Supplementary Materials

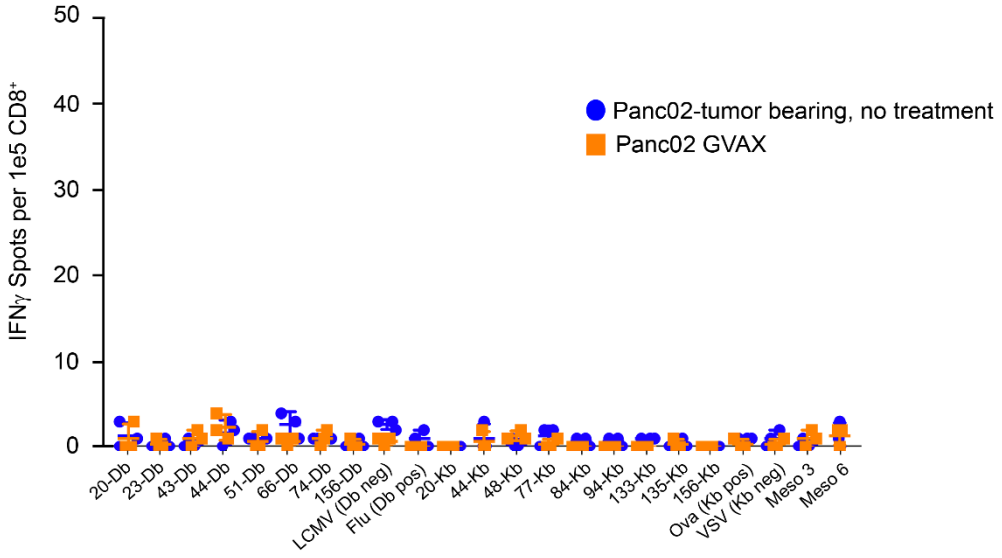

Figure S1: Responses to Immunogenic Peptides are Not Naturally Primed by Tumor or By Autologous GVAX. Mice were inoculated with $1x10^6$ Panc02 tumor cells on day 0. Vaccinated mice received three doses of GVAX administered in three limbs on days 10, 17 and 25, while Panc02 tumor–bearing mice received no treatment. Spleens were harvested on day 39. Peptide identifier is shown with the T2 antigen presenting cell (APC) MHC restriction. Symbols represent each replicate with a line at the mean ± SEM.

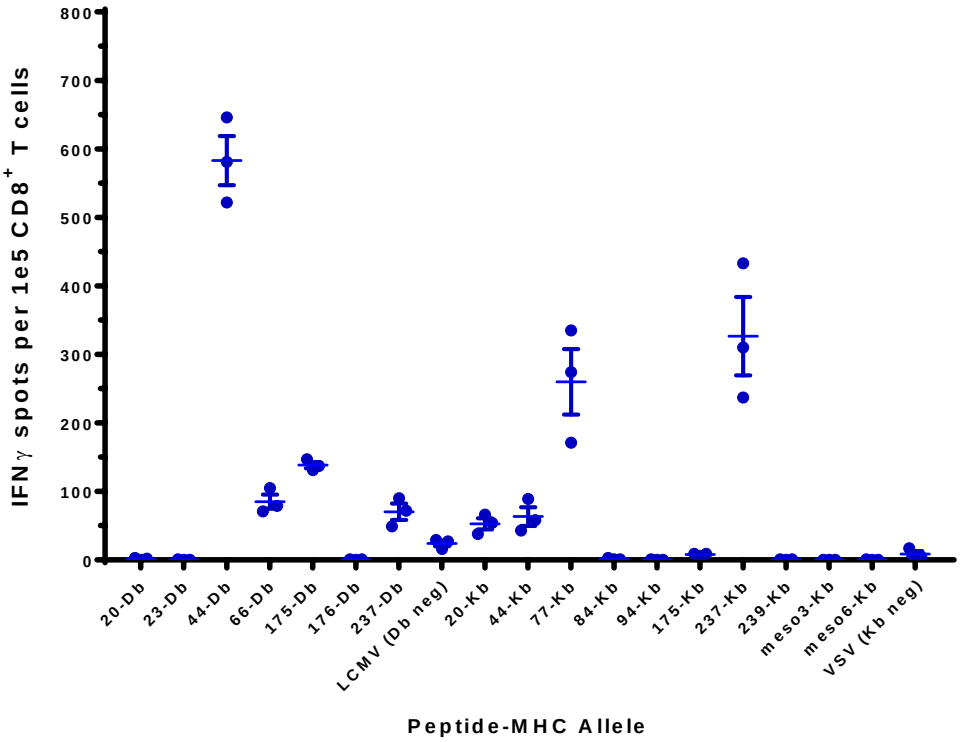

Figure S2: Naïve mice were vaccinated on days 0 and 7 with neoantigen-targeted SLP vaccine. Splenocytes were harvested on day 14 for ELISPOT assay as per "Methods" section.

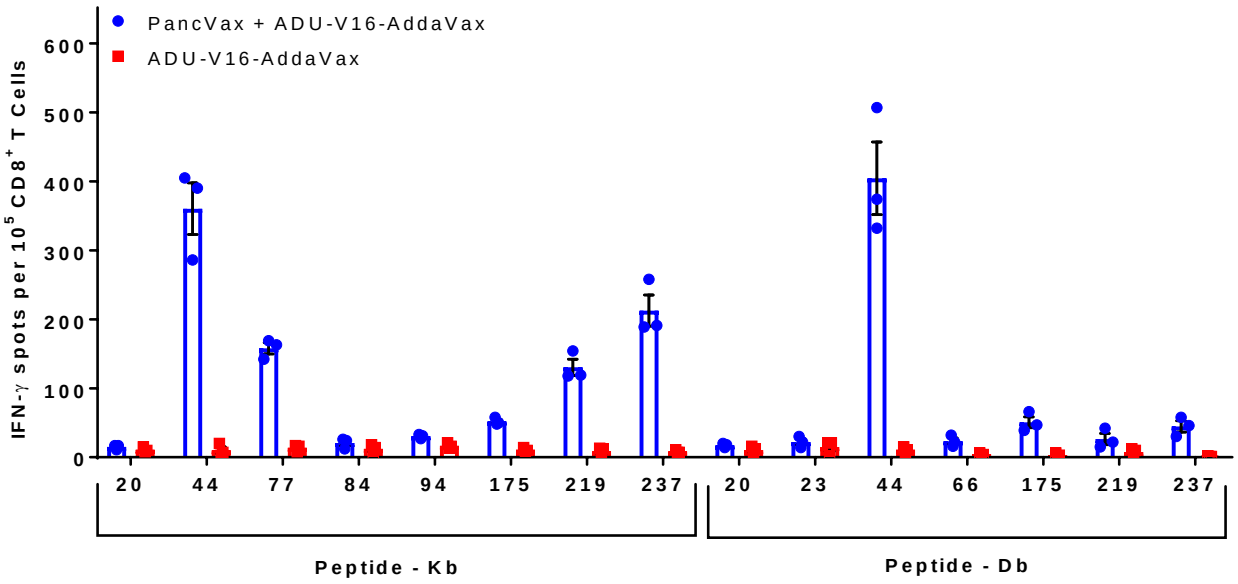

Figure S3: Naïve mice (n=3) were vaccinated with either PancVax + ADU-V16-AddaVax or ADU-V16-AddaVax alone on days 0 and 7. ELISPOT assay was performed on day 14. Symbols represent each biological replicate with a line at the mean ± SEM.

Table S1: Complete List of All Screened Peptides. Gene names and mutations are noted.

Peptide Identifier	Gene Name	20–mer Peptide Sequence	Mutation
1	Olfr1136	LIRMDPQLHIAMYFFLSHLS	P58A
2	Olfr1217	FANSGAICIILFSLLLVSYG	I209L
3	Olfr1247	SLKTHSQEGRCKALSTCSSH	R232C
4	Olfr1278	TEMVLLVAMALDRYVAICKP	W120L
5	Gatm	ISTIKVNIRNGNSLGGGFHC	A398G
6	4833422F24Rik	LFLLGLLGESVWYLHRYLTD	A241V
7	Fat4	RRLPLPSPSLWQLLRVWGLL	C22W
8	Chrnb2	VSYDGSIFWLLPAIYKSACK	P147L
9	Hsd3b3	SNTIIKALKNNFILRGGGKS	K154N
10	Ptgr1	EYVTEGFEKMAAAFMGMLKG	P310A
11	Slc5a9	WRRVCNINAITLLAINIFLW	I672T
12	Niacr1	NCDIYSSVDLPFFTTLSFTY	A272P
13	Emid2	CRWPGPCANLMSYRTLIRPT	V93M
14	Olfr549	CADIRVNVWYVLSVLLSTVV	G201V
15	Odz3	SLVTGDYLYNVSYSNDNDVT	F1561V
16	Fam92b	EARPLTDTNPPPSVPWPLAS	A241P
17	Bcl2a1d	TCLQTSFQFWTRIHNE	G123T
18	Olfr770	TTLFCVVLSYAYIIKTILKF	V215A
19	Olfr806	LITEFYLLAALSYDRYVAIC	M116L
20	Myo1g	LQGDVAFGHSNLFIRSPRTL	K696N
21	Kcnj12	MVEATAMTTQPRSSYLANEI	A312P
22	Cacnb1	LTSLRRNLSFCGGLEASPRG	W503C
23	Ace	ALEKIAFLPFAYLVDQWRWG	G473A
24	Stab1	IHKANYIAANRVFHTVTALR	G486R
25	Pfkm	MNNWEVYKLLSHVRPPVSKG	A389S
26	Olfr121	SLSVKRFAFATFSEVPGECF	K22T
27	Gpr111	PVLHHNGCVATTFFVHFFYL	A456T
28	Arhgap28	AVMLKAFFREMPTSLFPVEY	L470M
29	Fhod3	EKEDKLSEDRVTGLWSTSLQ	A809V
30	Slc6a7	GSQSPKPLMVNMRKYGGITS	H607N
31	Supv3l1	YTTGEEVEVQTYERLTPISV	K344T
32	Dnahc9	PAVKQSISKFIAFVHISVNK	M3013I
33	Daam2	LRQHENAILDTHLDFFEMVR	K326T
34	Vps39	KANSPLKGHEWTVQYLQHLG	R538W
35	Musk	WAYGVVLWEIVSYGLQPYYG	F797V

36	Rimbp2	VHLCVARYSYTPFDGPNENP	N200T
37	Mug1	QASSVEVEMNIYVVLARLTA	R1187I
38	Abcc9	DATVTEGGENISVGQRQLFC	F1446I
39	Supt5h	VVTVRHQAVTLKKDNRFAVA	Q575L
40	Zfp940	VNQGIVFNNHKRLNAGEKAT	Q159K
41	Slc17a6	GYIASRLAANPVFGAAILLT	R153P
42	Smg1	GENTYGRKSLVQELRINNVT	G103V
43	Ankrd11	YAEYVTYTGSVLLDGKPLSK	L2456V
44	Glb1l2	GSSAEESHLSCLNWSTLVPL	G36C
45	Slc6a20a	LLIVLVETIANCYVYGLKRF	K430N
46	Muc6	IFTATCGDDVAATFSIQLRR	P80A
47	A330008L17Rik	SPVRWISKPGFFFFFLLLQV	C81F
48	Gm10717	TFFSDFVIFQTFKWMFLIFL	K213T
49	Gucy2d	SVLSVVFWSVRLWADSLSLL	L53R
50	Gm10647	FCLFCFVFVFSQAPSDYHRV	G88S
51	Gm10715	RSYSVHFSFFKFFSDFVIFQ	T200K
52	Gm10719	DFVIFQVVKWMFLIFLDFQF	K214M
53	Zfp955b	EDVAVNFSLGHWALLDSYQK	P23H
54	Gm14403	LDPSQKSLYKDVMLETHRNL	G31D
55	Gm11168	VCISHFSRFSLISSFFKSSS	V67L
56	Gm904	TIGFMCGVGLLFLLIPFLKE	F38L
57	Hephl1	MHAVNGYMYGIQPGLSMCKK	S630I
58	Col6a5	SDALHNEFQLCTFKNRNPML	G85C
59	Irg1	EHEARHSFQYMACASLLDGS	V338M
60	Ttc18	ASEMHFIFLRSGHIYLEEKE	N982S
61	Btnl4	FSFHEASFSGSLFPYFRLKS	T490S
62	Zfp423	KKAEFIKGSHMCNVCSRTFF	K939M
63	Gpr125	SGNLFTSLSQATFDYLGSLR	G160A
64	Kcnq3	YDALERPRGWWLLYHALVFL	R120W
65	Olfr151	TAFMYLKPSTISSLAQENVA	L264I
66	Map2k5	MLWLALGPFCGMENQVLVIR	A11G
67	Ros1	EITQVFSNISRTMLNVPELQ	G627R
68	Olfr984	FRTFPMDKAVCVLYTMVTPM	S272C
69	Gtf2ird2	YEQMLQDEAAMVVRGLPEGL	V140M
70	Olfr1356	PFIYSLRNKDTQKALGKLLR	M297T
71	Cts3	SAVASLGPISFVIDAWHESF	V244F
72	Vmn1r235	KTILLQLSTFILCYIISCLF	M264I
73	Scn9a	CKLSDFAAALTPPLLIAKPN	A1797T
74	Ampd1	QRFDKFNDKYSPVGASELRD	N378S
75	Zfp541	KMIQTKSVAQWVEYYYIWKK	C1209W
76	Tpcn2	ITLWNVMVVNTWQVILEAYK	N637T

77	Rasa3	TERIYSLFNLSMGKLEKMQE	T203S
78	Lactb	LGLALGAKLVFGLRGAVPIQ	V58F
80	Fam75d3	YQGLTKAYAVTPGDHLSPSP	A221T
81	Utp20	LTNVFAVLSAENLSEATASI	K1243E
82	Cant1	TGSRAQEENTLFSYLKKGYL	W127L
83	Cblb	YELYCEMGSTLQLCKICAEN	F370L
84	Clcn7	ALGLRHLVVVGNHNQVVGLV	D771G
85	Cnppd1	NDEWGAAGGVTVATLNALER	A155T
86	Fbf1	FSSSLNTLSSLVEASHLTTS	R798L
87	Gkap1	VLSSVLTTASPFALLQVDSG	R15P
88	Irf7	YTETLLQHVSPGLQLELRGP	T277P
89	Jak1	YDPNQRPFFRDIMRDINKLE	A839D
90	Ktn1	VISEKEKEITYLCNELESLK	D986Y
91	Mars	SAICRYFFLLWGWEQDDLTN	C73W
92	Mmp10	DPALSFDSVSMLRGEVLFFK	T300M
93	Mocs3	LSRDEILRYSPQLLLPELGV	R65P
94	Notch2	AELINCQADVSAVDDHGKSA	A1969S
95	Pik3r5	EEEEDLEMDRYCAERDSLLS	H333Y
96	Ptpn11	TIQMVRSQRSVMVQTEAQYR	G507V
97	Rbm5	TALSPYASLAINNIRLIKDK	V259I
98	Rhpn2	VHFLDPHCSALLAGAKEGDY	S548L
99	Rrs1	QAKKERVAKNVLNRLRNLAR	A194V
100	Slc16a13	FFIPYVHLVANLQDLGWDPL	H240N
102	Slc35b3	NLTGVMLISLPLCADAVIGN	A203P
104	Syncrip	ISVANNRLFVASIPKSKTKE	G248A
105	Tm7sf3	YNFFETTIKFTPANIGYARA	A160T
106	Ubqln1	ASMFNTPGMQALLQQITENP	G12A
107	Vprbp	PVSLPRTPRIGNGIASRLGS	A905G
108	Zbtb43	MAHRRWIHVKPERLEQAWDG	A248P
109	4933409G03Rik	GGDDEDGGDEYGDDGDGGDD	D122Y
110	Acsm2	ASLTMHHLWKHPRLFTLWGN	P32H
111	Actr8	ELWIYQREWQHFGVRMLRER	R610H
112	Ankrd11var2	GHKSLCVNEVLSFYVPMVDV	W2625L
113	Arhgap30	HPVVPLVAPQSQTYAFETQT	R1076S
114	Arvcf	KRRVRQLRGLSLLVALLDHP	P405S
115	Baz2a	SIFVSPTSPPRLGESVLQDN	G373R
116	C2cd3	TSPWSSFMSDLSEVLSPQPT	M2073L
117	Ccdc113	DIKITAAEFSKLRSRRKSKA	Q76K
118	Ccdc67var2	LKAQFSKLTSTFEKLRLHQM	N106T
119	Cpa4	LLDNEDEEMQNNEGIERSGD	H107N
120	Csn3	RSVLNFNQYERNYYHYRPSL	P60R

121	Daglb	TDLVPSDIAACFTLLHQQQD	G238C
122	Dip2bvar2	SEGETVVNVLHFKKDAGLWH	D324H
123	Dip2b	ERIASVLGDKAHLNAGDNVV	G805A
124	Emilin2var2	AEPSQLPGIPCSKESGMKDI	S258C
125	Fam83c	TLGHSKLDLIAKYHQLQGAR	T710A
126	Frmd6	RGKDYILKHIQNMHKDQFAL	P201Q
127	Fxr2	PQRRNRSRRRCNRGNRTDGS	R594C
128	Fzd9	AMEIPMCRGIVYNLTRMPNL	G52V
129	Gm10564	RAGRDVEPRARATRRDWEPR	S154R
131	Hdgfrp3	QSRKSPGDEDGKDCKEEENK	D167G
132	Itpr3	EEPGGKNVRRFIQGVGHMMS	S916F
133	Kcnj12var2	DGKLCLMWRVANLRKSHIVE	G216A
134	Klhl7	ISKNFLSKTVLAEPLIQDNP	Q248L
135	Ktn1var3	VISEKEKEITGLCNELESLK	D986G
136	Lonrf1	YLEDVKIENGNEIRSLRELH	D739N
137	Lrfn1	APTLTMLCAKMGLLFVPPAI	T54M
138	Lrrc66	GMWPQSPVELIDSQDEQVTD	R351I
139	Lrrcc1var2	QNMDDAFRRQGDEIVEAHQA	V958G
140	Lrrcc1	QNMDDAFRRQMDEIVEAHQA	V958M
141	Mbtd1	ITAIKKQNILYNPKEKADWF	H12Y
142	Mtap2	YYKNGTVMAPGLPEMLDLAG	D807G
143	Mybbp1a	MKYALKRLITALGVGREAAR	G78A
145	Otop1	SQHQKMQCRFYGVLVGSVLG	D307Y
146	Paip1var2	RAPEQTKPQRDPPSSQDKIP	A17D
147	Pion	LVLHLNSHCSSADFEVFHLM	A675S
148	Ppig	KERDHETTKETEKPLDPKGK	K499T
149	Prdm16	VSNSSQGATAPTGSEEKFDG	A573P
150	Prkcb	DLTSRNDFMGFLSFGISELQ	S258F
151	Prkcc	VPSLCGVDHTDRRGRLQLEI	E156D
152	Prrc2b	MMPSYMDPRISPTRTPVDFY	T703S
153	Psd	PSSSLGSGNENDEAGGEEDV	D350N
154	Psg28	MEVSSELFSNVCTSWQRVLL	G11V
156	Rnf26	FTFGGLQALGALLYSCYSGL	T85A
157	Rrs1var4	QFARLKGIRPEKKTNLVWDE	D134E
158	Shank2	KYETDLGKDRKADDKKNMLI	R702K
159	Slc27a3	QGFLHFHDRTEDTFRWKGEN	G529E
160	Tatdn2	EESHTKVSVENEASALDRSS	K286N
161	Thrap3var3	GRGAFPRGRGWFMFRKSSTS	R906W
162	Thrap3var2	HDKFSGEEGEMEDDESGTEN	I930M
163	Ttnv2	GVGEPLESAPALMKNPFVLP	E25599A
164	Usp28	YNDISVTESSLEELERDSYG	W631L

165	Wdfy3var2	TELCHPPRHMAQKEQEEKLY	T43A
166	Wnt3	SCEVKTCWWAEPDFRAIGDF	Q224E
167	Zfp423var2	LAHIHQAHANHKHKCPMCPE	Q329H
168	Zfp687	LKTHFRTHGMPFIRARQGGS	A1225P
169	Braf	APPSDSTGPQTLTSPSPSKS	I313T
170	9530053A07Rik	RVQAFRHGTDTVIETKFGLL	M938T
171	Abcc6	AFRAQASFTAEHDALMDENQ	Q1144
172	Acsm2	TFHMNIKKLIHIQWGHQEAP	P32H
173	Ap2a2	AKTVFEALQAAACHENLVKV	P489A
174	Arfgef1	CAVSMDELLSATHPRMFSLQ	T1155
175	Bsg	MAAALLLPLAFTLLSGQ	A8P
176	Ccdc67	KCSQFQKQAQTYQTQLNGKK	N186T
177	Cd63	VKFLLYVLLLPFCACAVGLI	A20P
178	Chadl	LEGNMLEELRAGTFGALGSL	P150A
179	Clasp1	ALQSHLKNSDNIVSLPQSDR	S545N
180	Cog8	SRVGADFRGQVAPVFQRVAI	L373V
181	Col17a1	YSNVTQDLMDVFQTYGTIPG	F1366
182	Cpq	AEITGSMYPEQVVLVSGHLD	E281Q
183	Cspg4	EGISVELEVLATVIPLDVQN	P1360
184	Cwc22	AQQRTYEKFFALLAGRFCML	G507A
185	Dennd4a	TALSGGRSDLVYNSLSKDNV	G908V
186	Dmbt1	PTDQTTAEQTTVPDYTPIGT	P448T
187	Dnah11	YNYTTPRSFLEQISLFKSLL	K3048
188	Dnah5	SDVTWFDKAVGSLVEEEFGE	V2845
189	Dnah6	LYGEVNNVTLKWKDGLMALS	E1806
190	Edem3	DIIFDIEDYIVTTEAHLLPL	F490V
191	Eftud2	LLRLVCKKFFCEFTGFVDMC	G424C
192	Glrx	IQSGKVVVFITPTCPYCRKT	K20T
193	Gm13154	RLSFAQRTLYMDVMLENYNN	I39M
194	Gm7120	LGIFCLVADRFLRFPIIQHN	L59F
195	Gsg2	NLQHFHRTVLRFSSATDLLC	S739R
196	Hebp1	MGMTVPVSFAVFPNEDGSLQ	L86V
197	Hmcn1	VHVSDTGRYVWVAVNVAGMT	C2362
198	Hydin	AVSPAVHFSFPSHNFGTCFI	T4349
199	Igsf9	AGVVGGVCFLAVAVLVSILA	G747A
200	Il6st	MSAPTIWLAQALLF	R5T
201	Kansl1	ELRAELLGRQAVLEFSLENL	P129A
202	Lrfn1	MTSLVHLTLSLNTIGQVAAG	R98L
203	Mcm8	IPHQLLRKYIAYARQYVHPR	G636A
204	Megf11	CKLPESSYVEIKSPVHLGSP	M1017
205	Mroh1	QCFNTKVLGIMVETKDPALK	K779M

206	Mtcl1	VEQLQKEKSPLRSGSFLCSR	R1272
207	Mycbp2	IRLDKVVPLKGNVKYAVRLR	E1822
208	Myh10	SGAGKTENTKNVIQYLAHVA	K190N
209	Myo7b	DVNADTILHYQQELPKYLRG	H1910
210	Myo7b	KVLKELVPQNVTRLMSSEEW	L1962
211	N4bp2	PSTHPLHNSGFDLPGTDGDQ	S222F
212	Ndufs6	MAAALTFRRLLTL	V4A
213	Nfat5	VQQHPSTPKRYTVLYISPPP	H63Y
214	Nxf3	HKTLSACKEILFGSESIKTM	F309L
215	Pcdhb13	SATDSDSGSNGHITYSLLLP	A482G
216	Phkb	IGCLGTSKIYPILGKTVVCY	R559P
217	Plekha7	RLFPQLQTYVAYRPHPPQLR	P841A
218	Pnpla7	LSGWWLLWKRCNPLATKVKV	W1153
219	Ppp2r3a	SHRNSLDTNLISMLFQNLSE	T197I
220	Prkcb	KEPHAVFYAAQIAIGLFFLQ	E449Q
221	Rab11fip5	PVPRPHNSISYTLLSQKVLG	S992Y
222	Rimbp3	KEMQGLQFQPVHPSETSETT	G685V
223	Sall4	GKVANTNVTLHALRGTKVAV	Q179H
224	Samd9l	IERYFSEVQDLNSFWHSGVV	S1498
225	Scn9a	EFCKLSDFAATLDPPLLIAK	A1795
226	Shroom2	KVVNLLLSLSRRLARVENAL	G1372
227	Slco6d1	QSVPTSWNSMRLGLMSTVWR	S593R
228	Sys1	VLNALTCALGMLYFIRRGKQ	L81M
229	Tg	TVCDNSSIQVWCLTAERLGV	G1355
230	Tg	KVGTAWKQVYLFLGVPYAAP	R2226
231	Tmem30c	ANSIFNDTITISYNLNSSTQ	L169I
232	Tmem44	VPLTSLSHCKALRTMTAISR	P325A
233	Trpv4	TKKCPGVNSLLVDGSFQLLY	F544L
234	Tspan15	IYSTVFWLIGSLVLSVGIYA	G36S
235	Tspyl3	QADGAHLQLVLRFGRMRRLH	R151L
236	Ttc3	PAFRTSLNFVQTERGFRKTK	E390Q
237	Ttn	IKIVRLTTGSAYQFRVCAEN	E1901
238	Tubg1	EGFVLCHSIAWGTGSGLGSY	G143W
239	Usp19	VQQRPQVPSISISKCAACQR	P829S
240	Usp51	DAVVTKATMEQLLNSEGYLL	E642Q
241	Vstm4	NSSGETVTSVPSLAPLQPQK	T231P
242	Wdr11	PPLTTKNIKMSQPLLAVGTS	Y483S
243	Zbtb16	DLTKMGMIQLHNPSHPTGLL	Q12H
244	Zfp180	KGRGQVLNHSMVLGGQQELL	V220M
245	Zfp930	ECGKGFAHYSNLRKHGSTHT	T172N

Table S2: List of all Immunogenic Epitopes.

Gene names are shown. APL – altered peptide ligand

Peptide Identifier	Mutant Gene	20–mer Peptide Sequence	APL
3	Olfr1247	SLKTHSQEGRCKALSTCSSH	
11	Slc5a9	WRRVCNINAITLLAINIFLW	
14	Olfr549	CADIRVNVWYVLSVLLSTVV	
20	Myo1g	LQGDVAFGHSNLFIRSPRTL	
23	Ace	ALEKIAFLPFAYLVDQWRWG	
35	Musk	WAYGVVLWEIVSYGLQPYYG	
41	Slc17a6	GYIASRLAANPVFGAAILLT	
43	Ankrd11	YAEYVTYTGSVLLDGKPLSK	APL
44	Glb1l2	GSSAEESHLSCLNWSTLVPL	APL
48	Gm10717	TFFSDFVIFQTFKWMFLIFL	
51	Gm10715	RSYSVHFSFFKFFSDFVIFQ	
53	Zfp955b	EDVAVNFSLGHWALLDSYQK	
60	Ttc18	ASEMHFIFLRSGHIYLEEKE	APL
66	Map2k5	MLWLALGPFCGMENQVLVIR	APL
68	Olfr984	FRTFPMDKAVCVLYTMVTPM	
74	Ampd1	QRFDKFNDKYSPVGASELRD	
75	Zfp541	KMIQTKSVAQWVEYYYIWKK	
77	Rasa3	TERIYSLFNLSMGKLEKMQE	APL
84	Clcn7	ALGLRHLVVVGNHNQVVGLV	
94	Notch2	AELINCQADVSAVDDHGKSA	APL
133	Kcnj12var2	DGKLCLMWRVANLRKSHIVE	
135	Ktn1var3	VISEKEKEITGLCNELESLK	
156	Rnf26	FTFGGLQALGALLYSCYSGL	
175	Bsg	MAAALLLPLAFTLLSGQ	
176	Ccdc67	KCSQFQKQAQTYQTQLNGKK	
184	Cwc22	AQQRTYEKFFALLAGRFCML	
197	Hmcn1	VHVSDTGRYVWVAVNVAGMT	
201	Kansl1	ELRAELLGRQAVLEFSLENL	
212	Ndufs6	MAAALTFRRLLTL	
218	Pnpla7	LSGWWLLWKRCNPLATKVKV	
219	Ppp2r3a	SHRNSLDTNLISMLFQNLSE	
220	Prkcb	KEPHAVFYAAQIAIGLFFLQ	
222	Rimbp3	KEMQGLQFQPVHPSETSETT	
230	Tg	KVGTAWKQVYLFLGVPYAAP	
231	Tmem30c	ANSIFNDTITISYNLNSSTQ	
237	Ttn	IKIVRLTTGSAYQFRVCAEN	
238	Tubg1	EGFVLCHSIAWGTGSGLGSY	
239	Usp19	VQQRPQVPSISISKCAACQR	

Table S3: Minimal Epitopes of Immunogenic Peptides

Peptide Identifier	Protein: Mutation	Minimal Epitope	Predicted Affinity (nM)
20	Myo1g:p.K696N	VAFGHSNL	7
20	Myo1g:p.K696N	VAFGHSNLF	10
20	Myo1g:p.K696N	VAFGHSNLFI	177
23	Ace:p.G473A	KIAFLPFAYL	387
23	Ace:p.G473A	IAFLPFAYLV	390
44	Glb1l2:pG36C	LSCLNWSTL	632
44	Glb1l2:pG36C	SCLNWSTLV	844
66	Map2k5:p.A11G	CGMENQVLV	380
66	Map2k5:p.A11G	LALGPFCGM	427
66	Map2k5:p.A11G	CGMENQVLVI	897
77	Rasa3:p.T203S	RIYSLFNL	20
77	Rasa3:p.T203S	RIYSLFNLSM	391
77	Rasa3:p.T203S	LSMGKLEKM	395
77	Rasa3:p.T203S	SLFNLSMGKL	564
77	Rasa3:p.T203S	FNLSMGKL	931
77	Rasa3:p.T203S	IYSLFNLSM	969
84	Clcn7:p.D771G	VVVGNHNQV	256
175	Bsg:p.A8P	LPLAFTLL	425
175	Bsg:p.A8P	LLPLAFTLL	643
237	Ttn:p.E19018A	SAYQFRVC	31
237	Ttn:p.E19018A	SAYQFRVCA	437
237	Ttn:p.E19018A	SAYQFRVCAE	973
239	Usp19:p.P829S	ISISKCAAC	862

Table S4: Peptide Sequences for PancVAX

Peptide Identifier	Gene	20–mer Peptide Sequence	Mutation
20	Myo1g	LQGDVAFGHSNLFIRSPRTL	K696N
23	Ace	ALEKIAFLPFAYLVDQWRWG	G473A
44	Glb1l2	GSSAEESHLSCLNWSTLVPL	G36C
66	Map2k5	MLWLALGPFCGMENQVLVIR	A11G
77	Rasa3	TERIYSLFNLSMGKLEKMQE	T203S
84	Clcn7	ALGLRHLVVVGNHNQVVGLV	D771G
94	Notch2	AELINCQADVSAVDDHGKSA	A1969S
175	Bsg	MAAALLLPLAFTLLSGQ	A8P
218	Pnpla7	LSGWWLLWKRCNPLATKVKV	W1153
219	Ppp2r3a	SHRNSLDTNLISMLFQNLSE	T197I
230	Tg	KVGTAWKQVYLFLGVPYAAP	R2226
237	Ttn	IKIVRLTTGSAYQFRVCAEN	E1901