 1 614-624	A
1333	H-2Db	KVPRNQDWL	gp100 (pmel17) 25-33	A
351	H-2Kb	HNTQYCNL	MAGEA5 5-12	A
185	H-2Kb	SVYDFFVWL	Tyrosinase related protein-2 180-188	A
2311	H-2Kb	TVSEFLKL	Murine Survivin 97-104	A
275	H-2Kd	DYWGQGTEL	Surface IgG (sA20-Ig) of A20 106-114	A
814	H-2Kd	EYILSLEEL	GPC3 298-306	A
343	H-2Kd	TYVPANASL	Neu/Her-2/Erbb2 proto-oncoprotein 66-74	A
150	H-2Ld	LPYLGWLVF	Tumor Antigen P815 35-43	A

Chlamydia

Code	Allele	Sequence	Origin	
334	A*02:01	RLNMFTPYI	Chlamydia trachomatis MOMP 258-266	A

Cytomegalovirus (CMV)

Code	Allele	Sequence	Origin	
739	A*01:01	VTEHDTLLY	HCMV pp50 245-253	A
266	A*01:01	YSEHPTFTSQY	HCMV pp65 363-373	A
008	A*02:01	NLVPMVATV	HCMV pp65 495-504	S
1598	A*02:01	VLAELVKQI	HCMV IE1 81-89	A
1599	A*03:01	KLGGALQAK	HCMV IE1 184-192	A
414	A*24:02	QYDPVAALF	HCMV pp65 341-349	A
380	A*24:02	VYALPLKML	HCMV pp65 113-121	A
308	B*07:02	RPHERNGFTVL	HCMV pp65 265-275	A
045	B*07:02	TPRVTGGGAM	HCMV pp65 417-426	S
691	B*08:01	QIKVRVDMV	HCMV IE1 88-96	A
114	B*35:01	IPSINVHHY	HCMV pp65 123-131	A
2313	H-2Db	HGIRNASFI	MCMV m45 985-993	A
278	H-2Dd	AGPPRYSRI	MCMV m164 257-265	A
021	H-2Ld	YPHFMPTNL	MCMV IE1 168-176	S

Epstein-Barr Virus (EBV)

Code	Allele	Sequence	Origin	
042	A*02:01	CLGGLLTMV	EBV LMP-2 426-434	S
2292	A*02:01	FLDKGTYTL	EBV BALF-4 276–284	A
666	A*02:01	FLYALALLL	EBV LMP-2 356-364	A
001	A*02:01	GLCTLVAML	EBV BMLF-1 259-267	S
409	A*02:01	YLLEMLWRL	EBV LMP-1 125-133	A
727	A*03:01	RLRAEAQVK	EBV EBNA-3A 603–611	A
639	A*11:01	ATIGTAMYK	EBV BRLF-1 134-142	A
199	A*11:01	IVTDFSVIK	EBV EBNA-4 416-424	A
508	A*11:01	SSCSSCPLSK	EBV LMP-2 340-349	A
648	A*24:02	PYLFWLAAI	EBV LMP-2 131-139	A
420	A*24:02	TYGPVFMCL	EBV LMP-2 419-427	A
683	A*24:02	TYGPVFMSL	EBV LMP-2 419–427	A
2305	B*07:02	QPRAPIRPI	EBV EBNA-3C 881-889	A
044	B*07:02	RPPIFIRRL	EBV EBNA-3A 247-255	S
073	B*08:01	FLRGRAYGL	EBV EBNA-3A 193-201	S
489	B*08:01	QAKWRLQTL	EBV EBNA-3A 158-166	A
190	B*08:01	RAKFKQLL	EBV BZLF-1 190-197	S
399	B*35:01	EPLPQGQLTAY	EBV BZLF-1 54-64	A
387	B*35:01	HPVGEADYFEY	EBV EBNA-1 407-417	A
692	B*40:01	IEDPPFNSL	EBV LMP-2 200-208	A

Hepatitis B Virus (HBV)

Code	Allele	Sequence	Origin	
032	A*02:01	FLLSLGIHL	HBV Polymerase 573-581	S
027	A*02:01	FLLTRILTI	HBV Envelope 183-191	S
283	A*02:01	FLPSDFFPSI	HBV Core 18-27 (subtype ADR4)	A
023	A*02:01	FLPSDFFPSV	HBV Core antigen 18-27	S
028	A*02:01	GLSPTVWLSV	HBV Surface antigen 185-194	A
031	A*02:01	WLSLLVPFV	HBV Surface antigen 172-181	S
377	A*11:01	YVNVNMGLK	HBV Core antigen 88-96	A
378	A*24:02	EYLVSFGVW	HBV Core 117-125	A
413	A*24:02	KYTSFPWLL	HBV Polymerase 756-764	A
422	H-2Kb	ILSPFLPLL	HBV Surface antigen 208-216	A
1431	H-2Kb	MGLKFRQL	HBV Core 93-100	A
477	H-2Kb	VWLSVIWM	HBV Surface antigen 190-197	A
129	H-2Ld	IPQSLDSWWTSL	HBV Surface antigen 28-39	S

Hepatitis C Virus (HCV)

Code	Allele	Sequence	Origin	
1066	A*01:01	ATDALMTGF	HCV NS3 1436-1444	A
740	A*01:01	ATDALMTGY	HCV NS3 1436-1444	A
037	A*02:01	ALYDVVTKL	HCV NS5b 2594-2602	A
003	A*02:01	CINGVCWTV	HCV NS3 67-75	S
858	A*02:01	CVNGVCWTV	HCV NS3 1073-1081	A
002	A*02:01	DLMGYIPAV	HCV Core 132-140	S
491	A*02:01	DLMGYIPLV	HCV Core 132-140	A
1094	A*02:01	GLQDCTMLV	HCV NS5B 2727-2735	A
242	A*02:01	KLSGLGINAV	HCV NS3 1406-1415	A
040	A*02:01	KLVALGINAV	HCV NS3 1406-1415	S
172	A*02:01	LLFNILGGWV	HCV NS4b 1807-1816	A
036	A*02:01	VLSDFKTWL	HCV NS5a 1987-1995	A
004	A*02:01	YLLPRRGPRL	HCV Core 35-44	A
035	A*03:01	RVCEKMALY	HCV NS5B 2588-2596	S
415	A*24:02	AYSQQTRGL	HCV NS3 25-33	A
845	B*07:02	DPRRRSRNL	HCV Core 111-119	A
742	B*07:02	GPRLGVRAT	HCV Core 41-49	A
721	B*08:01	HSKKKCDEL	HCV NS3 1395-1403	A
942	B*35:01	CPNSSIVY	HCV E1 207-214	A
565	B*35:01	HPNIEEVAL	HCV NS3 1359-1367	A
939	B*40:01	REISVPAEIL	HCV NS5a 2266-2275	A
791	H-2Db	GAVQNEVTL	HCV NS3 1629-1637	A

Human Immunodeficiency Virus (HIV)

Code	Allele	Sequence	Origin	
430	A*02:01	GLADQLIHL	HIV-1 Vif 101-109	A
084	A*02:01	ILKEPVHGV	HIV-1 RT 476-484	S
246	A*02:01	KLTPLCVTL	HIV-1 Env gp120 90-98	A
799	A*02:01	LTFGWCFKL	HIV-1 Nef 137-145	A
010	A*02:01	SLYNTVATL	HIV-1 Gag p17 76-84	S
174	A*02:01	TLNAWVKVV	HIV-1 Gag p24 19-27	A
109	A*03:01	QVPLRPMTYK	HIV-1 Nef 73-82	S
194	A*03:01	RLRPGGKKK	HIV-1 Gag p17 19-27	S
419	A*24:02	RYLKDQQLL	HIV-1 Gag gp41 67-75	A
411	A*24:02	RYPLTFGWCY	HIV-1 Nef 134-143	A
877	B*07:02	GPGHKARVL	HIV gag p24 223–231	A
2306	B*27:05	GRAFVTIGK	HIV-1 gp100 103-111	A
196	B*07:02	IPRRIRQGL	HIV-1 Env gp120 848-856	A
257	B*07:02	TPGPGVRYPL	HIV-1 Nef 128-137	S
193	B*08:01	FLKEKGGL	HIV-1 Nef 90-97	S
195	B*08:01	GEIYKRWII	HIV-1 Gag p24 261-269	A
1072	B*15:01	RLRPGGKKKY	HIV-1 p17 20-29	A
294	B*27:05	KRWIILGLNK	HIV-1 Gag p24 263-272	A
874	B*27:05	KRWIIMGLNK	HIV-1 Gag p24 263-272	A
255	B*35:01	NPDIVIYQY	HIV-1 RT 328-336	A
1211	B*35:01	VPLDEDFRKY	HIV-1 RT 273-282	A
840	B*40:01	KEKGGLEGL	HIV-1 Nef 92-100	A
1684	H-2Dd	IGPGRAFYA	HIV-1 US4 gp120 318-326	A
177	H-2Dd	RGPGRAFVTI	HIV-1 IIIB gp120 318-327	A
176	H-2Kd	AMQMLKETI	HIV-1 Gag p24 199-207	A

Human Papillomavirus (HPV)

Code	Allele	Sequence	Origin	
2312	A*02:01	MLDLQPETT	HPV 16 E7 12-20	A
502A	A*02:01	RAHYNIVTF	HPV 16 E7 49-57	A
095	A*02:01	YMLDLQPETT	HPV 16 E7 11-20	S
2064	A*03:01	KLCLRFLSK	HPV 33 E6 64-72	A
2065	B*07:02	KPTLKEYVL	HPV 33 E7 5-13	A
502H	H-2Db	RAHYNIVTF	HPV 16 E7 49-57	A

Human T-lymphotropic Virus (HTLV)

Code	Allele	Sequence	Origin	
2309	A*02:01	AVLDGLLSL	HTLV bZIP factor 42-50	A
200	A*02:01	LLFGYPVYV	HTLV-1 Tax 11-19	A
1043	A*24:02	SFHSLHLLF	HTLV Tax 301-309	A

Influenza

Code	Allele	Sequence	Origin	
076	A*01:01	CTELKLSDY	Influenza A (PR8) NP 44-52	A
540	A*01:01	VSDGGPNLY	Influenza A PB1 591-599	A
007	A*02:01	GILGFVFTL	Influenza A MP 58-66	S
2295	A*02:01	ILGFVFTLTV	Influenza A MP 59-68	A
077	A*03:01	ILRGSVAHK	Influenza A (PR8) NP 265-274	A
1722	A*11:01	KSMREEYRK	Influenza A MP2 70-78	A
1720	A*11:01	RMVLASTTAK	Influenza A MP1 178-187	A
1513	A*11:01	SIIPSGPLK	Influenza A MP 13-21	A
1743	B*07:02	QPEWFRNVL	Influenza A PB1 329-337	A
1744	B*07:02	SPIVPSFDM	Influenza A NP 473-481	A
463	B*27:05	SRYWAIRTR	Influenza A NP 383-391	A
009	H-2Db	ASNENMDAM	Influenza A (NT60) NP 366-374	S
119	H-2Db	ASNENMETM	Influenza A (PR8) NP 366-374	S
120	H-2Db	SSLENFRAYV	Influenza A (PR8) polymerase acidic protein 224-233	A
240	H-2Kd	IYSTVASSL	Influenza A HA 533-541	A
098	H-2Kd	TYQRTRALV	Influenza A (PR8) NP 147-155	S

Lymphocytic Choriomeningitis Virus (LCMV)

Code	Allele	Sequence	Origin	
2308	A*02:01	ALPHIIDEV	LCMV envelope gp 10-18	A
2310	A*02:01	YLVSIFLHL	LCMV envelope gp 447-455	A
070	H-2Db	FQPQNGQFI	LCMV NP 396-404	S
069	H-2Db	KAVYNFATC	LCMV GP1 33-41	S
186	H-2Db	SGVENPGGYCL	LCMV GP 276-286	A
2076	H-2Kb	ISHNFCNL	LCMV GP 118-125	A

Listeria

Code	Allele	Sequence	Origin	
178	H-2Kd	GYKDGNEYI	Listeria monocytogenes Listeriolysin 91-99	A

Malaria

Code	Allele	Sequence	Origin	
314	A*02:01	YLNKIQNSL	Plasmodium falciparum CSP 334-342	A
376	H-2Kd	SYIPSAEKI	Plasmodium berghei CSP 252-260	A
771	H-2Kd	YYIPHQSSL	Plasmodium falciparum liver stage antigen 1671-1679	A

Minor Histocompatibility Antigen (miHAg)

Code	Allele	Sequence	Origin	
175	A*02:01	FIDSYICQV	miHAg H-Y SMCY 311-319	A
581	A*02:01	RTLDKVLEV	miHAg HA-8	A
473	A*02:01	VLHDDLLEA	Minor Histocompatibility Antigen HA-1 137-145	A
1113	B*07:02	SPSVDKARAEL	miHAg SMCY 1041-1051	A
328	H-2Db	KCSRNRQYL	miHAg SMCY 738-746	A
327	H-2Db	WMHHNMDLI	miHAg UTY 246-254	S

Mycobacterium tuberculosis

Code	Allele	Sequence	Origin	
324	A*02:01	GLPVEYLQV	Mycobacterium bovis antigen 85-A 6-14	A
276	A*02:01	KLIANNTRV	Mycobacterium bovis antigen 85-A 200-208	A
547	H-2Db	AIQGNVTSI	Mycobacterium tuberculosis ESAT-6 17-25	A
764	H-2Kb	IMYNYPAM	Mycobacterium tuberculosis TB10.4 4-11	A
769	H-2Kb	IMYNYPAML	Mycobacterium tuberculosis TB10.4 4-12	A
158	H-2Ld	MPVGGQSSF	Mycobacterium tuberculosis Ag85A 70–78	A

Respiratory Syncytial Virus (RSV)

Code	Allele	Sequence	Origin	
801	A*02:01	KMLKEMGEV	RSV NP 137-145	A
149	H-2Kd	KYKNAVTEL	RSV A strain F protein 85-93	A
154	H-2Kd	SYIGSINNI	RSV M2 82-90	A

Sendai Virus

Code	Allele	Sequence	Origin	
056	H-2Kb	FAPGNYPAL	Sendai virus NP 324-332	S

Simian Immunodeficiency Virus (SIV)

Code	Allele	Sequence	Origin	
1110	Mamu A*01	CTPYDINQM	SIV Gag 181-189	A
1112	Mamu A*02	GSENLKSLY	SIV Gag 71-79	A
1111	Mamu A*02	YTSGPGIRY	SIV Nef 159-167	A

Trypanosoma cruzi

Code	Allele	Sequence	Origin	
708	H-2Kb	ANYNFTLV	Trypanosoma cruzi SP 536-543	A
964	H-2Kb	VNHRFTLV	Trypanosoma cruzi ASP-2 553-560	A

Vaccinia Virus

Code	Allele	Sequence	Origin	
978	A*02:01	ILDDNLYKV	Vaccinia virus Copenhagen protein G5 18-26	A
703	A*02:01	KVDDTFYYV	Vaccinia virus host range protein 2 74-82	A
733	H-2Kb	TSYKFESV	Vaccinia virus WR epitope B8R 20-27	A

Vesicular Stomatitis Virus (VSV)

Code	Allele	Sequence	Origin	
373	H-2Kb	RGYVYQGL	VSV NP 52-59	A
622	H-2Ld	MPYLIDFGL	VSV N 275-283	A

Yellow Fever

Code	Allele	Sequence	Origin	
1182	H-2Kb	ATLTYRML	Yellow Fever virus 17D polyprotein 268-275	A

West Nile Virus

Code	Allele	Sequence	Origin	
1322	A*02:01	ATWAENIQV	West Nile virus NY-99 polyprotein precursor 3390-3398	A
1320	A*02:01	RLDDDGNFQL	West Nile virus NY-99 polyprotein precursor 1452-1461	A
1327	A*02:01	YTMDGEYRL	West Nile virus NY-99 polyprotein precursor 2023-2031	A
663	H-2Db	LGMSNRDFL	West Nile virus polyprotein 294-302	A

Other

Code	Allele	Sequence	Origin	
133	A*02:01	LLDVPTAAV	Interferon gamma inducible protein (GILT) 30 27-35	A
366	A*02:01	LMWYELSKI	KSHV-8 gB 492-500	A
1153	A*02:01	QLFNHTMFI	Non-muscle Myosin 478-486	A
353	A*02:01	RILGAVAKV	Vinculin 822-830	A
1152	A*02:01	VLMIKALEL	Non-muscle Myosin-9 741-749	A
773	A*02:01	VLPLTVAEV	Mesothelin 530–538	A
339	H-2Dk	RRLGRTLLL	Polyoma virus middle T protein 389-397	A
828	H-2Kb	KSPWFTTL	MuLV Env 622-629	A
188	H-2Kb	SSIEFARL	HSV-1 gp B 498-505	A
488	H-2Kb	VVYDFLKL	SV40 T antigen 404-411	A
458	H-2Kd	KYNKANVFL	NRP-V7 superagonist peptide for 8.3 Tg NOD mouse	A
062	H-2Kd	RYLKNGKETL	HLA-Cw3 170-179	A
398	H-2Ld	SPSYVYHQF	MuLV env gp70 423-431	A

HLA-E

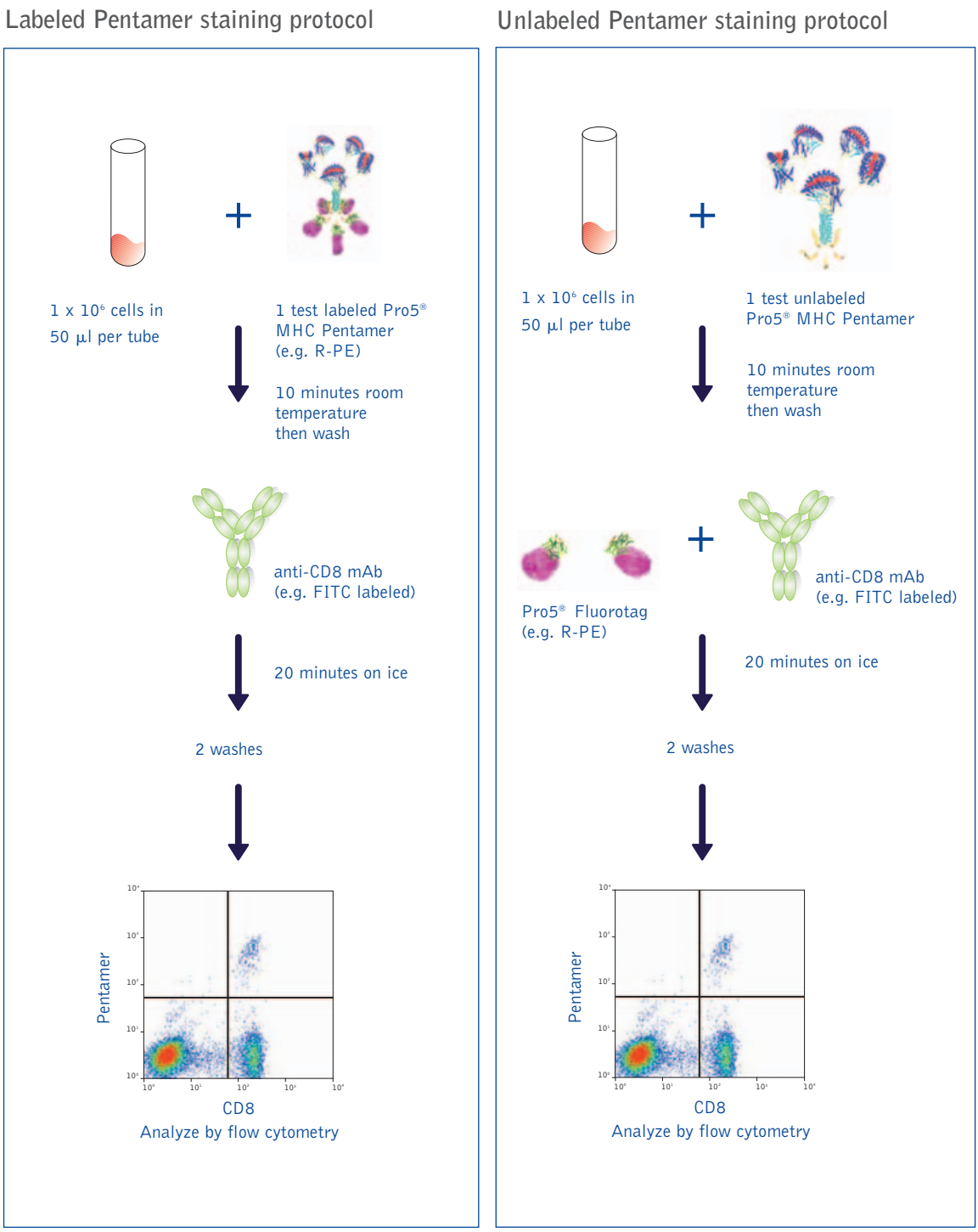
Code	Allele	Sequence	Origin	
712	E*01:01	VMAPRTLIL	HLA-C leader sequence peptide	S

Applications

Pro5® MHC Class I Pentamer Staining

For flow cytometry analysis of antigen-specific $CD8^+$ T cells, for populations as small as 0.02% of lymphocytes. Staining can be combined with staining for other phenotypic markers for detailed investigation.

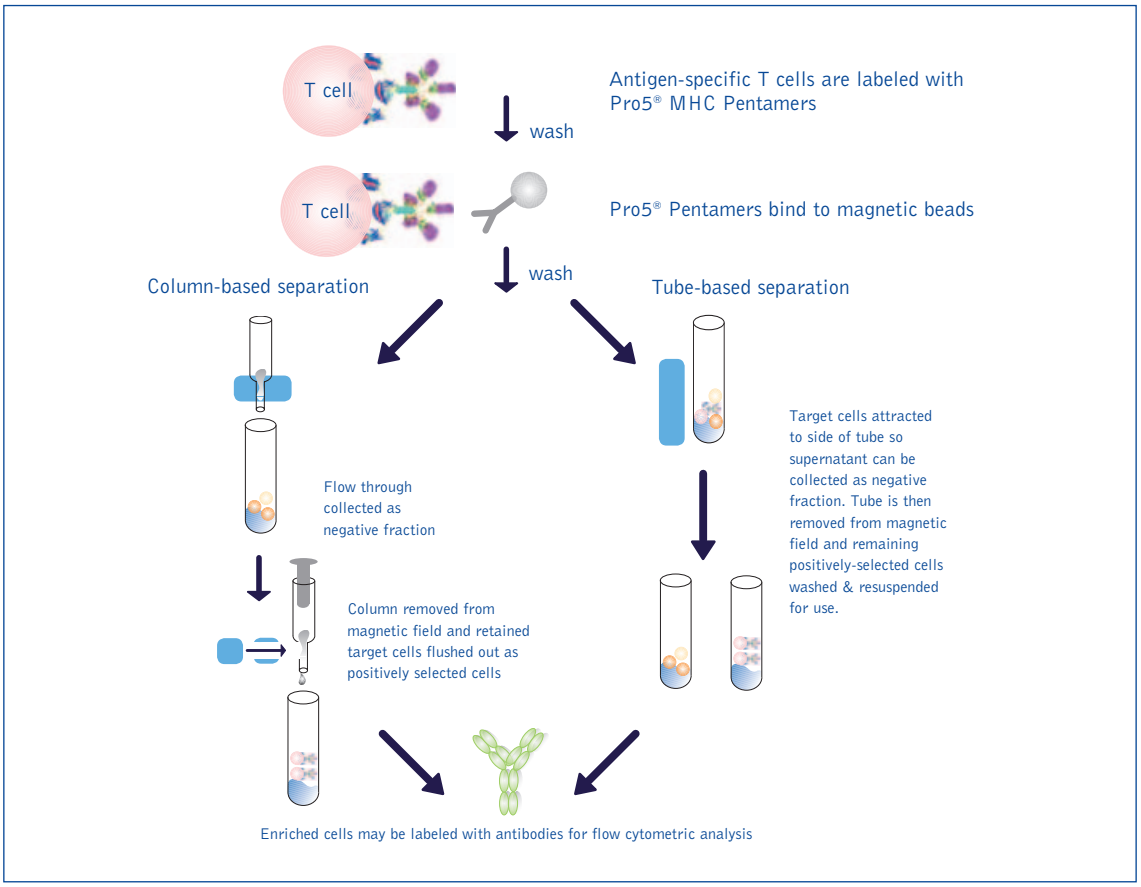
Figure 6



Bead Separation of Antigen-Specific CD8+ T cells

In addition to detecting antigen-specific T cells, Pro5® Pentamers may be used in conjunction with magnetic beads to enrich or deplete the T cell population of interest.

Figure 7



Staining for Pro5® MHC Class I Pentamers and Intracellular Cytokines

Co-staining with Pentamers and for intracellular cytokines may be used to investigate the immune effector function of antigen-specific T cells.

Figure 8

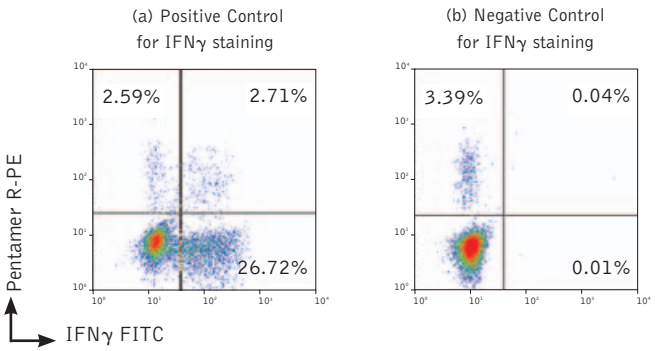


Figure 8: IFNγ versus Pro5® Pentamer staining of live lymphocytes. PBMC were incubated with Pentamer specific for the cells of interest B*08:01/ RAKFKQLL (EBV), then stimulated with PMA and ionomycin (non-specific activation) (a) or rested (b) for 16 hours in the presence of Brefeldin A. Fixation, permeabilization and staining for IFNγ was performed.

How to Order

You can place an order online, or by fax or telephone, by emailing us, or through a distributor if you prefer. For further details please visit

http://www.proimmune.com/ecommerce/page.php?page=Order-Info

Pro5® Catalog and Custom Pentamer Product Codes

Code	Pro5® Pentamer	Code	Pro5® Pentamer & Anti-CD8 Kits
F1A	50 tests Biotin	F81A	50 tests Biotin + anti-CD8 FITC
F1B	150 tests Biotin	F81B	150 tests Biotin + anti-CD8 FITC
F1C	500 tests Biotin	F81C	500 tests Biotin + anti-CD8 FITC
F2A	50 tests R-PE	F82A	50 tests R-PE + anti-CD8 FITC
F2B	150 tests R-PE	F82B	150 tests R-PE + anti-CD8 FITC
F2C	500 tests R-PE	F82C	500 tests R-PE + anti-CD8 FITC
F4A	50 tests APC	F84A	50 tests APC + anti-CD8 FITC
F4B	150 tests APC	F84B	150 tests APC + anti-CD8 FITC
F4C	500 tests APC	F84C	500 tests APC + anti-CD8 FITC
F0A	50 tests unlabeled	F80A	50 tests unlabeled + anti-CD8 FITC
F0B	150 tests unlabeled	F80B	150 tests unlabeled + anti-CD8 FITC
F0C	500 tests unlabeled	F80C	500 tests unlabeled + anti-CD8 FITC

One test of Pro5® Pentamer is sufficient to stain approximately 1-2 x 10^6 PBMC.

Pro5® Fluorotag and Pro5® Biotag Product Codes

The protocols for the use of unlabeled catalog and custom Pro5® Pentamers in flow cytometry require an additional Pro5® Fluorotag (R-PE, APC) or Pro5® Biotag (biotin) molecule. These are available in quantities of 50, 100 or 500 tests.

Code	Label	Code	Label
K1A	50 tests Biotag	K4A	50 tests Fluorotag APC label
K1B	150 tests Biotag	K4B	150 tests Fluorotag APC label
K1C	500 tests Biotag	K4C	500 tests Fluorotag APC label
K2A	50 tests Fluorotag R-PE label		
K2B	150 tests Fluorotag R-PE label		
K2C	500 tests Fluorotag R-PE label		

Matched Peptide Product Codes

ProImmune provides matched peptides for all catalog peptide specificities and custom Pro5® Pentamers. Matched peptides are provided lyophilized in 1 or 2 mg quantity, and at a guaranteed purity of >70% (Immunograde). They are suitable for *in vitro* T cell stimulation experiments and can be purchased at a much-reduced cost compared to a separate standard custom peptide synthesis. Matched peptides are dispatched in less than one week.

Code	Quantity	Purity
P0A	1mg lyophilized peptide	>70% (Immunograde)
P0B	2mg lyophilized peptide	>70% (Immunograde)

More Information

Publications

The publications citing Pro5® Pentamers are all indexed on our website, at
http://www.proimmune.com/ecommerce/page.php?page=Product-Citations

Case Studies

Articles on the research performed by Pentamer users are available to read at
http://www.proimmune.com/ecommerce/page.php?page=casestudies

Technical Questions

Protocols and advice on using Pentamers
http://www.proimmune.com/ecommerce/page.php?page=protocols

Pentamer Handbook

Everything you need to know to plan a successful Pentamer experiment
http://www.proimmune.com/ecommerce/page.php?page=handbook

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