

Supplemental Table S1. HLA haplotypes from lymphoma patients

	HLA class I			HLA class II		
Patient ID	A	B	C	DRB1	DQB1	DPB1
Pt.1	02:01	18:01	03:04	01:01	03:02	02:01
	03:01	40:01	07:01	04:01	05:01	04:01
Pt.2	01:01	08:01	06:02	03:01	02:01	01:01
	30:01	13:02	07:01	07:01	02:02	17:01
Pt.3	01:01	08:01	06:02	03:01	02:01	02:01
		37:01	07:01	15:01	06:02	04:01
Pt.4	01:01	08:01	07:01	03:01	02:01	02:01
				15:01	06:02	14:01
Pt.5	02:01	15:01	03:03	01:01	03:03	04:01
	32:01	51:01	14:02	07:01	05:01	
Pt.6	03:01	07:02	03:04	13:02	06:02	03:01
	11:01	40:01	07:02	15:01	06:04	04:01
Pt.7	02:01	40:01	03:03	07:01	02:02	04:01
	24:02	55:01	03:04	15:01	06:02	04:02

Supplemental Table S2. Synthetic genes used in this study

Gene name	Synthetic DNA sequence	Information amino acid sequence
S2	<p><u>AGA TCT</u> AAC CTG GTA CCA ATG GTA GCT ACA GTG <u>GGT GGT GGT GGT TCT</u> CCG CTC AAG ATG TTG AAT ATT CCG AGC ATT AAC GTC CAC CAT TAC CCA TCT GCT GCG GAG AGA AAA CAT <u>CTC GAG</u></p> <p>Linker</p>	<p>RSNLVPMVATVGGGGSPLKMLNIPSINVHHY PSAAERKHLE</p>
S10	<p><u>AGA TCT</u> AAC CTG GTA CCA ATG GTA GCT ACA GTG <u>GGT GGT GGT GGT TCT</u> CCG CTC AAG ATG TTG AAT ATT CCG AGC ATT AAC GTC CAC CAT TAC CCA TCT GCT GCG GAG AGA AAA CAT <u>GGT GGT GGT GGT TCT</u> AAC CTG GTA CCA ATG GTA GCT ACA GTG <u>GGT</u> <u>GGT GGT GGT TCT</u> CCG CTC AAG ATG TTG AAT ATT CCG AGC ATT AAC GTC CAC CAT TAC CCA TCT GCT GCG GAG AGA AAA CAT <u>GGT GGT GGT TCT</u> AAC CTG GTA CCA ATG GTA GCT ACA GTG <u>GGT GGT GGT GGT TCT</u> CCG CTC AAG ATG TTG AAT ATT CCG AGC ATT AAC GTC CAC CAT TAC CCA TCT GCT GCG GAG AGA AAA CAT <u>GGT GGT GGT</u> <u>GGT TCT</u> AAC CTG GTA CCA ATG GTA GCT ACA GTG <u>GGT GGT GGT GGT TCT</u> CCG CTC AAG ATG TTG AAT ATT CCG AGC ATT AAC GTC CAC CAT TAC CCA TCT GCT GCG GAG AGA AAA CAT <u>GGT GGT GGT GGT TCT</u> AAC CTG GTA CCA ATG GTA GCT ACA GTG <u>GGT</u> <u>GGT GGT GGT TCT</u> CCG CTC AAG ATG TTG AAT ATT CCG AGC ATT AAC GTC CAC CAT TAC CCA TCT GCT GCG GAG AGA AAA CAT <u>CTC GAG</u></p> <p>Linker</p>	<p>RSNLVPMVATVGGGGSPLKMLNIPSINVHHY PSAAERKHGGGGSNLVPMVATVGGGGSPLKM LNIPSINVHHYPSAAERKHGGGGSNLVPMVA TVGGGGSPLKMLNIPSINVHHYPSAAERKHG GGGSNLVPMVATVGGGGSPLKMLNIPSINVH HYPSAAERKHGGGGSNLVPMVATVGGGGSPL KMLNIPSINVHHYPSAAERKHLE</p>
L2	<p><u>AGA TCT</u> CTC GCC CGG AAC CTG GTC CCC ATG GTC GCC ACC GTG CAG GGG CAA <u>GGT</u> <u>GGT GGT GGT TCT</u> TAC GCC CTG CCC CTG AAG ATG CTG AAC ATC CCA TCC ATC AAC GTG CAC CAC TAT CCT TCC GCC GCC GAA CGG AAG CAT CGG CAC CTC <u>CTC GAG</u></p>	<p>RSLARNLVPMVATVQQGGGGSYALPLKMLN IPSINVHHYPSAAERKHRHLE</p>
MITD-WT	<p><u>CTG CAT</u> ATC GTG GGC ATT GTT GCT GGC CTG GCT GTC CTA GCA GTT GTG GTC ATC GGA GCT GTG GTC GCT GCT GTG ATG TGT AGG AGG AAG AGC TCA GGT GGA AAA GGA GGG AGC TAC TCT CAG GCT GCG TGC AGC GAC AGT GCC CAG GGC TCT GAT GTG TCT CTC ACA GCT TGA <u>GGA TCC</u></p>	<p><u>LQ</u>IVGIVAGLAVLAVVVIGAVVAVMCRRKS SGGKGGSYSQAACSDSAQGSDVSLTA</p>
MITD-Y320E	<p><u>CTG CAT</u> ATC GTG GGC ATT GTT GCT GGC CTG GCT GTC CTA GCA GTT GTG GTC ATC GGA GCT GTG GTC GCT GCT GTG ATG TGT AGG AGG AAG AGC TCA GGT GGA AAA GGA GGG AGC GAG TCT CAG GCT GCG TGC AGC GAC AGT GCC CAG GGC TCT GAT GTG TCT CTC ACA GCT TGA <u>GGA TCC</u></p>	<p><u>LQ</u>IVGIVAGLAVLAVVVIGAVVAVMCRRKS SGGKGGSESQAACSDSAQGSDVSLTA</p>

MITD-S335E	<u>CTG CAT</u> ATC GTG GGC ATT GTT GCT GGC CTG GCT GTC CTA GCA GTT GTG GTC ATC GGA GCT GTG GTC GCT GCT GTG ATG TGT AGG AGG AAG AGC TCA GGT GGA AAA GGA GGG AGC TAC TCT CAG GCT GCG TGC AGC GAC AGT GCC CAG GGC TCT GAT GTG GAG CTC ACA GCT TGA <u>GGA TCC</u>	<u>LQIVGIVAGLAVLAVVVIGAVVA</u> AVMCRKRS SGGKGG SY SQAACSDSAQGS DV ELTA
MITD- Y320E/S335E	<u>CTG CAT</u> ATC GTG GGC ATT GTT GCT GGC CTG GCT GTC CTA GCA GTT GTG GTC ATC GGA GCT GTG GTC GCT GCT GTG ATG TGT AGG AGG AAG AGC TCA GGT GGA AAA GGA GGG AGC GAG TCT CAG GCT GCG TGC AGC GAC AGT GCC CAG GGC TCT GAT GTG GAG CTC ACA GCT TGA <u>GGA TCC</u>	<u>LQIVGIVAGLAVLAVVVIGAVVA</u> AVMCRKRS SGGKGG SE SQAACSDSAQGS DV ELTA
NY-ESO-1	atgcaggccgaaggccggggcacagggggttcgacgggcgatgctgatggcccaggaggccctggcattcc tgatggcccagggggcaatgctggcggcccaggagaggcgggtgccacgggcggcagaggtccccggggcg caggggcagcaagggcctcggggccgggaggaggcgccccgcggggtccgcatggcggcgcggttcaggg ctgaatggatgctgcagatgcgggggccagggggccggagagccgcctgcttgagttctacctcgccatgcc tttcgcgacacccatggaagcagagctggcccgcaggagcctggcccaggatgccccaccgcttcccgtgc caggggtgcttctgaaggagttcactgtgtccggcaacatactgactatccgactgactgctgcagaccac cgccaactgcagctctccatcagctcctgtctccagcagctttccctgttgatgtggatcacgcagtgctt tctgcccgtgtttttggctcagcctccctcagggcagaggcgc	MQAEGRGTTGGSTGDADGPGGPGIPDGPGGNA GGPGEAGATGGRGPRGAGAARASGPGGGAPR GPHGGAASGLNGCCRCGARGPESRLLEFYLA MPFATPMEAE LARRSLAQDAPPLVPVGVLLK EFTVSGNILTIRLTAADHRQLQLSISCLQQ LSLLMWITQCFLPVFLAQPPSQRR
LMP2A	accgcaggattcctgatctttctgatgtggcttcgcgcttttcggggtaattaggtgctgtagatattgttg ttattattgtctcaccctcgaatccgaagagcggcctcctacgccttaccggaatactgtaacggctggat tccttatattccttatcggattcgctctgtttggggtcattaggtgctgccggtactgttggtactactgc cttacgctggagtcagaggaacgccccctacaccatacaggaataccgtg	TAGFLIFLIGFALFGVIRCCRYCCYCYCLTLE SEERPPTPYRNTVTAGFLIFLIGFALFGVIR CCRYCCYCYCLTLESEERPPTPYRNTV
TCR CD8- CMV#8	<u>GAATTC</u> AGCGGCCGCACCATGGGCACGAGGCTCTTCTTCTATGTGGCCCTTTGTCTGTCTGTTGGGCAGGACACA GGGATGCTGAAATCACCCAGAGCCCAAGACACAAGATCACAGAGACAGGAAGGCAGGTGACCTTGGCGTGT CACCAGACTTGGAACCACAACAATATGTTCTGGTATCGACAAGACCTGGGACATGGGTGAGGCTGATCCA TTACTCATATGGTGTTCAAGACACTAACAAAGGAGAAGTCTCAGATGGCTACAGTGCTCTTAGATCAAACA CAGAGGACCTCCCCCTCACTCTGGAGTCTGCTGCCTCCTCCAGACATCTGTATATTTCTGCGCCAGCAGC GACCCACCCGAGGAGAAGCTGTTCTTCGGCAGCGGCACCCAGCTGAGCGTGCTGGAGGACCTGAACAAGGT GTTCCACCCGAGGTGCTGTGTTTGAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGG TGTGCCTGGCCACAGGCTTCTTCCCCGACCACGTGGAGCTGAGCTGGTGGGTGAATGGGAAGGAGGTGCAC AGTGGGGTCAGCACGGACCCGAGCCCTCAAGGAGCAGCCCGCCCTCAATGACTCCAGATACTGCCTGAG CAGCCGCCTGAGGGTTTCGGCCACCTTCTGGCAGAACCCCGCAACCACTTCCGCTGTCAAGTCCAGTTCT ACGGGCTCTCGGAGAAATGACGAGTGACCCAGGATAGGGCCAAACCCGTACCCAGATCGTCAGCGCCGAG GCCTGGGGTAGAGCAGACTGTGGCTTTACCTCGGTGTCTTACCAGCAAGGGGTCTGTCTGCCACCATCCT CTATGAGATCCTGCTAGGGAAGGCCACCCTGTATGCTGTGCTGGTCAGCGCCCTTGTGTTGATGGCCATGG TCAAGAGAAAGGATTTCAggaggaggaggagcggcagtggaGTGAACAGACTTTTGATTTTGACCTTCTC <u>AAGTTGGCGGGAGACGTGGAGTCCAAACCCAGGGCCCATGAAGAGGATATTGGGAGCTCTGCTGGGCTCTT</u> <u>GAGTGCCCAAGTTTGTGTGTGAGAGGAATACAAGTGGAGCAGAGTCTCCAGACCTGATTCTCCAGGAGG</u> <u>GAGCCAATTCCACGCTGCGGTGCAATTTTCTGACTCTGTGAACAATTTGCAGTGTTTCATCAAAACCTT</u> <u>TGGGGACAGCTCATCAACCTGTTTTACATTCCCTCAGGGACAAAACAGAATGGAAGATTAAGCGCCACGAC</u> <u>TGTCGCTACGGAACGCTACAGCTTATTGTACATTTCTCTTCCAGACCACAGACTCAGGCGTTTATTCT</u> <u>GCGCCGTGTTGAGGTGGGAGACCAGCGGCAGCAGGCTGACCTTCGGCGAGGGCACCCAGCTGACCGTGAAC</u> <u>CCCGACATCCAGAACCCCGACCCTGCCGTGTACCAGCTGAGAGACTCTAAATCCAGTGACAAGTCTGTCTG</u>	MGTRLFFFYVALCLLWAGHRDAEITQSPRHKI TETGRQVTLACHQTWNHNNMFWRQDLGHGL RLIHYSYGVQDTNKGEVSDGYSVSRNTEDL PLTLESAASSQTSVYFCASSDPTEEKLFFGS GTQLSVLED LNKVFPPEVAVFEPSEAEISHT QKATLVCLATGFFPDHVELSWVWNGKEVHSG VSTDPOPLKEQPALNDSRYCLSSRLRVSATF WQNPRNHFRQVQFYGLSENDEWTQDRAKPV TQIVSAEAWGRADCGFTSVSYQQGVLSATIL YEILLGKATLYAVLVSAVLVLMAMVKRKDFRR RRSGSGVKOTLNFDDLKLKAGDVESNPG PMKR <u>ILGALLGLLSAQVCCVRGIQVEQSPDLILQ</u> <u>EGANSTLRCNFSDSVNNLQWFHQNPNWQOLIN</u> <u>LFYIPSGTKQNGRLSATTVATERYSLYISS</u> <u>SQTTDSGVYFCAVVRWETSGSRLTFGEGTQL</u> <u>TVNPDIQNPDPVYQLRDSKSSDKSVCLFTD</u> <u>FDSQTNVSQKSDSDVYITDKTVLDMRSMDFK</u> <u>SNSAVAWSNKSDFACANAFNNSIIIPEDTFFP</u> <u>SPRESSCDVKLVEKSFETDNLNLFQNLVIGF</u> <u>RILLKLVAGFNLLMTLRLWSS-</u>

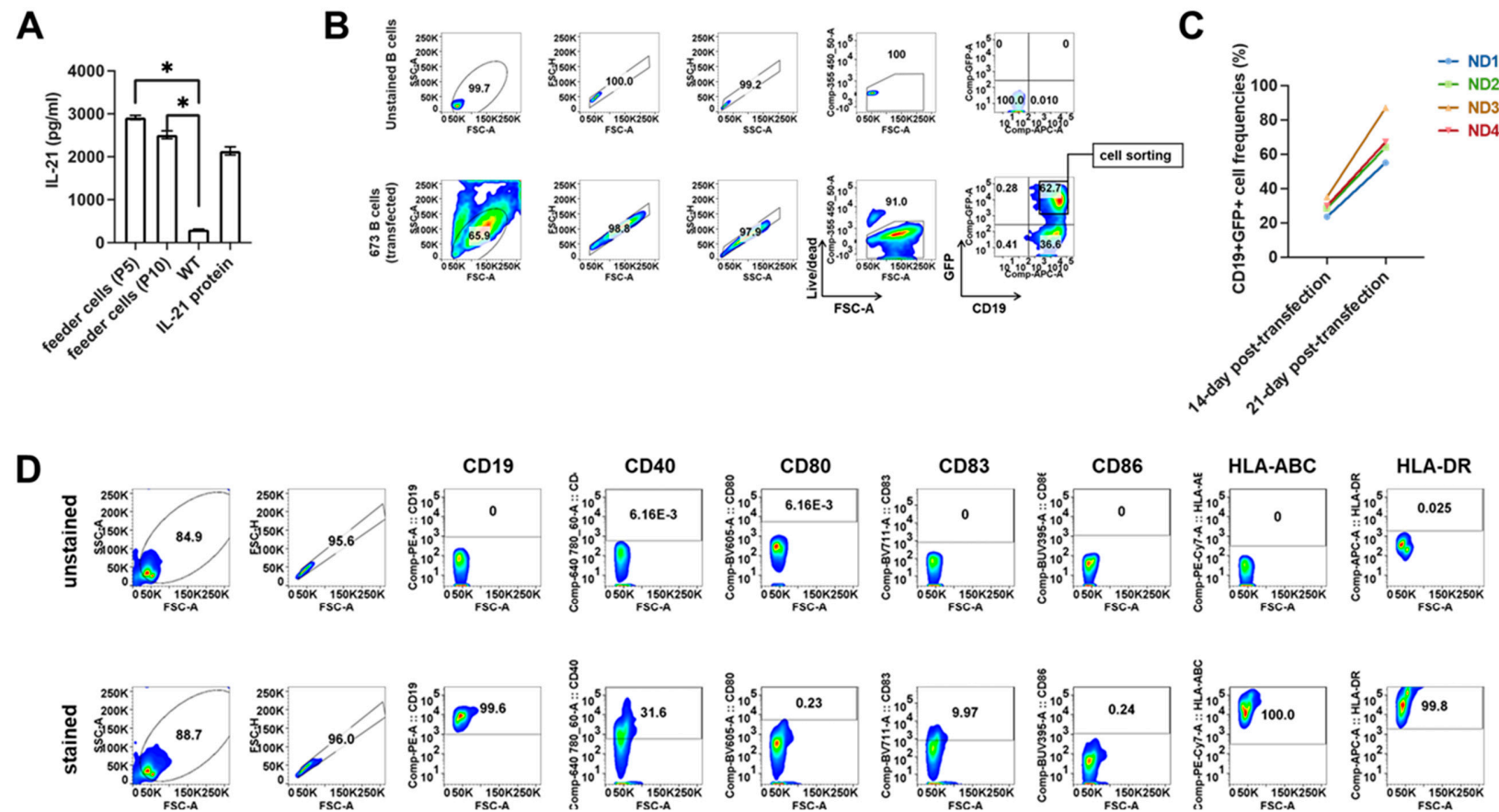
	<p><u>CCTATTACCGATTTTGATCTCTCAAACAAATGTGTACAAAGTAAGGATTCTGATGTGTATATCACAGACA</u> <u>AAACTGTGCTAGACATGAGGTCTATGGACTTCAAGAGCAACAGTGCTGTGGCCTGGAGCAACAAATCTGAC</u> <u>TTTGCATGTGCAAAACGCCTTCAACAAACAGCATTATTCCAGAAGACACCTTCTTCCCCAGCCCAGAAAAGTTC</u> <u>CTGTGATGTCAAGCTGGTCGAGAAAAGCTTTGAAACAGATACGAACCTAAACTTTCAAACCTGTCAGTGA</u> <u>TTGGGTTCCGAATCCTCCTCTGAAAGTGGCCGGGTTAATCTGCTCATGACGCTGCGGCTGTGGTCCAGC</u> <u>tgaTCTAGA</u></p> <ul style="list-style-type: none"> • TCR beta-chain variable region • <i>TCR beta-chain constant region</i> • <u>Linker</u> • <u>2A peptide</u> • <u>TCR alpha-chain variable region</u> • <i>TCR alpha-chain constant region</i> 	
TCR CD4- CMV#1	<p><u>GAATTC</u>AGCGGCCGCACCATGGGCTGCAGGCTCCTCTGCTGTGTGGTCTTCTGCCTCCTCCAAGCAGGTCCTTTGGACACAGCTG TTTCCCAGACTCCAAAATACCTGGTCCACACAGATGGGAAACGACAAGTCCATTAAATGTGAACAAAATCTGGGCCATGATACTAT GTATTGGTATAAACAGGACTCTAAGAAATTTCTGAAGATAATGTTTAGCTACAATAAAGGAGCTCATTATAAATGAAACAGTT CCAAATCGCTTCTACCTAAATCTCCAGACAAAGCTCACTTAAATCTTACATCAATTCCCTGGAGCTTGGTGACTCTGCTGTGT ATTTCTGTGCCAGCAGTCAAGAGAAACGGGGGGCTTTCTTCGGGCCAGGGACACGGCTCACCGTGGTTGAGGACCTGAACAAGGT GTTCCACCCGAGGTCGCTGTGTTTGAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGGTGTGCTTGGCCACA GGCTCTTCCCCGACCACGTGGAGCTGAGCTGGTGGGTGAATGGGAAGGAGGTGCACAGTGGGGTCAGCAGGCCGCCGACCCGACGCCCC TCAAGGAGCAGCCCGCCTCAATGACTCCAGATACTGCCTGAGCAGCCGCTGAGGGTTTCGGCCACCTTCTGGCAGAACCCCG CAACCACTTCCGCTGTCAAGTCCAGTTCTACGGGCTCTCGGAGAAATGACGAGTGGACCCAGGATAGGGCCAAACCCGTCACCCAG ATCGTCAGCGCCGAGGCTGGGGTAGAGCAGACTGTGGCTTTACCTCGGTGTCTACCAGCAAGGGGTCTGTCTGCCACCATCC TCTATGAGATCCTGCTAGGGAAGGCCACCCTGTATGCTGTGTGCTGAGCGCCCTGTGTGTATGGCCATGGTCAAGAGAAAGGA TTTCAGGAGGAGGAGGAGCGGCAGTGGACTCGAGGTGAAACAGACTTTGAATTTTGACCTTCTCAAGTTGGCGGGAGAGCTGGAG <u>TCCAACCCAGGGCCCATGGAGACACTCTTGGGCTGCTTATCCTTTGGCTGCAGCTGCAATGGGTGAGCAGCAACAGGAGGTGA</u> <u>CGCAGATTCTGCAGCTCTGAGTGTCCAGAAGGAGAAAACTTGGTTCTCAACTGCAGTTTCACTGATAGCGCTATTTACAACCT</u> <u>CCAGTGGTTTAGGCAGGACCCTGGGAAAGGACTCACATCTCTGTTGCTTATTCACTGCAAGTCAAGAGAGAGCAACCAAGTGAAGA</u> <u>CTTAATGCCTCGCTGGATAAATCATCAGGACGTAGTACTTTATACATTGCAGCTTCTCAGCCTGGTGACTCAGCCACCTACCTCT</u> <u>GTGCTGTTAAAGACAATGATATGCGTTTGGAGCCGGAACCAGGCTCACTGTAAAACCTAATATCCAGAACCCTGACCTGCGCT</u> <u>ATACCAGCTGAGAGACTCTAAATCCAGTGACAAGTCTGTCTGCCTATTACCGATTGTTGATTCTCAACAAATGTGTCAAAAGT</u> <u>AAGGATTCTGATGTGTATATCACAGACAAAACCTGTGCTAGACATGAGGTCTATGGACTTCAAGAGCAACAGTGTGTGGCCTGGA</u> <u>GCAACAAATCTGACTTTGCATGTGCAAAACGCCTTCAACAAACAGCATTATTCCAGAAGACACCTTCTTCCCCAGCCCAGAAAAGTTC</u> <u>CTGTGATGTCAAGCTGGTCGAGAAAAGCTTTGAAACAGATACGAACCTAAACTTCAAACCTGTTAGTGATTGTGTTGCGAATC</u> <u>CTCCTCCTGAAAGTGTGCGGTTTAATCTGCTCATGACGCTGCGGCTGTGGTCCAGCTGATCTAGA</u></p> <ul style="list-style-type: none"> • TCR beta-chain variable region • <i>TCR beta-chain constant region</i> • <u>2A peptide</u> • <u>TCR alpha-chain variable region</u> • <i>TCR alpha-chain constant region</i> 	<p>MGCRLLCVVFFCLLQAGPLDTAVSQTPKYLV TQMGNDKSIKCEQNLGHDTMYWKQDSKKFL KIMFSYNNKELIINETVPNRFSPKSPDKAHL NLHINSLELGDSAVYFCASSQEKRGAFFGPG TRLTVVEDLNKVFPEVAVFEPSEAEISHTQ KATLVCLATGFFPDHVELSWVNGKEVHSGV STDPQPLKEQPALNDSRYCLSSRLRVSATFW QNPRNHFRQVQFYGLSENDEWTQDRAKPV QIVSAEAWGRADCGFTSVSYQQGVLSATILY EILLGKATLYAVLVSAVLMMVVRKDFRRR RS<u>SGGLEVKOTLNFDDLKLAGDVESNPGPME</u> <u>TLLGLLILWLQLQWVSSKQEVTPQIPAAALSVP</u> <u>EGENLVLNCSFTDSAIYNLQWFRQDPGKGLT</u> <u>SLLLIQSSQREQTSGRNLNASLDKSSGRSTLY</u> <u>IAASQPGDSATYLCVAKDNDMRFGAGTRLTV</u> <u>KPNIQNPDPVYQLRDSKSSDKSVCLFTDFD</u> <u>SQTNVSQSKSDVYITDKTVLDMRSMDFKSN</u> <u>SAVAWSNKSDFACANAFNNSIIPEDTFFPSP</u> <u>ESSCDVKLVEKSFETDTNLFQNLVIVLRI</u> <u>LLLKVVGFNLLMTLRLWSS</u></p>

TCR-NYESO-KFJ05	<p>GAATTCAGCGGCCGCACCATGGGAATCAGGCTCCTGTGCTGTGGCCTTTTGTCTTCTGGCTGTAGGCCTCGTAGATGTGAAAGTAACCCAGAGCTCGAGATATCTAGTCAAAAGGACGGGAGAGAAAGTTTCTGGAATGTGTCCAGGATATGGACCATGAAATATGTTCTGGTATCGACAAGACCCAGGTCTGGGGCTACGGCTGATCTATTTCTCATATGATGTTAAATGAAAGAAAAAGGAGATATTCCTGAGGGGTACAGTGTCTCTAGAGAGAAGAAGGAGCGCTTCTCCTGATTCTGGAGTCCGCCAGCACCAACCAGACATCTATGTACCTCTGCGCGAGCAGCCAGCGCCAGGAAGGCGATACCCAGTATTTTGGCCCCAGGCACCCGGCTGACAGTGTCTCGAGGACCTGAAACAAGGTGTTCCACCCGAGGTGCTGTGTTTGAAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGGTGTGCCTGGCCACAGGCTTCTTCCCCGACCACGTGGAGCTGAGCTGGTGGGTGAATGGGAAGGAGGTGCACAGTGGGGTCAGCACGGACCCCGCAGCCCCCTCAAGGAGCAGCCCGCCTCAATGACTCCAGATACTGCCCTGAGCAGCCGCTGAGGGTTTCGGCCACCTTCTGGCAGAACCCCCGCAACCACCTTCGCTGTCAAGTCCAGTTCTACGGGCTCTCGGAGAATGACGAGTGGACCCAGGATAGGGCCAAACCCGTCACCCAGATCGTCAGCGCCGAGGCTGGGGTAGAGCAGACTGTGGCTTTACCTCGGTGTCTTACCAGCAAGGGGTCTGTCTGCCACCATCTCTATGAGATCCTGCTAGGGAAGGCCACCTGTATGCTGTGCTGGTCAGCGCCTTGTGTTGATGGCCATGGTCAAGAGAAAGGATTTCAAGGAGAGGAGCAGCGGCTGACTCGAGGTGAAACAGACTTTGAATTTTGACCTTCTCAAGTTGGCGGGAGAGCCTGGAGTCCAAACCCAGGGCCCATGAGGCAAGTGGCGAGAGTGCCTGTCTGACCTGAGTACTTTGAGCCTTGCTAAGACCAACAGCCCATCTCCTATGGACTCATATGAAGGACAAGAAGTGAACATAACCTGTAGCCACACAACATTTGCTACAAATGATTATATCACGTGGTACCAACAGTTTCCCCAGCCAAAGGACCCAGTATTATTTATTCGAAGGATACAAGACAAAAGTTACAAACGAAGTGGCCCTCTGTTTATCCCTGCCCAGACAGAAAGTCCAGCACTCTGAGCCTGCCCCGGGTTTCCCTGAGCGACACTGCTGTGTACTACTGCGCTGGTGGCGGAAATTCTGGATAAACTTTAACAAATTTTATTTTGGATCTGGGACCAAACTCAATGTAAAAACCAATATCCAGAACCCCTGACCCCTGCCGTATACCACTGAGAGACTCTAAATCCAGTGACAAGTCTGTCTGCTATTTCACCGATTTTGATTCTCAAAACAAATGTGTACACAAAGTAAGGATTCTGATGTGTATATCACAGACAAAACCTGTGCTAGACATGAGGTCTATGGACTTCAAGAGCAACAGTGTCTGTGGCTGGAGCAACAAATCTGACTTTGCATGTGCAAAACGCCCTTCAACAACAGCATTATTCAGAGAACACCTTCTTCCCCAGCCAGAAAGTTCTGTGATGTCAAGCTGGTCGAGAAAAGCTTTGAAAACAGATACGAACCTAAACTTTCAAAACCTGTTAGTGATTGTGTTCGGAATCCTCCTCTGAAAGTGGTCCGGTTTAAATCTGCTCATGACGCTGCGGCTGTGGTCCAGCTGA</p> <ul style="list-style-type: none"> • TCR beta-chain variable region • TCR beta-chain constant region • <u>2A peptide</u> • <u>TCR alpha-chain variable region</u> • <u>TCR alpha-chain constant region</u> 	<p>MGIRLLCRVAFCF LAVGLVDVKVTQSSRYLV KRTGEKVFL ECVQDMDHENMFWRQDPGLGL RLIYFSYDV KMEKGD IPEGYSVSREKKERF SLILESASTNQ TSMYLCASSQRQEGDTQYFG PGTRLTLVLED LNKVPFPEVAVFEPSEABISH TQKATLVCLATGFFPDHVELSWVNGKEVHS GVSTDPQPLKEQPALNDSRYCLSSRLRVSAT FWQNPRNHFR CQVQFYGLSENDEWTQDRAKP VTQIVSAEAWGRADCGFTSVSYQQGVLSATI LYEILLGKATLYAVLVSALVLMAMVKRKDFR RRRS^GSGLEV KOTLNF^{DL}LKLAGDVESNPGP MRQVARVIVFL TLSTLSLAKTTQPI SMDSYE GQEVNITCSHN NIATNDYITWYQQFPSQGP FI IQGYKTKVTNEVASLFI PADRKSTLSLP RVLSLSDTAVYYCLVGEILDNFNKFYFGSGTK LNVKPNIQNPDP AVYQLRDSKSSDKSVCLFT DFDSQTNVSQSKSDSVYITDKTVLDMRSMDF KSNSAVAWSNK SDFACANAFNNSIIPEDTFF SP^{ESS}CDVKLVEKSFETDTNLNFQNL^LVIV LRILL^LLKVVGFNLLMTLRLWSS</p>
TCR-NYESO-KFJ15	<p>GAATTCAGCGGCCGCACCATGAGCATCGGGCTCCTGTGCTGTGTGGCCTTTTCTCTCTGTGGGCAAGTCCAGTGAATGCTGGTGTACCTCAGACCCCAAATTCAGAGTCTCTGAAGACAGGACAGAGCATGACACTGCAGTGTGCCAGGATATGAACCATAAATCCATGTACTGGTATCGACAAGACCCAGGCTATGGGACTGAGGCTGATTTTATTACTCAGCTTCTGAGGGTACCACTGACAAAGGAGAAGTCCCAATGGCTACAATGTCTCCAGATTAACACAAACGGGAGTTCTCGCTCAGGCTGGAGTCCGGTCTCTCCCTCCCAGACATCTGTGTACTTCTGCGCGAGCCAGACCTTTAGCCCCGGGCCAGACCCAGTTTGGCGCGGCCACCAAGGCTCAGCGTCACAGAGGACCTGAACAAAGGTGTTCCACCCGAGGTGCTGTGTTTGAAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGGTGTGCCTGGCCACAGGCTTCTTCCCCGACCACGTGGAGCTGAGCTGGTGGGTGAATGGGAAGGAGGTGCACAGTGGGGTCAGCACGGACCCCGCAGCCCTCAAGGAGCAGCCCGCCTCAATGACTCCAGATACTGCCCTGAGCAGCCGCTGAGGGTTTCGGCCACCTTCTGGCAGAACCCCGCAACCACTTCCGCTGTCAAGTCCAGTTCTACGGGCTCTCGGAGAATGACGAGTGGACCCAGGATAGGGCCAAACCCGTCACCCAGATCGTCAGCGCCGAGGCTGGGGTAGAGCAGACTGTGGCTTTACCTCGGTGTCTTACCAGCAAGGGGTCCCTGTCTGCCACCATCCTCTATGAGATCCTGCTAGGGAAGGCCACCTGTATGCTGTGCTGGTCAGCGCCTTGTGTTGATGGCCATGGTCAAGAGAAAAGGATTTCAAGGAGGAGGAGCGGCTGACTCGAGGTGAAACAGACTTTGAATTTTGACCTTCTCAAGTTGGCGGGAGACGCTGAGTCCAAACCCAGGGCCCATGGAACCTCTCCTGGGAGTGTCTTTGGTGATTCTATGGCTTCAACTGGCTAGGGTGAACAGTCAACAGGGAGAAGAGGATCCTCAGGCCTTGAGCATCCAGGAGGGTGAATGCCACCATGAATGCAGTTACAAAACCTAGTATAAACAAATTACAGTGGTATAGACAAATTCAGGTAGAGGCTTGTCCACCTAATTTTAAATACGTTCAAATGAAAGAGAGAAACAGTGGAGAATTAAGAGTCACGCTTGACACTTCCAAGAAAAGCAGTTCCTTGTGATCAGCGCTTCCGGGACAGCAGACACTGCTTCTTACTCTGTGCGCAGCCGCAACGATTATAAACTGAGCTTTGGAGCCGGAACACAGTAAGTGAAGAGCAAAATATCCAGAACCTGACCCTGCCGTATACCACTGAGAGACTCTAAATCCAGTGACAAGTCTGTCTGCTATTTCACCGATTTTGATTCTCAAAACAAATGTGTCAAAAGTAAGGATTTCTGATGTGTATATCACAGACAAAACCTGTGCTAGACATGAGGTCTAAGGACTTCAAGAGCAACAGTGTCTGGCCTGGAGCAACAAATCTGACTTTGCATGTGCAAAACGCCCTTCAACAACAGCATTATTCAGAGAACACCTTCTTCCCCAGCCAGAAAGTTTCTGTGATGTCAAGCTGGTCGAGAAAAGCTTTGAAAACAGATACGAACCTAAACTTTCAAAACCTGTTAGTGATTGTGTGGAATCCTCCTCTGAAAGTGGTCCGGTTTAAATCTGCTCATGACGCTGCGGCTGTGGTCCAGCTGA</p> <ul style="list-style-type: none"> • TCR beta-chain variable region • TCR beta-chain constant region 	<p>MSIGLLCCVAFSLLWASPVNAGVTQTPKFQV LKTGQSM TLQCAQDMNHNSMYWYRQDPGMGL RLIYYSASEG TTDKGEVPNGYNVSR LNKREF SLRLES AAPSQTSVYFCASQTFSPGQTQFGP GTRLTVTED LNKVPFPEVAVFEPSEAEISHT QKATLVCLATGFFPDHVELSWVNGKEVHSG VSTDPQPLKEQPALNDSRYCLSSRLRVSATF WQNPRNHFR CQVQFYGLSENDEWTQDRAKPV TQIVSAEAWGRADCGFTSVSYQQGVLSATIL YEILLGKATLYAVLVSALVLMAMVKRKDFRR RRRS^GSGLEV KOTLNF^{DL}LKLAGDVESNPGPM ETLGLVSLVILWLQLARVNSQQGEEDPQALS IQEGENATMNC SYKTSINN^LLQWYRQNSGRGL VHLILIRSNEREK HSGRLRVTLDTSKKSSSL LITASRAADTASYFCATGNDYKLSFGAGTTV TVRANI QNPDP AVYQLRDSKSSDKSVCLFTD FDSQTNVSQSKSDSVYITDKTVLDMRSMDFK SNSAVAWSNK SDFACANAFNNSIIPEDTFFP SP^{ESS}CDVKLVEKSFETDTNLNFQNL^LVIVL RIILL^LLKVVGFNLLMTLRLWSS</p>

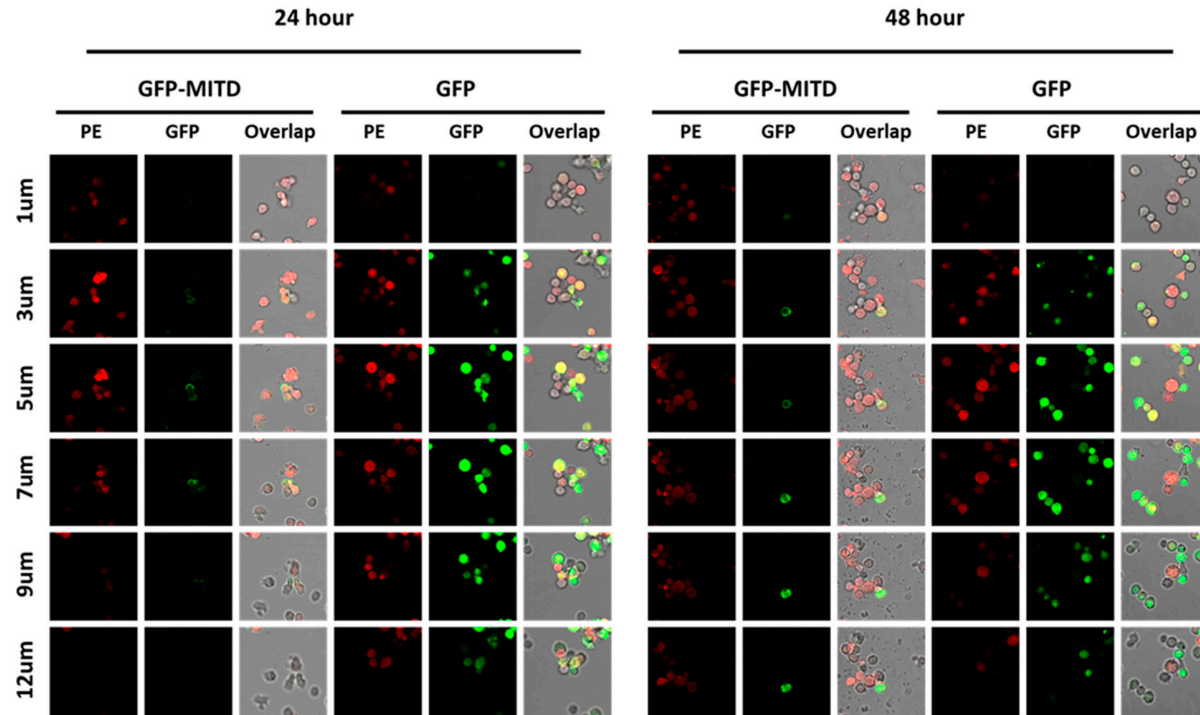
	<ul style="list-style-type: none"> • <u>2A peptide</u> • <u>TCR alpha-chain variable region</u> • <u>TCR alpha-chain constant region</u> 	
TCR-NYESO-KFJ37	<p>GAATTTCAGCGGCCGCACCATTGGGCTTCAGGCTCCTGCTGTGTGGCCTTTTGTCTCCTGGGAGCAGGCCCAGTGGAATTCTGGAGTCACACAACCCCAAAGCAGCTGATCACAGCAACTGGACAGCGAGTGACGCTGAGATGCTCCCCCTAGGTCTGGAGACCTCTCTGTGTACTGGTACCAACAGAGCCTGGACCAGGGCCTCCAGTTCCTCATTCAGTATTATAATGGAGAAGAGAGAGCAAAAGGAAACATTCTTGAAACGATTCTCCGCACAACAGTTCCTTGACTTGCAGCTCTGAACTAAACCTGAGCTCTCTGGAGCTGGGGGACTCAGCTTTGTATTTCTGCGCGAGCAGCGCGGCCATACCGGCAGCAACGAACAGTTTTTTGGGCCAGGGACACGGCTCACCGTGCTAGAGGACCTGAACAAGGTGTTCCCAACCGAGGTCGCTGTGTTTGGAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGGTGTGCTGGGCCACAGGCTTCTTCCCGACCAAGTGGAGCTGAGCTGGTGGGTGAATGGGAAGGAGGTGCACAGTGGGGTCAGCACGGACCCGACAGCCCCTCAAGGAGCAGCCCGCCCTCAATGACTCCAGATACTGCCTGAGCAGCCGCTGAGGGTTTCGGCCACCTTCTGGCAGAAACCCCGCAACCACTTCCGCTGTCAAGTCCAGTTCACGGGCTCTCGGAGAATGACGAGTGGACCCAGGATAGGGCCAAACCCGTACCCAGATCGTCAGCGCCGAGGCTGGGGTAGAGCAGACTGTGGCTTACCTCGGTGTCTACAGCAAGGGGTCTGTCTGCCACCATCTCTATGAGATCCTGCTAGGGAAGGCCACCTGTATGCTGTGCTGGTCAGCGCCCTTGTTGTATGGCCATGGTCAAAGAAAGGATTTCAGGAGGAGGAGCGGCAGTGGACTCGAGGTGAAACAGACTTTGAATTTTGACCTTCTCAAGTTGGCGGGAGACGCTGGAGTCCAACCCAGGGCCCATGAGGCAAGTGGCGAGAGTGATCGTGTCTCGACCTGAGTACTTTGAGCCTTGCTAAGACACCCAGCCCATCTCCATGGACTCATATGAAGGACAAGAAGTGAACATAACCTGTAGCCACAACAACATTGCTACAAATGATTAATACACGCTGGTACCAACAGTTTCCAGCCAGGACACAGATTATTTATTCAGAAGATACAAGACAAAAGTTACAACAGGAAGTGCCCTCCCTGTTTTATCCCTGCCAGAGAAAGTCCAGACTCTGAGGCTGCCCGGTTTCCCTGAGCCAGCACTGTGTGTACTACTGCCCTGGTGGTGATCAGAAACTGGTGTGGAACTGGCACCCGACTTCTGGTCAGTCCAATATCCAGAACCCTGACCTCGCCGTATACCAGCTGAGAGACTCTAAATCCAGTGACAAGTCTGTCTGCCTATTACCGATTCTGATTCTCAAACAATGTGTACAAAGTAAGGATTCTGATGTGTATATCACAGACAAAACCTGTGTAGACATGAGGTCATGAGACTTCAAGAGCAACAGTGTGTGGCTGGGAGCAACAAATCTGACTTTGTCATGTGCAAAACGCCCTTCAACAACAGCATTATTCAGAAGACACCTTCTTCCCGCAGCCAGAAAGTTCTGTGATGTCAAGCTGGTGCAGAAAAGCTTTGAAACAGATACGAACCTTAACTTTCAAACCTGTTAGTGATTGTGTTGCGAATCTCTCTCCTGAAAGTGGTGGGTTAATCTGCTCATGACGCTGCGGCTGTGGTCCAGCTGA</p> <ul style="list-style-type: none"> • <u>TCR beta-chain variable region</u> • <u>TCR beta-chain constant region</u> • <u>2A peptide</u> • <u>TCR alpha-chain variable region</u> • <u>TCR alpha-chain constant region</u> 	<p>MGFRLCCVAFCLLGAGPVDSGVTQTPKHLITATGQRVTLRCSPRSGDLSVYWYQQSLDQGLQFLIQYYNGEERAKGNILERFSAQQFPDLHS ELNLSLELGDSSALYFCASSGGHTGSNEQFFGPGTRLTVLEDLNKVFPPPEVAVFEPSEAEISH TQKATLVCLATGFFPDHVELSWVNGKEVHSGVSTDPQPLKEQPALNDSRYCLSSRLRVSATFWQNPRNHFRQVQFYGLSENDEWTQDRAK PVTQIVSAEAWGRADCGFTSVSYQQGVLSAT ILYEILLGKATLYAVLVSALVLMAMVKRDF RRRRSGSGLEVKQTLNFDLLKLAGDVESNPG PMRQVARVIVFLTLSTLSLAKTTQPI SMDSY EGQEVNITCSHNNIATNDYITWYQQFPSQGP RFI IQGYKTKVTNEVASLFI PADRKSSSTLSL PRVLSLDTAVYYCLVVDQKL VFGTGT RLLVS PNIONPDPAVYQLRDSKSSDKSVCLFTDFDS QTNVSQSKSDVYITDKTVLDMRSMDFKSNS AVAWSNKSDFACANAFNNSIIPEDTFEPSPE SSCDVKLVKESFETDTNLFQNL LVLRLIL LLKVVGFNLLMTLRLWSS</p>
TCR-LMP2A-C1	<p>GAATTTCAGCGGCCGCACCATTGAGCCTCGGGCTCCTGTGCTGTGGGGTCTTTTCTCTCCTGTGGGCAGGTCCAGTGAATGCTGGTGTCACCTCAGACCCCAAATTCGGGCTCCTGAAGACAGGACAGAGCATGACACTGCTGTGTGCCAGGATATGAACCATGAATACATGTACTGGTATCGACAAGACCCAGGCATGGGGCTGAGGCTGATTCATTACTCAGTTGGTGAGGGTACAACCTGCCAAAGGAGAGGTCCTGATGGCTACAATGTCTCCAGATTAAAAAAACAGAATTTCTGCTGGGGTTGGAGTCCGGTCTCCCTCCCAACATCTGTGTACTTCTGCGCGAGCAGCCCGGAAGGCGTGTTTAAACGAACAGTTTTTCGGGCCAGGGACACGGCTCACCGTGCTAGAGGACCTGAA CAAGGTGTTCCCAACCGAGGTCGCTGTGTTTGGAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGGTGTGCGCTGCCACAGGCTTCTTCCCGACCAAGTGGAGCTGAGCTGGTGGGTGAATGGGAAGGAGGTGCACAGTGGGGTCAGCACGGACCCGCGAGCCCTCAAGGAGCAGCCCGCCCTCAATGACTCCAGATACTGCCTGAGCAGCCGCTGAGGGTTTCGGCCACCTTCTGGCAGAA CCCCCGCAACCACTTCCGCTGTCAAGTCCAGTTCACGGGCTCTCGGAGAATGACGAGTGGACCCAGGATAGGGCCAAACCCGCTACCCAGATCGTCAGCGCCGAGGCTGGGGTAGAGCAGACTGTGGCTTTACCTCGGTGTCTACAGCAAGGGGTCTGTCTGCCA CCATCCTCTATGAGATCCTGCTAGGGAAGGCCACCTGTATGCTGTGCTGGTCAGCGCCCTTGTTGTATGGCCATGGTCAAGAGAAAGGATTTCAGGAGGAGGAGGCGGCAGTGGACTCGAGGTGAAACAGACTTTGAATTTTGACCTTCTCAAGTTGGCGGGAGAGC GTGGAGTCCAACCCAGGGGCCATGGAGACTCTCTGAAAAGTGTCTTCAGGCACCTTGTTGTGGCAGTTGACCTGGGTGAGAAGCC AACAACCAAGTGCAGAGTCTCAAGCCGTGATCTCCGAGAAGGGGAAGATGCTGTGATCAACTGCAGTTCCTCCAAGGCTTTATA TTCTGTACTCTGGTACAGGCAGAAAGCATGGTGAAGCACCCGCTCTCTCTGATGATATTAAGTGAAGGGTGGAGAAACAGAAAGGTCAT GAATAATATCTGCTTCATTATAATGAAAAAAGCAGCAAGAGTCTCCTGTACCTTACGGCCTCCAGCTCAGTTACTCAGGAACCT ACTTCTGCGGCACCGGCAGCGCGCGCGGATGGCTGACCTTTGGCAAGGGGACTCATCTAATCATCAGCCCTATATCCAGAACCCCTGACCTTGCCGTATACCAAGCTGAGAGACTCTAAATCCAGTGACAAGTCTGTCTGCCTATTACCGATTCTGATTCTCAA ACAATGTGTCAAAAGTAAGGATTCTGATGTGTATATCACAGACAAAACCTGTGTAGACATGAGGTCATGGACTTCAAGAGCA ACAGTGTGTGGCTGGAGCAACAAATCTGACTTTGTCATGTGCAAAACGCCCTTCAACAACAGCATTATTCAGAAGACACCTTCT CCCCAGCCAGAAAGTTCTGTGATGTCAAGCTGGTCAGAAAAGCTTTGAAACAGATACGAACCTTAACTTTCAAACCTGTTA</p>	<p>MSLGLCCGVFSLWAGPVNAGVTQTPKFRV LKTGQSMTLLCAQDMNHEMYWYRQDPGMGL RLIHYSVGEETTAKGEVPDGYNVSRLLKQNF LLGLESAAPSQTSVYFCASSPEGVFNEQFFG PGTRLTVLEDLNKVFPPPEVAVFEPSEAEISH TQKATLVCLATGFFPDHVELSWVNGKEVHS GVSTDPQPLKEQPALNDSRYCLSSRLRVSAT FWQNPRNHFRQVQFYGLSENDEWTQDRAKP VTQIVSAEAWGRADCGFTSVSYQQGVLSATI LYEILLGKATLYAVLVSALVLMAMVKRDFR RRRRSGSGLEVKQTLNFDLLKLAGDVESNPGP METLLKVLSGTLWQLTWVRSQQPVQSPQAV ILREGEDAVINCSSSKALYSVHWYRQKHGEA PVFLMILLKGGEQKGHEKISASFNEKKQSS LYLTASQLSYSGTYFCGTGSGGGADGLTFGK GTHLIIQPYIQNPDPNAVYQLRDSKSSDKSVC LFTDFDSQTNVSQSKSDVYITDKTVLDMRS MDFKSNSAVAWSNKSDFACANAFNNSIIPED</p>

	<p><u>GTGATTGTGTTGCGAATCCTCCTCTGAAAGTGCTCGGGTTTAAATCTGCTCATGACGCTGCGGCTGTGGTCCAGCTGA</u></p> <ul style="list-style-type: none"> • TCR beta-chain variable region • <i>TCR beta-chain constant region</i> • <u>2A peptide</u> • TCR alpha-chain variable region • <i>TCR alpha-chain constant region</i> 	<p><u>TFPSPRESSCDVKLVEKSFETDTNLFQNL</u> <u>VIVLRILLKVVGFNLLMTLRLWSS</u></p>
TCR-LMP2A-C2	<p><u>GAATTCAGCGGCCGCACCATGAGCCTCGGGCTCCTGTGCTGTGGGGTCTTTTCTCTCCTGTGGGCAGGTCCAGTGAATGCTGGT</u> <u>GTCACCTCAGACCCCAAATTCGGGGTCTGAAGACAGGACAGAGCATGACACTGCTGTGTGCCAGGATATGAACCATGAATACA</u> <u>TGTACTGGTATCGACAAGACCCAGGCATGGGGCTGAGGCTGATTCACTACTCAGTTGGTGAGGGTACAAC TGCCAAAGGAGAGGT</u> <u>CCCTGATGGCTACAATGTCTCCAGATTAAAAAACAGAATTTCTCTGCTGGGGTTGGAGTCGGCTGCTCCCTCCCAAAACATCTGTG</u> <u>TACTTCTGCGCGAGCAGCTATGGCATTATGAACAGTTTTTCGGGCCAGGGACACGGCTCACCGTGCTAGAGGACCTGAACAAGG</u> <u>TGTTCCCAACCCGAGGTCGCTGTGTTTGAGCCATCAGAAGCAGAGATCTCCACACCCAAAAGGCCACACTGGTGTGCCTGGCCAC</u> <u>AGGCTTCTTCCCGACACGTGGAGCTGAGCTGGTGGTGAAATGGAAGGAGGTGCACAGTGGGGTCAGCACGGACCCGCAGCCCC</u> <u>CTCAAGGAGCAGCCCGCCCTCAATGACTCCAGATACTGCCTGAGCAGCCGCTGAGGGTTTCGGCCACCTTCTGGCAGAACCCCC</u> <u>GCAACCACTTCCGCTGTCAAGTCCAGTTCTACGGGCTCTCGGAGAATGACGAGTGGACCCAGGATAGGGCCAAACCCGTCAACCA</u> <u>GATCGTCAGCGCCGAGGCCCTGGGGTAGAGCAGACTGTGGCTTTACCTCGGTGTCCTACCAGCAAGGGGTCTGTCTGCCACCATC</u> <u>CTCTATGAGATCCTGTAGGGAAGGCCACCTGTATGCTGTGCTGGTCAGCGCCCTTGTGTTGATGGCCATGGTCAAGAGAAAGG</u> <u>ATTTCAAGGAGGAGGAGCGGCAGTGGACTCGAGGTGAAACAGACTTTGAATTTTGACCTTCTCAAGTTGGCGGGAGACGTGGA</u> <u>GTCCAAACCCAGGGCCCATGGAGACTCTCCTGAAAGTGCTTTTCAGGCACCTTGTGTGGCAGTTGACCTGGGTGAGAAGCCAACAA</u> <u>CCAGTGCAGAGTCTCAAGCCGTGATCCTCCGAGAAGGGGAAGATGCTGTCACTCAACTGCAGTTCCTCCAAGGCTTTATATTCTG</u> <u>TACACTGGTACAGGCAGAAGCATGGTGAAGCACCCGTCTTCTGATGATATTACTGAAGGGTGAGAAACAGAAGGGTCATGAAAA</u> <u>AATATCTGCTTCATTTAATGAAAAAAGCAGCAAGCTCCCTGTACCTTACGGCCTCCAGCTCAGTTACTCAGGAACCTACTTTC</u> <u>TGCGGCACCGAAGATGGCCGCGCGCGCGGATGGCCTGACCTTTGGCAAAGGACATCATCTAATCATCCAGCCCTATATCCAGA</u> <u>ACCCTGACCCTGCCGTATACAGCTGAGAGACTCTAATCCAGTGACAAGTCTGTCTGCCTATTACCCGATTTTGATTCTCAAAC</u> <u>AAATGTGTCACAAAGTAAGGATTCTGATGTGTATATCACAGACAAAACGTGCTAGACATGAGGTCTATGGACTTCAAGAGCAAC</u> <u>AGTGTGTGGCCTGGAGCAACAAATCTGACTTTGCATGTGCAACGCCTTCAACAACAGCATTATCCAGAAGACACCTTCTTCC</u> <u>CCAGCCAGAAAGTTCTGTGATGTCAAGCTGGTCGAGAAAAGCTTTGAAACAGATACGAACCTAAACTTTCAAAACCTGTTAGT</u> <u>GATTGTGTGCGAATCCTCCTCTGAAAGTGCTCGGGTTTAAATCTGCTCATGACGCTGCGGCTGTGGTCCAGCTGA</u></p> <ul style="list-style-type: none"> • TCR beta-chain variable region • <i>TCR beta-chain constant region</i> • <u>2A peptide</u> • TCR alpha-chain variable region • <i>TCR alpha-chain constant region</i> 	<p>MSLGLLLCCGVFSLLWAGPVNAGVTQTPKFRV LKTGQSMSTLLCAQDMNHEMYWYRQDPGMGL RLIHYSVGEGETTAKGEVPDGYNVSRLLKQNF LLGLESAAPSQTSVYFCASSYGIYEQFFGPG TRLTVLEDLNVFPPEVAVFEPSEAEISHTQ KATLVCLATGFFPDHVELSWVWNGKEVHSGV STDPQPLKEQPALNDSRYCLSSRLRVSATFW QNPRNHFRQVQFYGLSENDEWTQDRAKPV QIVSAEAWGRADCGFTSVSYQQGVLSATILY EILLGKATLYAVLVSALVLMAMVKRDFRRR RSGSGLEVKQTLNFDLLKLAGDVESNPGPME TLLKVLSGTLLWQLTWVRSQQPVQSPQAVIL REGEDAVINCSSSKALYSVHWYRQKHGEAPV FLMILLKGGEQKGHEKISASFNEKKQQSSLY LTASQLSYSGTYFCGTEDGRGGADGLTFGKG THLI IQPYIQNPDPAVYQLRDSKSSDKSVCL FTDFDSQTNVSQSKSDVYITDKTVLDMRSM DFKSNSAVAWSNKSDFACANAFNNSIIPEDT FFPSPRESSCDVKLVEKSFETDTNLFQNLV IVLRILLKVVGFNLLMTLRLWSS</p>

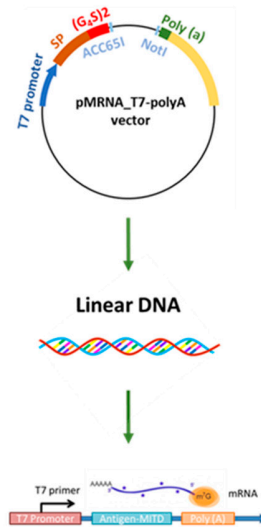
Supplemental Figures



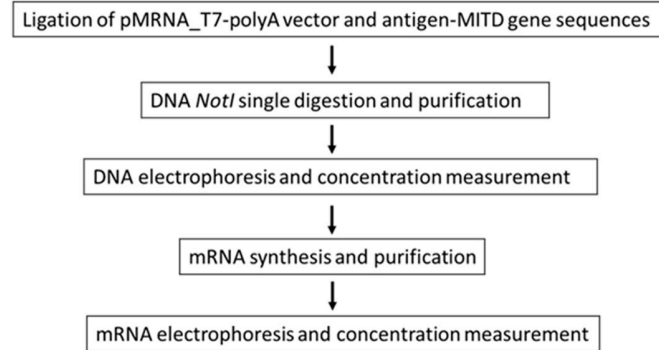
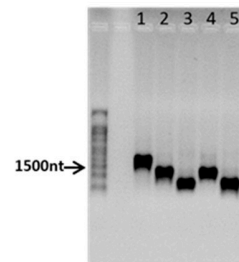
Supplementary Figure S1. Characterization of B cell immortalization. **(A)** IL-21 secretion from feeder cells. Supernatant samples from the genetically engineered feeder cells at 5th and 10th passage were subject to ELISA detecting the IL-21 secretion, with that from WT feeder cells serving as negative control. The IL-21 protein standards in the assay kit served as the positive control. **(B)** Flow cytometric gating strategy of GFP+CD19⁺ cells from the immortalized B cells. After retroviral transfection of BCL-6/BCL-XL and GFP-reporter genes, the transfected B cells were subjected to flow cytometric analysis for detecting the GFP+CD19⁺ cells, via using live/dead cell dye and anti-CD19 and examining GFP expression. Unstained ND B cells were used as the negative control for setting the gates of live cells and GFP+CD19⁺ cells. At day 14 post-transfection, the GFP+CD19⁺ cells were collected (with the proportion of the cells as indicated) using the BD FACS Aria Fusion Cell Sorter. **(C)** Cell immortalization of B cells from different NDs. B cells from 4 NDs were immortalized, and the frequencies of GFP+CD19⁺ cells were detected via flow cytometric analyses at 14 and 21 days post retroviral transfection. **(D)** Flow cytometric gating strategy of immortalized B cell biomarker identification. B cell biomarkers were analyzed in ND B cells, along with immortalized B cells from ND#673 and Pt.1 as shown in Fig 1C. With unstained cells serving as the negative control, the analyzed cells were stained with antibodies against CD19, HLA-ABC, HLA-DR, CD40, CD80, CD63 and CD86. The expression of HLA-ABC, HLA-DR, CD40, CD80, CD63 and CD86 were gated from CD19⁺ cells. Related to Figure 1.



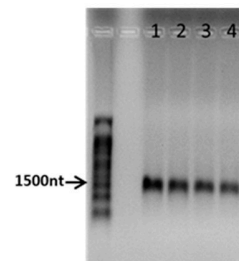
Supplementary Figure S2. Confocal imaging of immortalized B cells processing GFP-MITD-WT mRNA. mRNA of GFP or GFP-MITD-WT was electroporated into immortalized B cells, and confocal imaging was conducted at 24- and 48-hours post-mRNA transduction. A z-series imaging was conducted and visualization of the cells in different layers were provided respectively at 24 and 48 hours post mRNA electroporation. Related to Figure 2.

A**B**

mRNA production procedures

**C**

No	Gene-MITD WT	mRNA Concentration (ng/ul)	260/280	260/230
1	CMV-MITD-WT	2395.9	2.09	2.16
2	NEF-MITD-WT	2474.2	2.23	2.16
3	S2-MITD-WT	2953	2.28	2.15
4	S10-MITD-WT	3300.2	2.22	2.15
5	L2-MITD-WT	2886	2.25	2.41

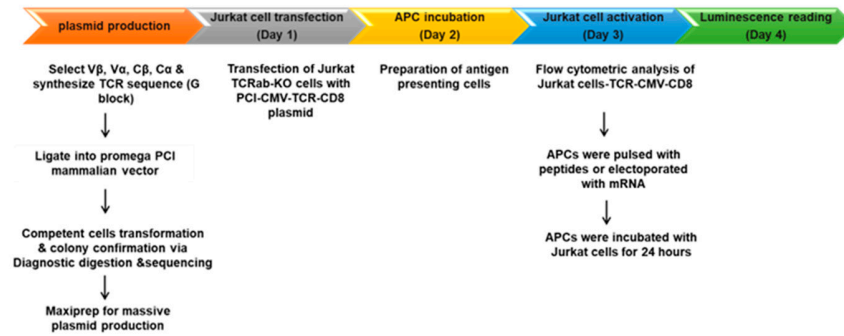
D

No.	CMV-MITD variants	mRNA Concentration (ng/ul)	260/280	260/230
1	CMV-MITD-Y320E	1953.6	2.12	2.16
2	CMV-MITD-S335E	2078.7	2.12	2.16
3	CMV-MITD-Y320E/S335E	2105.5	2.27	2.15
4	CMV-MITD-WT	2027.7	2.26	2.15

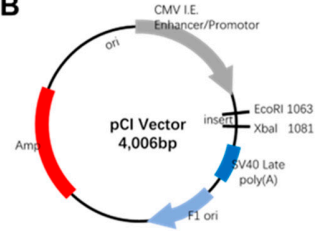
Supplementary Figure S3. Production of mRNA of CMV gene conjugated with MITD. (A-B) General schema of mRNA production. pMRNA_T7-polyA vector was used for ligation of the CMV gene and MITD sequences. (C) mRNA synthesis was conducted from five vector templates, containing MITD-WT and respectively CMVpp65-full length gene, Nef full length gene, S2 sequence, L2 sequence and S10 sequence. (D) mRNA synthesis was conducted from CMV-MITD vector templates, containing CMVpp65-full length gene and respectively MITD-WT, MITD-S335E, MITD-Y320E and MITD-Y320E/S335E gene. The ligated DNA was linearized via restriction enzyme NotI digestion, followed with DNA purification and confirmation with DNA gel electrophoresis. mRNA synthesis was conducted using HiScribe™ T7 ARCA mRNA Kit, with the concentration and purify confirmed by RNA denaturing gel electrophoresis and nanodrop. Related to Figure 2.

A

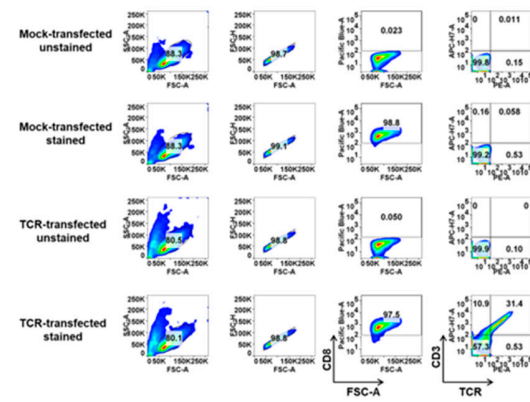
Jurkat cell activation bioassay



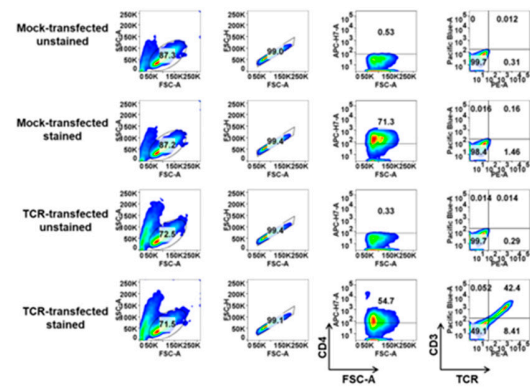
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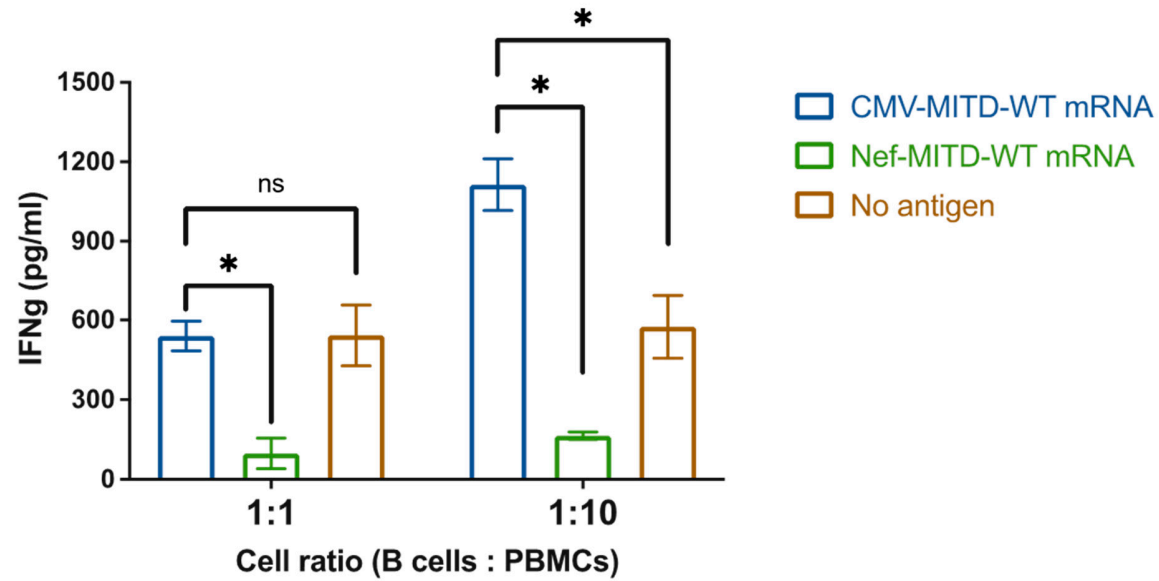
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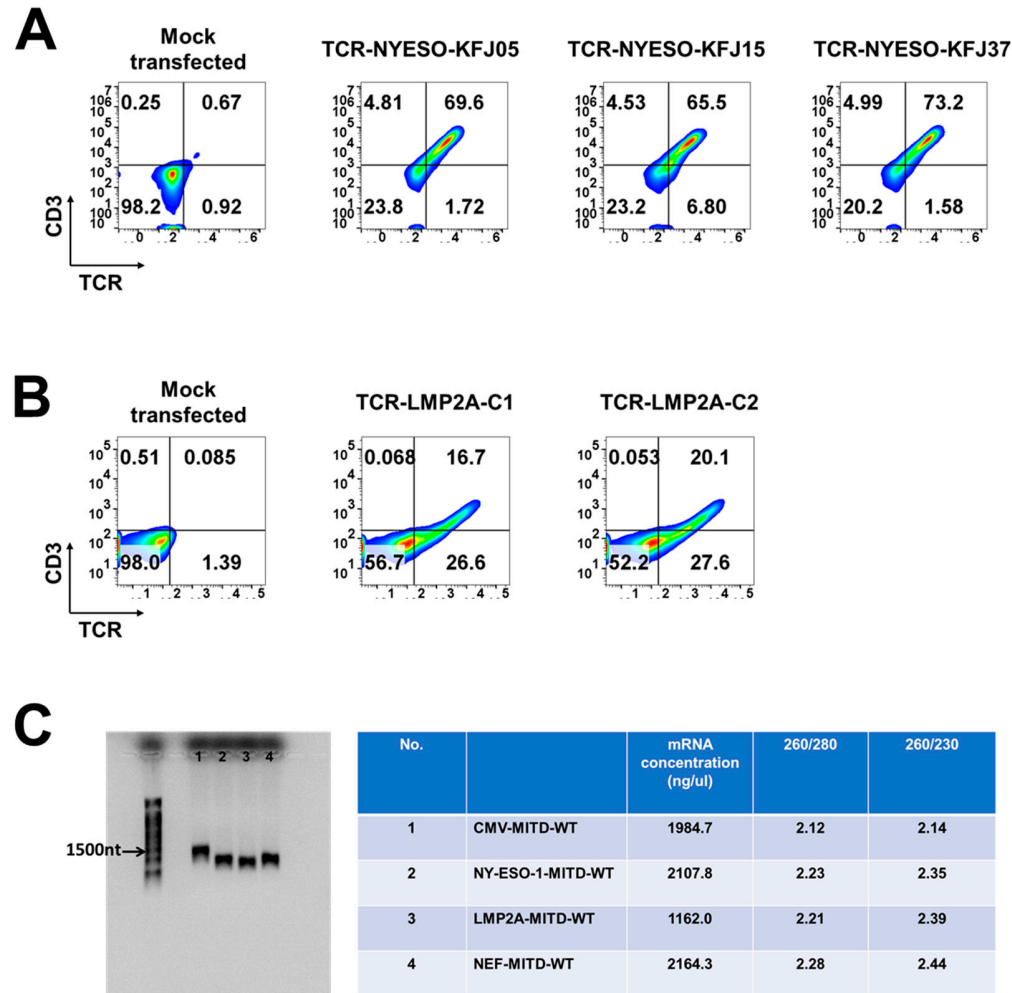
D



Supplementary Figure S4. Jurkat cell activation bioassay. **(A)** General schema of Jurkat cell activation bioassay. CMV pp65-specific TCR sequence was designed, synthesized, and ligated to the PCI mammalian vector (Promega). TCR deficient Jurkat cells were transfected with the engineered plasmid and subsequently stimulated with the B cells processing mRNA of antigens conjugated with MITD. **(B)** Template plasmid containing TCR sequences. PCI vector was digested with EcoRI and XbaI double digestion in the multiple cloning sites, followed with DNA purification. CMV pp65-specific TCR (TCR_{CD8}-CMV#4 and TCR_{CD4}-CMV#1) sequences were ligated into the PCI vector via the in-fusion cloning kit, followed with competent cell transformation and plating. Diagnostic sequencing was subsequently performed in picked colonies. **(C)** Flow cytometric analysis of Jurkat cells expressing CMV pp65-specific TCR. TCR-deficient Jurkat cells were transfected with engineered plasmid containing CMV pp65-specific TCR (TCR_{CD8}-CMV#4), and flow cytometric analysis was performed after 2 days confirming the expression of CD8, CD3 and TCR. **(D)** Flow cytometric analysis of Jurkat cells expressing CMV pp65-specific TCR. TCR-deficient Jurkat cells were transfected with engineered plasmid containing CMV pp65-specific TCR (TCR_{CD4}-CMV#1), and flow cytometric analysis was performed after 2 days confirming the expression of CD4, CD3 and TCR. Related to Figure 3.



Supplementary Figure S5. Optimization of B cell: PBMC quantity ratios for PBMC stimulation. Autologous PBMCs were stimulated with immortalized ND #739 B cells respectively at 1:1 and 1:10 ratios (for two times). T cells were subsequently isolated from the stimulated PBMCs and co-incubated with immortalized B cells processing CMV-MITD-WT or Nef-MITD-WT mRNAs or with no antigens for 24 hours before IFNγ release were detected. Related to Figure 6.



Supplementary Figure S6. TCR expression on Jurkat cells and mRNA production. (A) Flow cytometric analysis of Jurkat cells expressing TCRs recognizing NY-ESO-1₆₀₋₇₂. TCR $\alpha\beta$ -KO Jurkat cells were transfected with engineered plasmids respectively expressing TCR-NYESO-KFJ05, TCR-NYESO-KFJ15, and TCR-NYESO-KFJ37 and flow cytometric analysis was performed after 2 days confirming the expression of CD3 and TCR. (B) Flow cytometric analysis of Jurkat cells expressing TCRs recognizing LMP2A₄₈₄₋₄₉₃ epitope. TCR $\alpha\beta$ -

KO Jurkat cells were transfected with engineered plasmids expressing TCR-LMP2A-C1 and TCR-LMP2A-C2 and flow cytometric analysis was performed after 2 days confirming the expression of CD3 and TCR. **(C)** mRNA synthesis was conducted from vector templates, respectively containing CMV-MITD-WT, NY-ESO-1-MITD-WT, LMP2A-MITD-WT, and Nef-MITD-WT. The ligated DNA was linearized via restriction enzyme NotI digestion, followed with DNA purification and confirmation with DNA gel electrophoresis. mRNA synthesis was conducted using HiScribe™ T7 ARCA mRNA Kit, with the concentration and purity confirmed by RNA denaturing gel electrophoresis and nanodrop. Related to Figure 7.