

Figure 1

Number of Positive Pools: 4x background

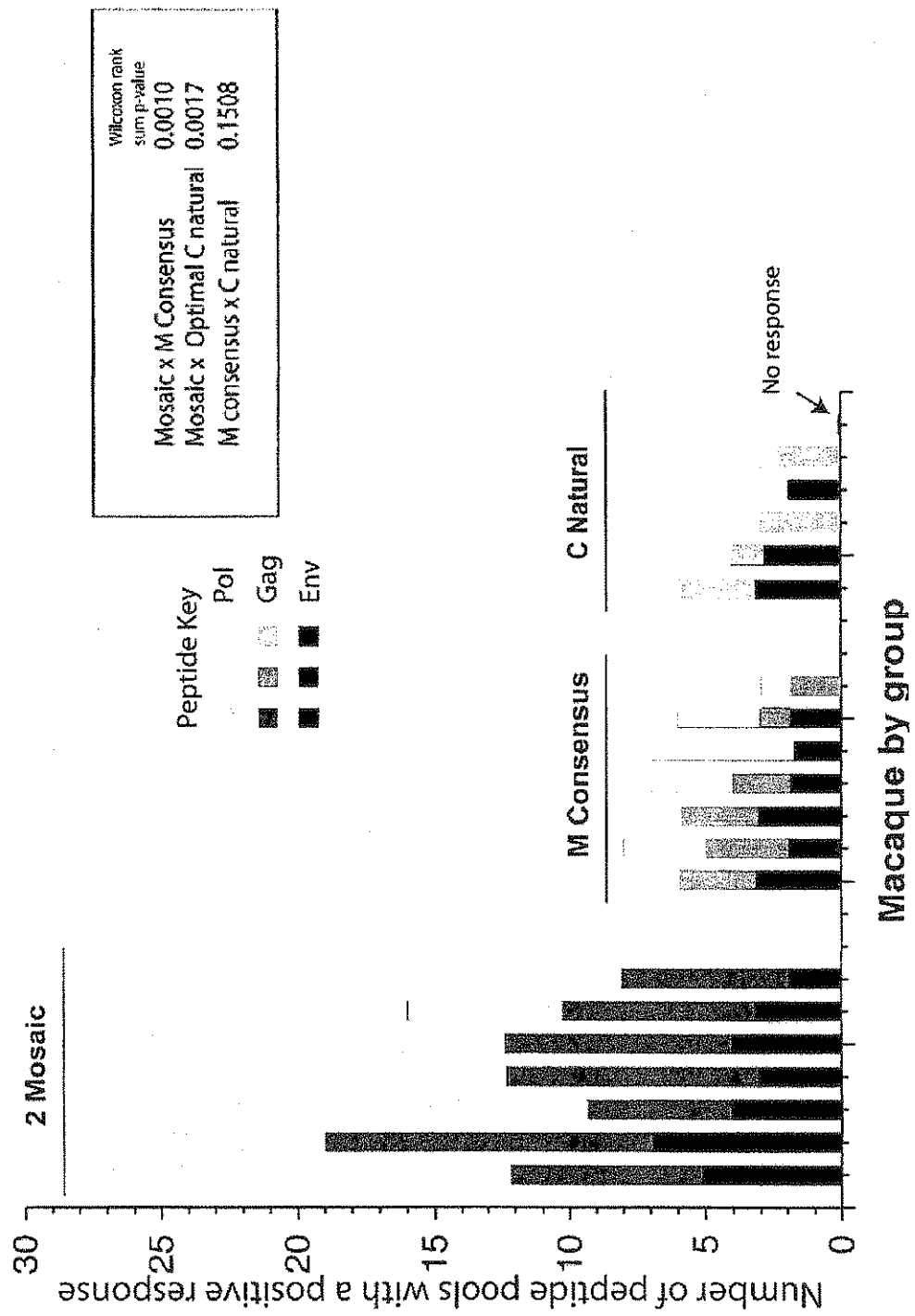
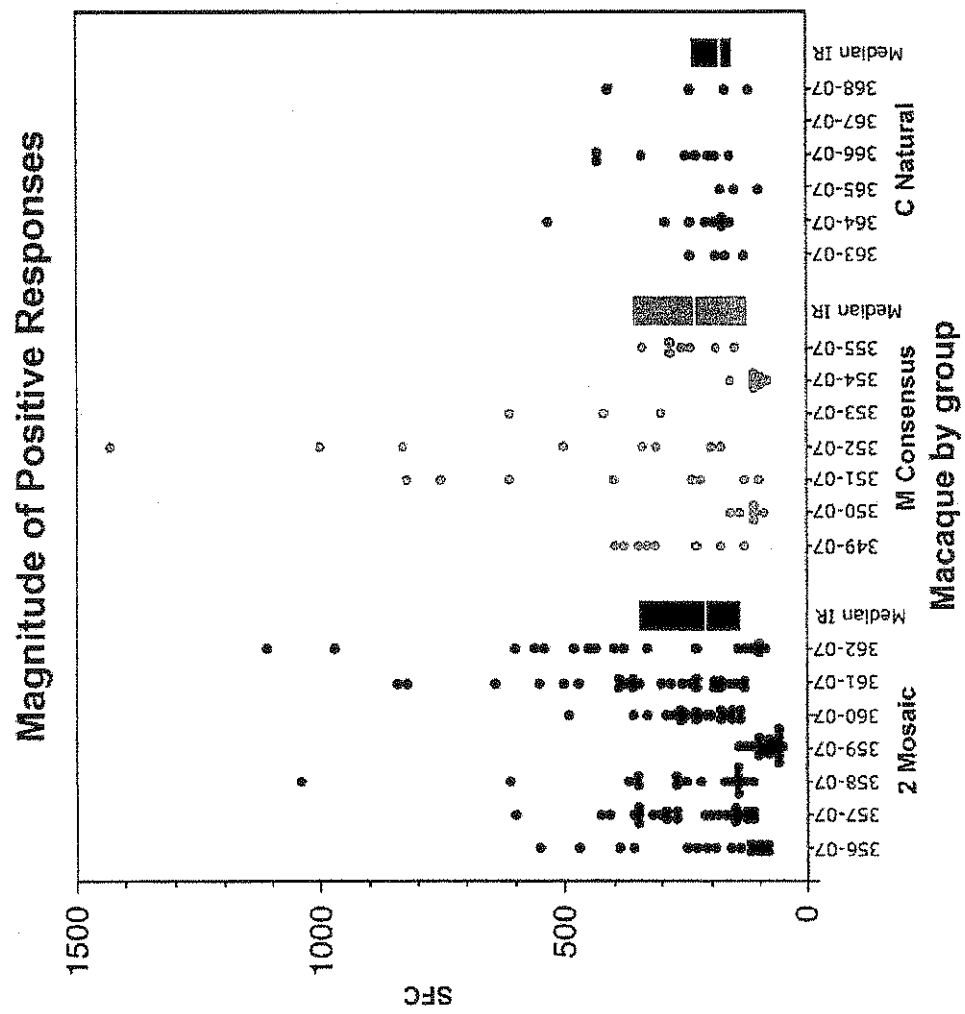


Figure 2



Mos x Con, $p = 0.56$
 Mos x C natural, $p = 0.95$
 Con x C natural, $p = 0.71$

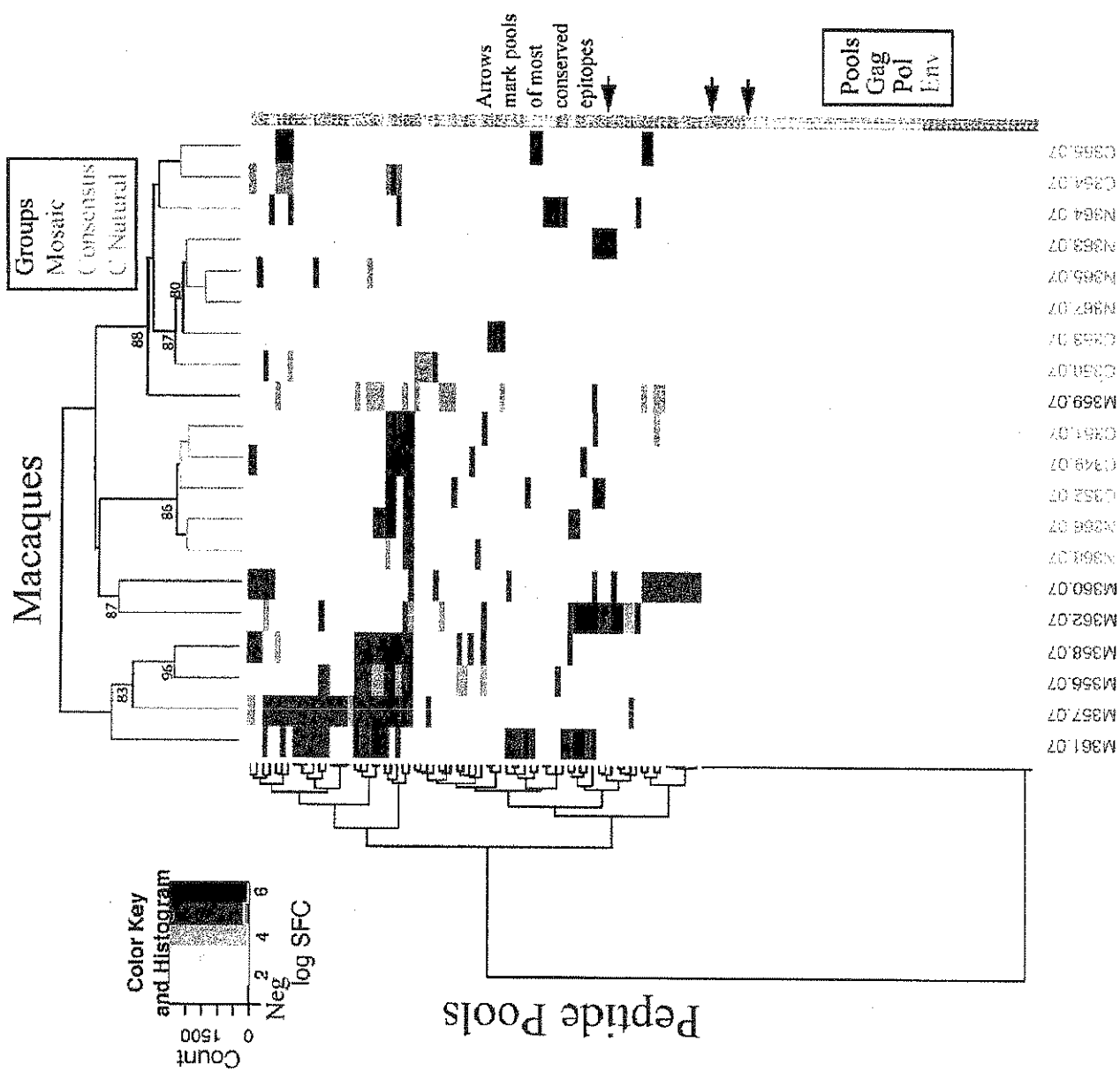
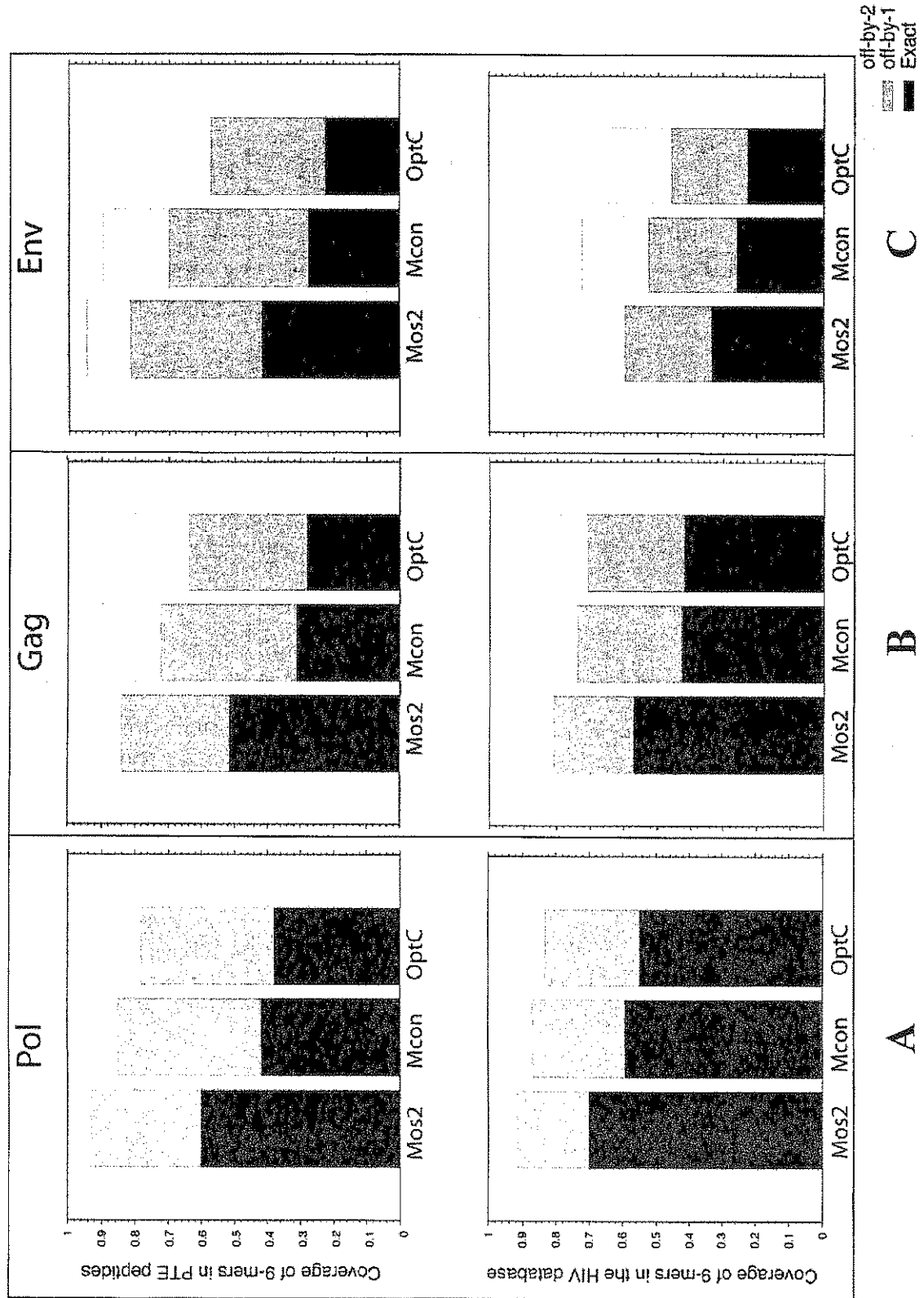


Figure 4
PTE and M group 9-mer coverage of different vaccine candidates



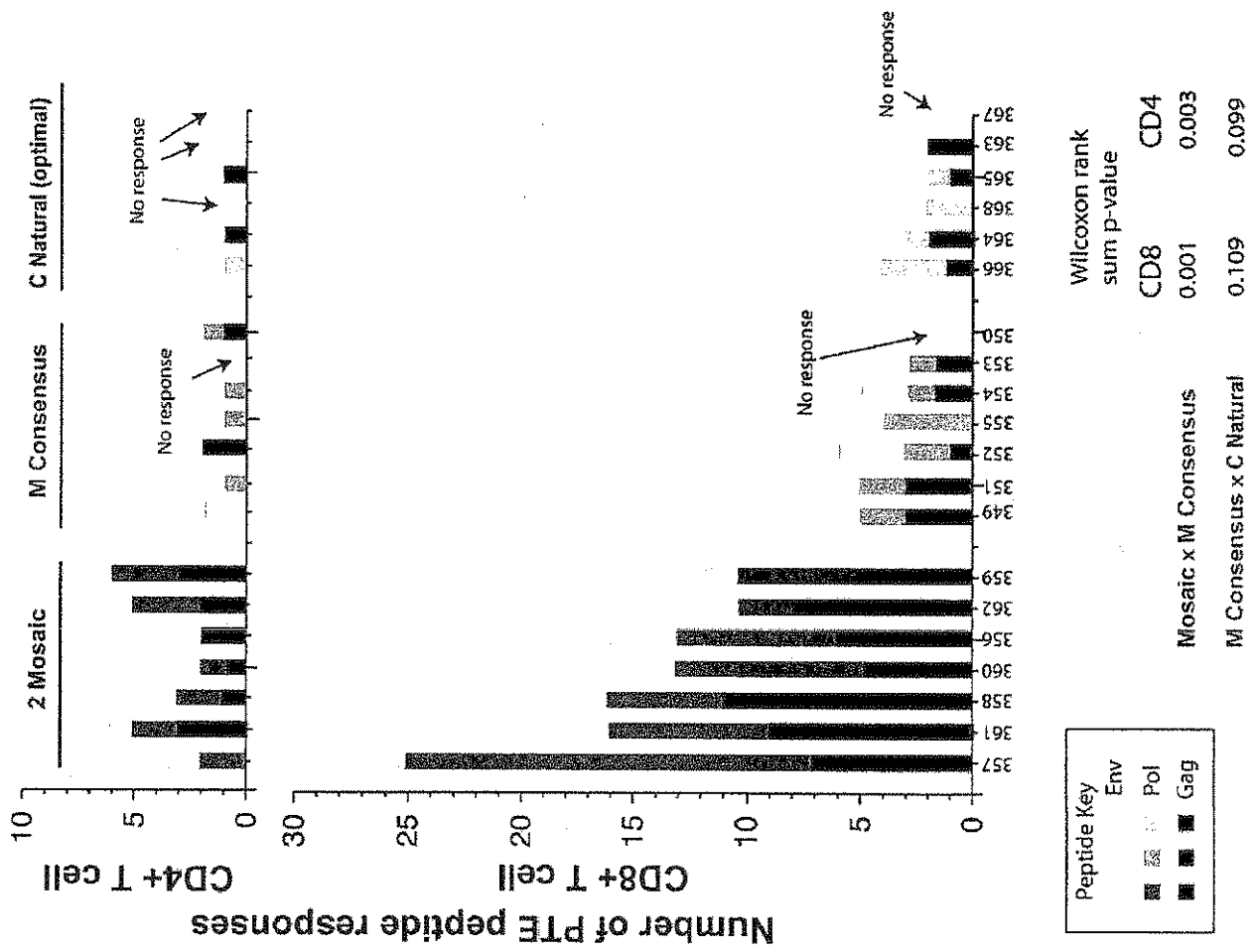


Figure 6

- CD8 T cells: median (range)
 - 2 Mosaic: 16 (12-29)
 - Mcon: 6 (0-7)
 - OptC: 3 (0-7)
- CD4 T cells:
 - 2 Mosaic: 4 (2-6)
 - Mcon: 1 (0-2)
 - OptC: 0.5 (0-2)

Figure 8

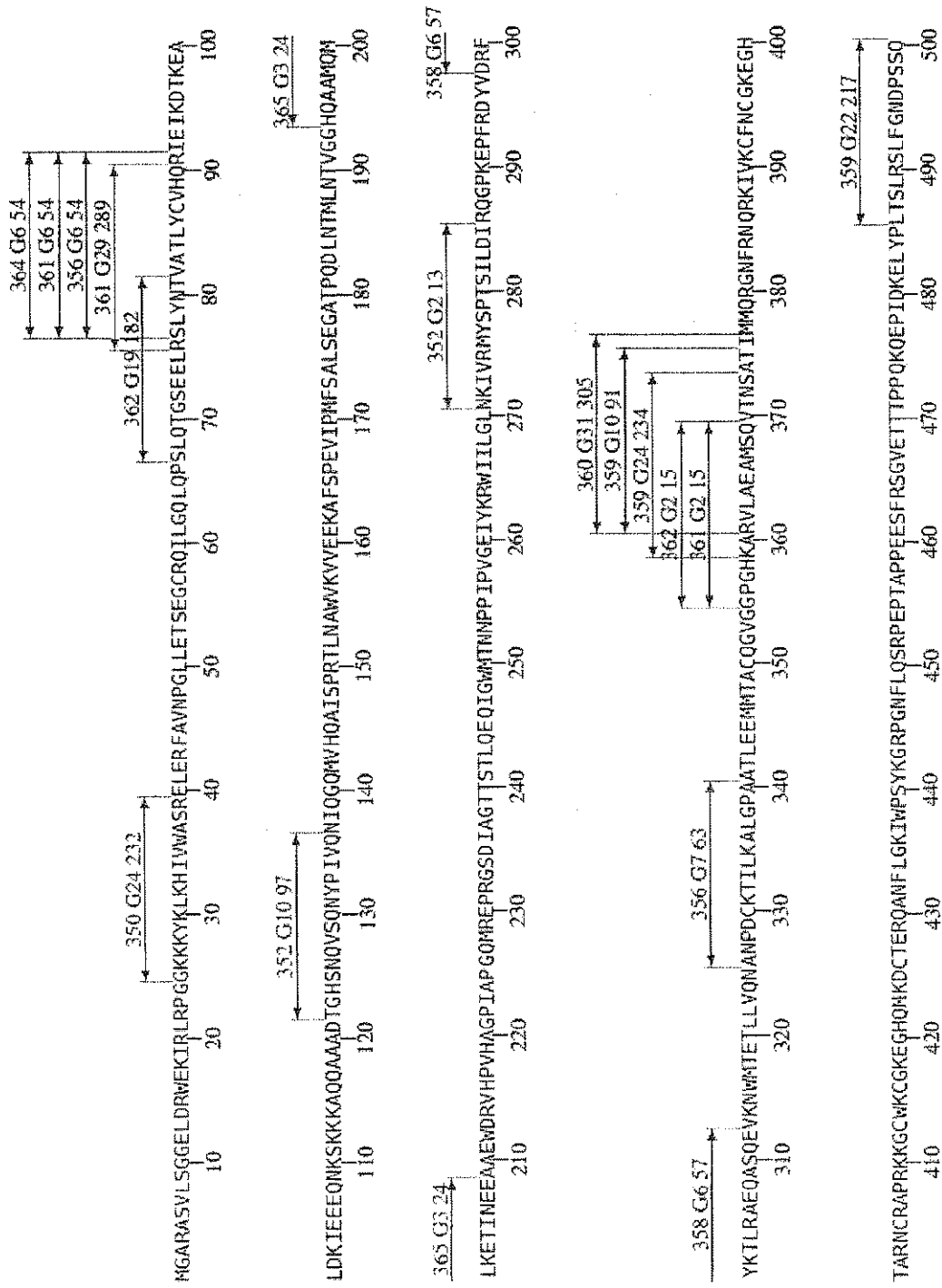


Figure 9

OptC 366-07:

5 CD8 responses:

OptC	IVQQQSNLLRAIEAQQ			
E54	VVQQQSNLLRAIEAQ	Env	548	562
E72	-VQQQNNLLRAIEAQH	Env	549	563

OptC	AVFIHNFKRKGGIGGY			
P22	AVFIHNFKRKGGIGG	Pol	894	908
P236	-VLIHNFKRKGGIGGY	Pol	895	909

OptC	MAICEEMEKEGKITK			
P224	TAICEEMEKEGKITK	Pol	190	204

OptC	CTHGIKPVVSTQILL			
E15	CTHGIKPVVSTQILL	Env	247	261

OptC	GGPSHKARVLAEMMS			
G76	GGPSHKARVLAEMMG	Gag	354	368

1 CD4 response:

OptC	LIQVQRDQAEHLKTA			
P86	LIQVQRDQAEHLKTA	Pol	876	890

Figure 10

Mos1	ICTTTPWNASWSNKSL	T...A
Mos2	ICTTAVPWNTSWSNKSQ	T...S
E334	ICTTTPWNASWSNR	A...A
E214	-CTTTPWNSSWSNKT	A...T
E158	--TTAVPWNASWSNKSL	
E290	--TTAVPWNTSWSNKSL	

Figure 11

8 CD8 responses:			5 CD4 responses:		
Mos1	EQLIKERVYLSWVPAHKGIG		Mos1	RSLYNTVATLYCVHQH	
Mos2	EQLIKKEKVYLAWVPAHKGIG		Mos2	RSLENTVATLYCVHAE	76
P221	BELIKKEKVYLAWVP	Pol	G289	KSLENTVATLYCVHAE	90
P250	BELIKKEKVYLSWVP	Pol	G54	-SLYNTVATLYCVHQH	77
P316	-KLIERKDVYLSWVPA	Pol			91
P223	--LIKERVYLSWVPAH	Pol	Mos1	YVTDGRGQKIVSLTE	
P169	-----EKVYLAWVPAHKGIG	Pol	Mos2	YVTDGRGQKVVSLTD	
P83	-----EKVYLSWVPAHKGIG	Pol	P134	YVTDGRGQKVVSLTE	612
				626	
Mos1	CTHGIRPVVSTQLLL				
Mos2	CTHGIRPVVSTQLLL				
E15	CTHGIRPVVSTQLLL	Env	Mos1	CTTVPWNASWSNKS	
E47	CTHGIRPVVSTQLLL	Env	Mos2	CTTAVPWNISWSNKS	
			E53	CTTNVPWNSSWSNKS	604
Mos1	ICTTVPWNASWSNKS			618	
Mos2	ICTTAVPWNISWSNKSQ				
E334	ICTTVPWNASWSNR	Env	Mos1	WWAGIQOEFEGIPYNP	
E214	-CTTVPWNSSWSNKT	Env	Mos2	WWAGIQOEFEGIPYNP	
E158	--TTAVPWNASWSNKS	Env	P135	WWAGIQOEFEGIPYNP	846
E290	--TTAVPWNISWSNKS	Env		860	
Mos1	ACQGVGCGFCHKARVLAEMS		Mos1	GFCHKARVLAEMSQ	
Mos2	ACQGVGCGFCHKARVLAEMS		Mos2	GFCHKARVLAEMSQ	
G166	ACQGVGCGFCHKARVL	Gag	G15	GFCHKARVLAEMSQ	355
G76	-----GGFCHKARVLAEMG	Gag		369	
Mos1	AAEWDRVHPVHAGPIAPGQ				
Mos2	AAEWDRVHPVHAGPVAPGQ				
G319	AAE--DRLHPVHAGPIP	Gag			
G242	-ADWDRVHPVHAGPVA	Gag			
G44	-AEWDRVHPVHAGPIA	Gag			
G277	--WDRVHPVHAGPNPPG	Gag			
G102	----DRVHPVHAGPIPPGQ	Gag			
Mos1	HSNWRAMASDFNLPP				
Mos2	HSNWRAMASEFNLPP				
P93	HSNWRAMASDFNLPP	Pol			
Mos1	KGRPGNFLOQRPEPT				
Mos2	KGRPGNFLOQRPEPT				
G86	KGRPGNFLOQRPEPT	Gag			
Mos1	SRELERFAVNPGLLE				
Mos2	SRELERFALNPGLLE				
G39	SRELERFALNPGLLE	Gag			

Figure 12

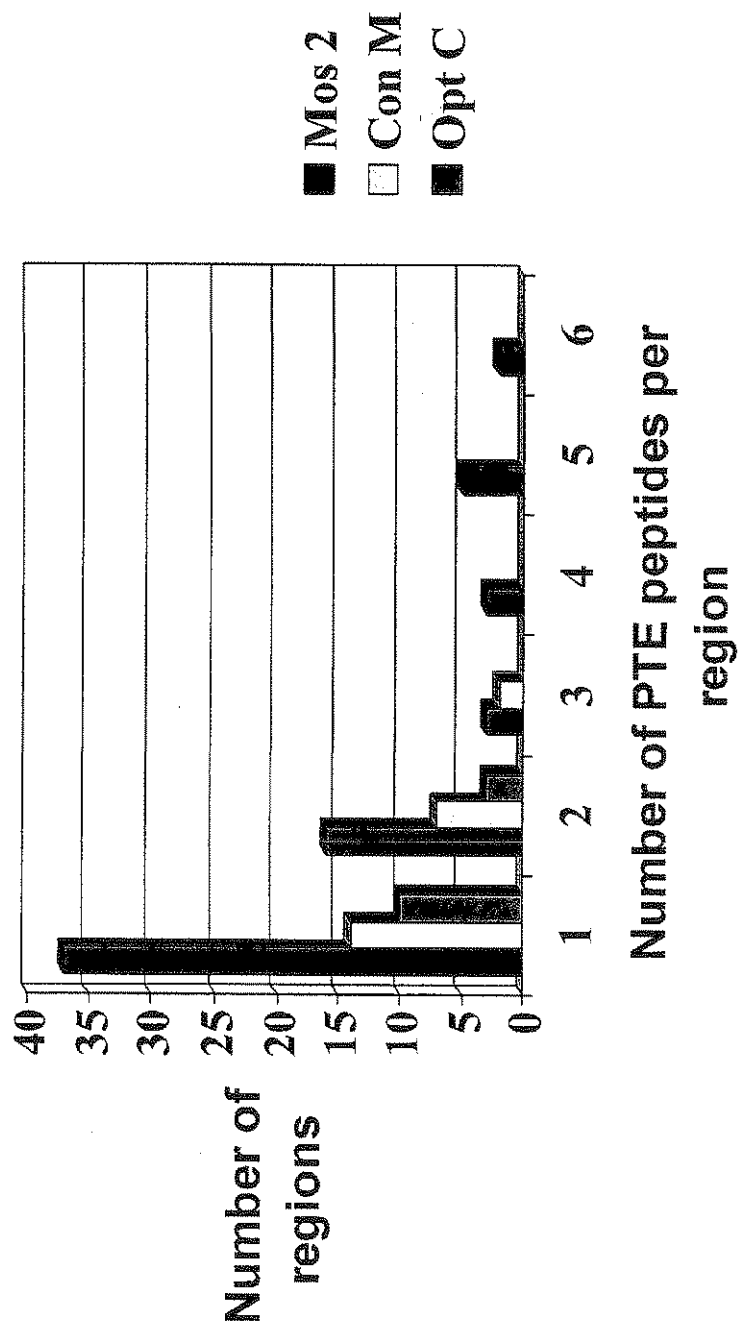


Figure 13

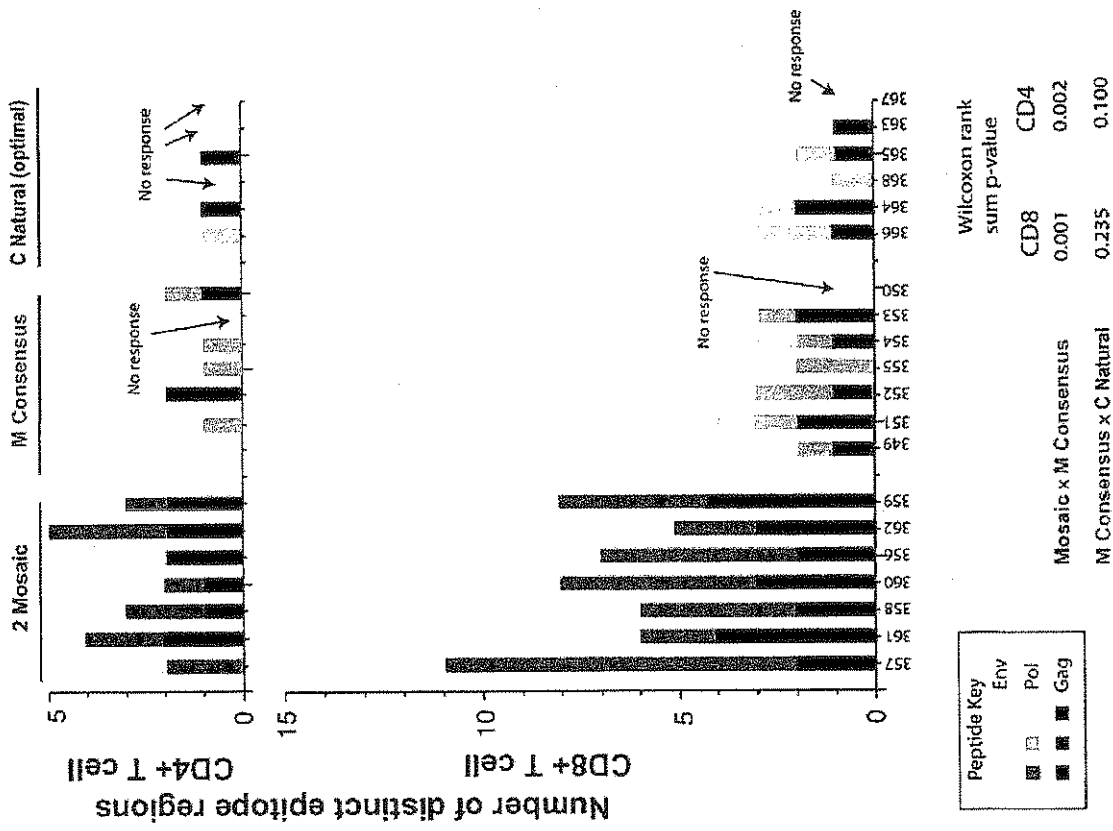
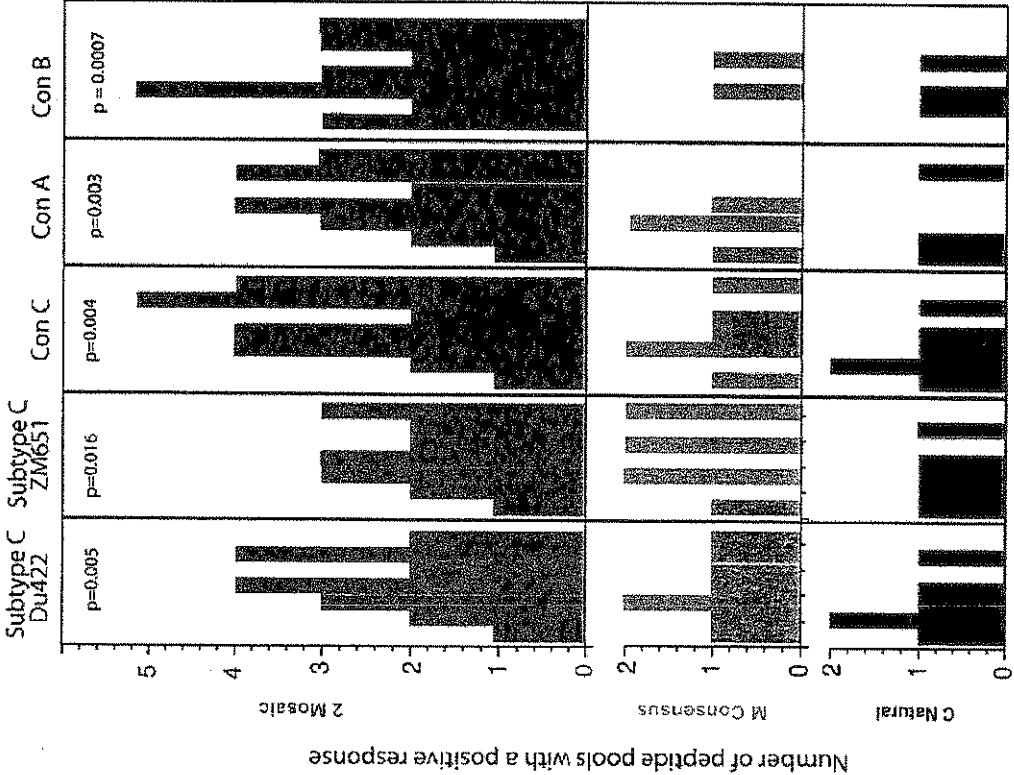


Figure 14

- CD8 T cells: median (range)
 - 2 Mosaic: 8 (7-14)
 - Mcon: 3 (0-6)
 - OptC: 1.5 (0-5)
- CD4 T cells:
 - 2 Mosaic: 3 (2-5)
 - Mcon: 1 (0-2)
 - OptC: 0.5 (0-2)

Figure 15

Testing responses in vaccine groups against
Positive Peptides Pools based on 5 different Gags



Each animal's responses to each of the sets of peptides
The p values are Wilcoxon rank tests, Mosaic x M con.
M con and C optimal natural were not significantly different.

Figure 16

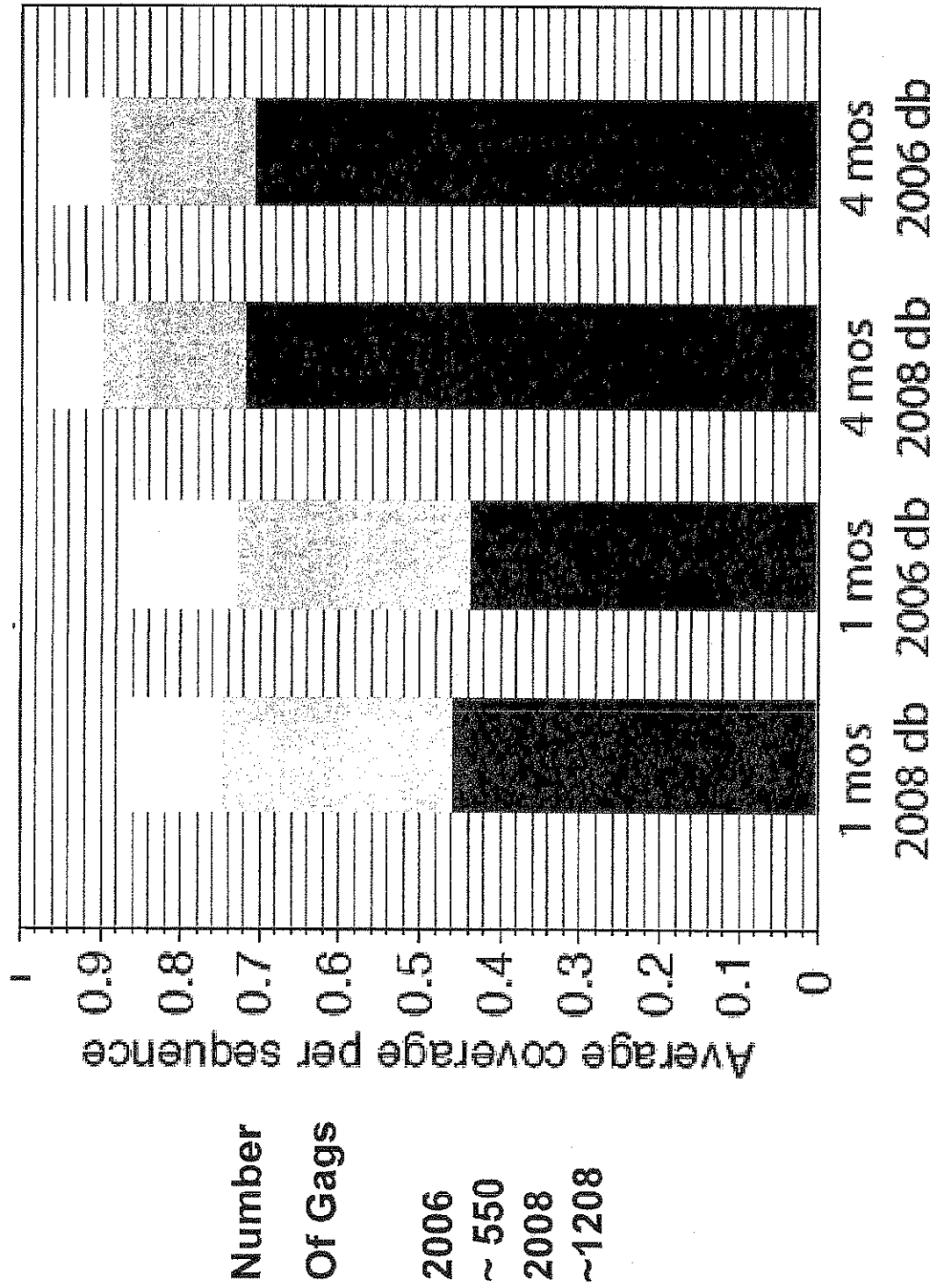


Figure 17

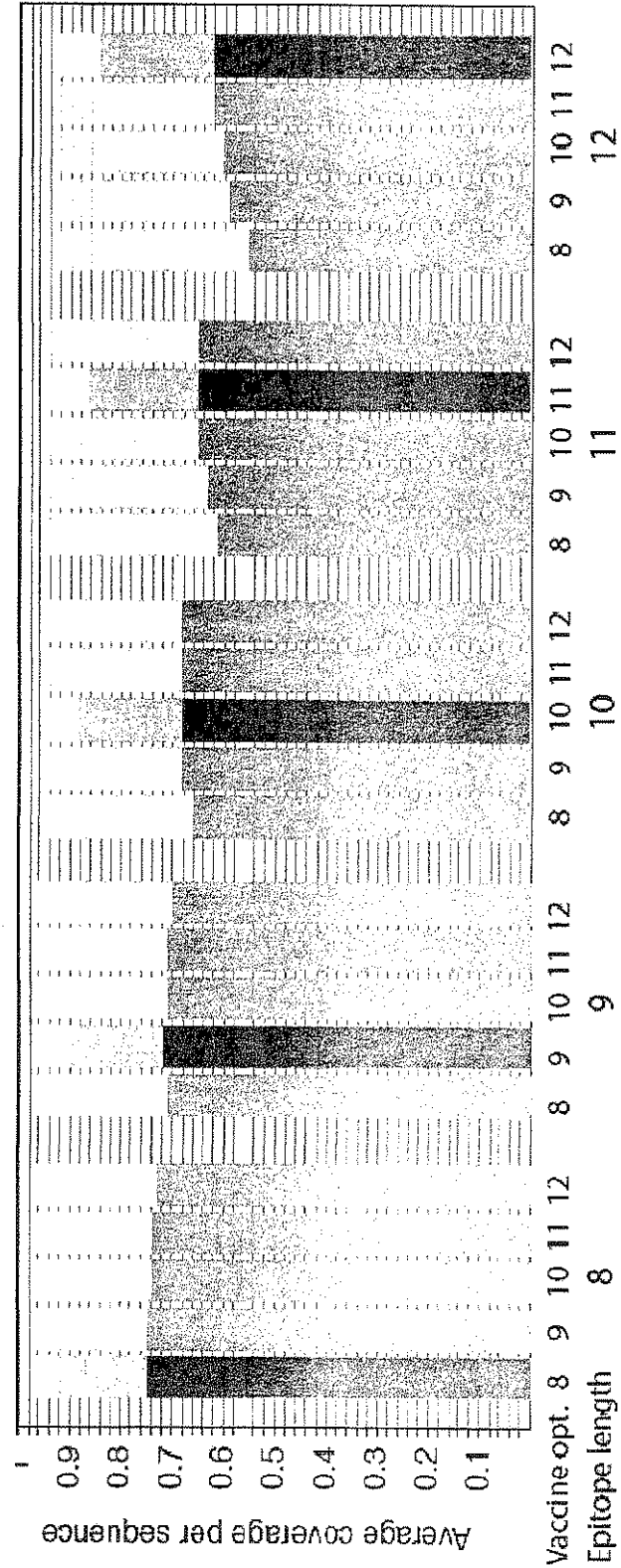


Figure 18

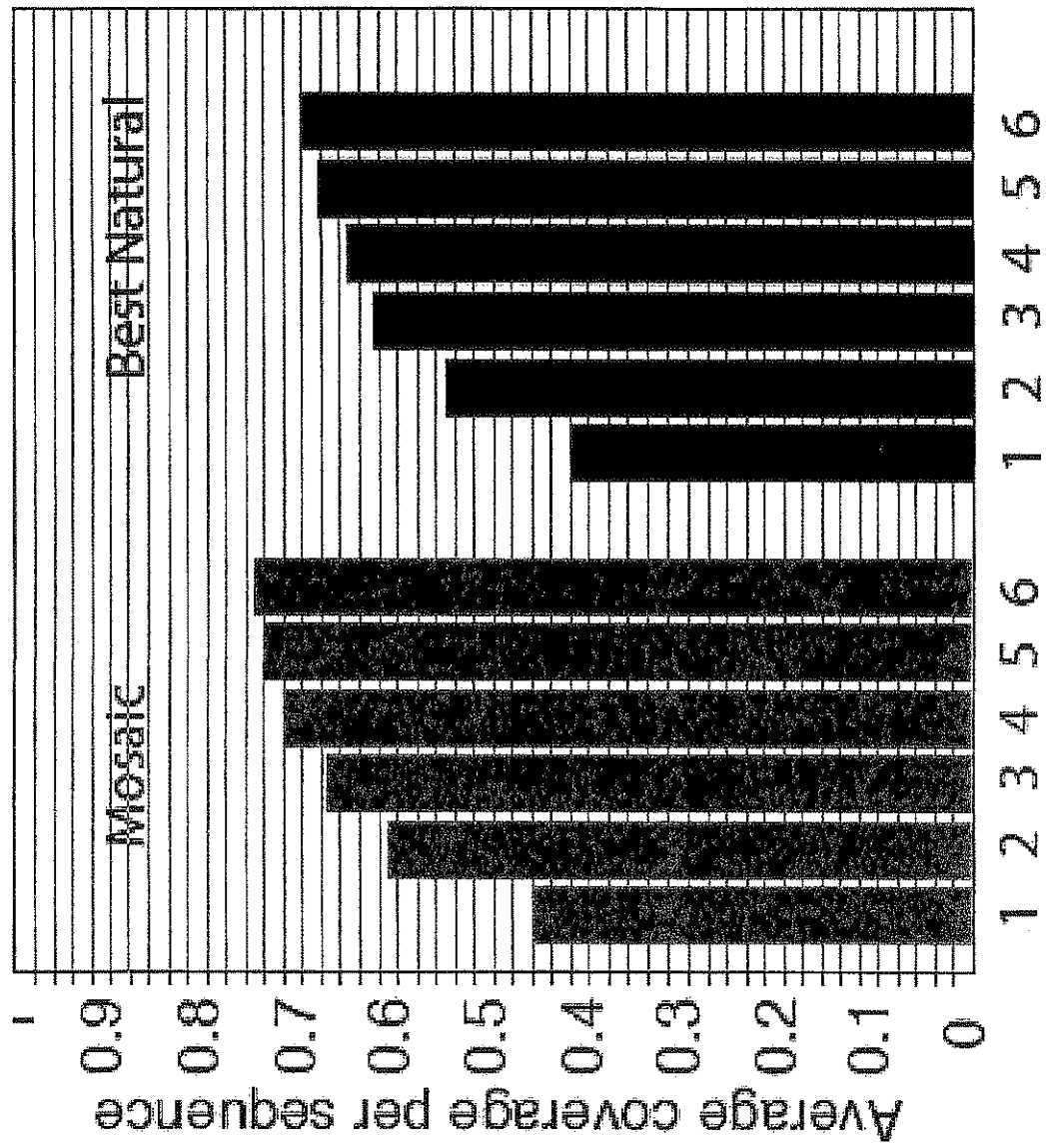


Figure 19

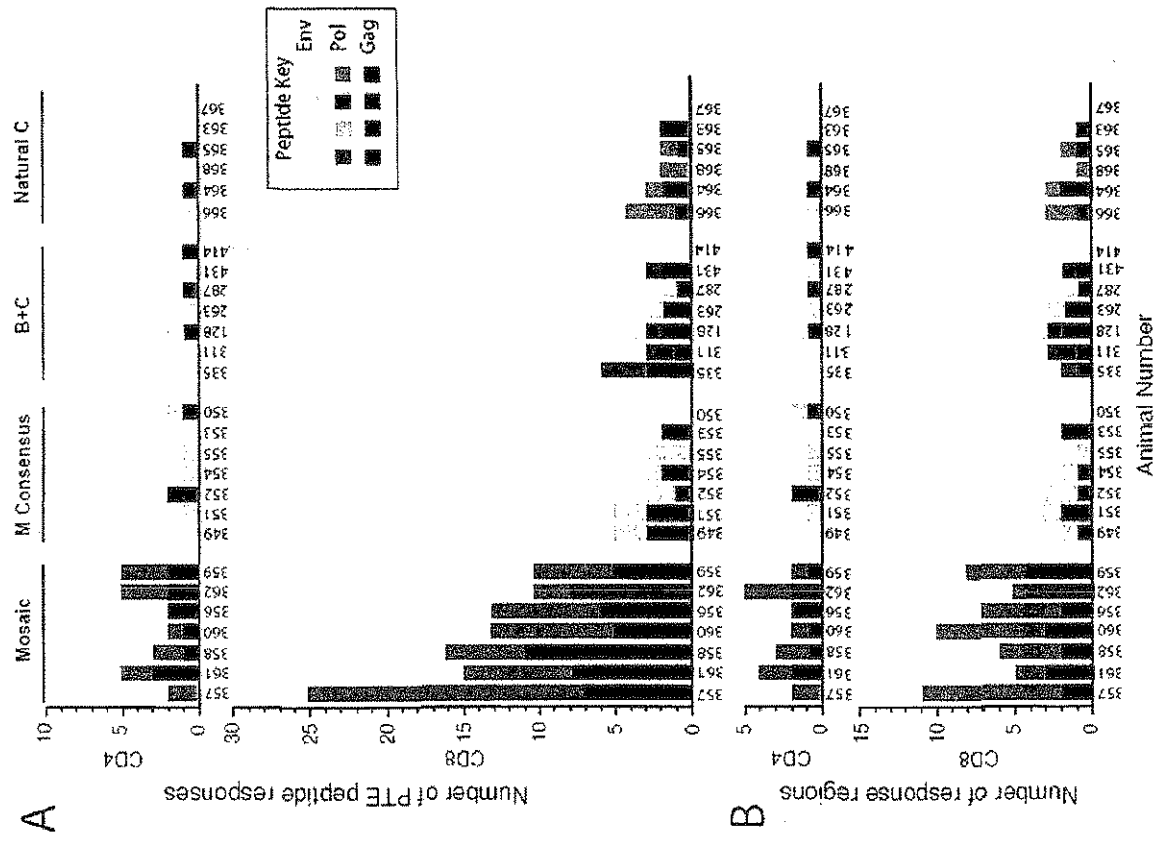
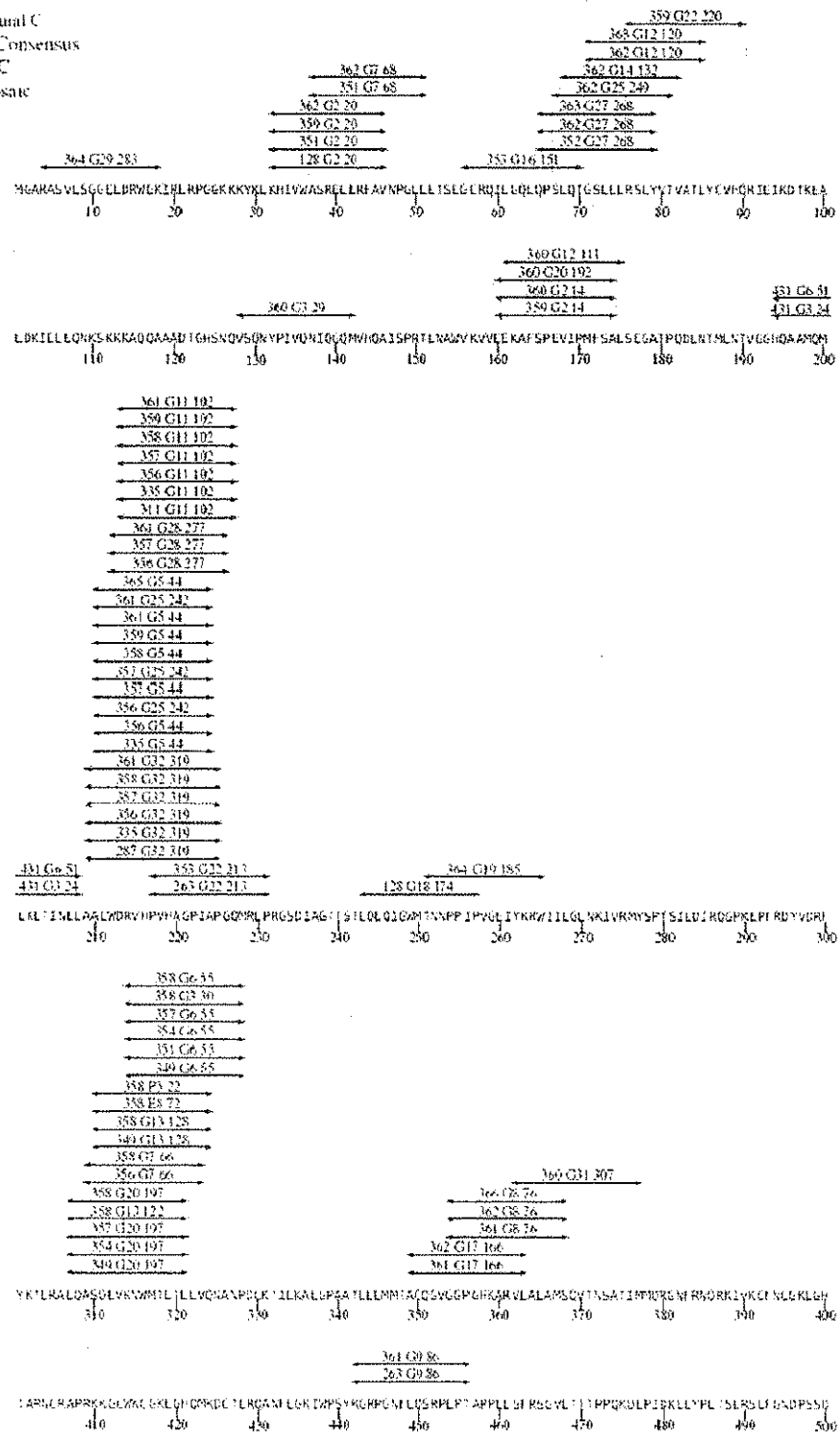


Figure 20A

CD8 Gag

Natural C
M Consensus
B+C
Mosaic



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Figure 20B

CD8 Pol

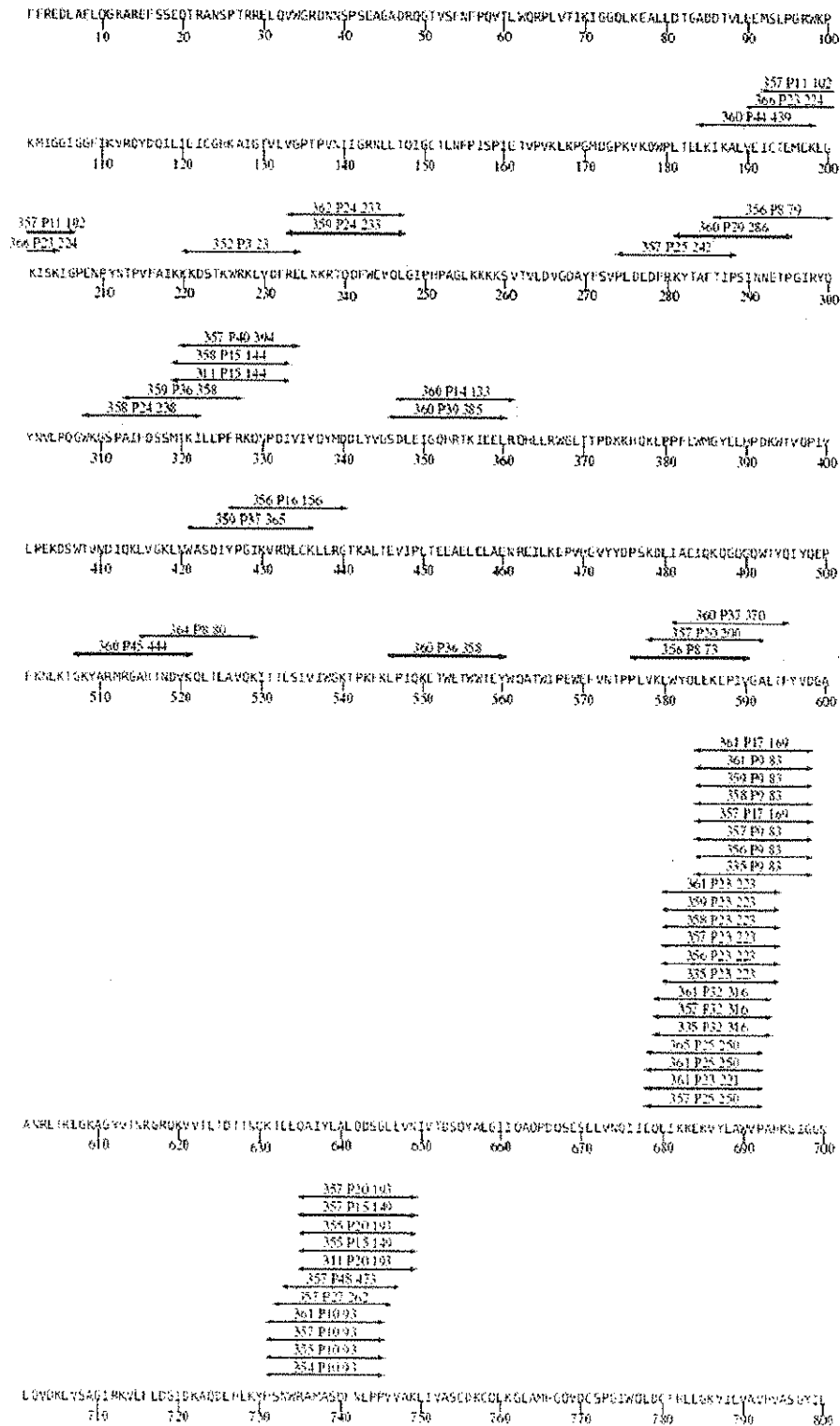


Figure 20B (con't)

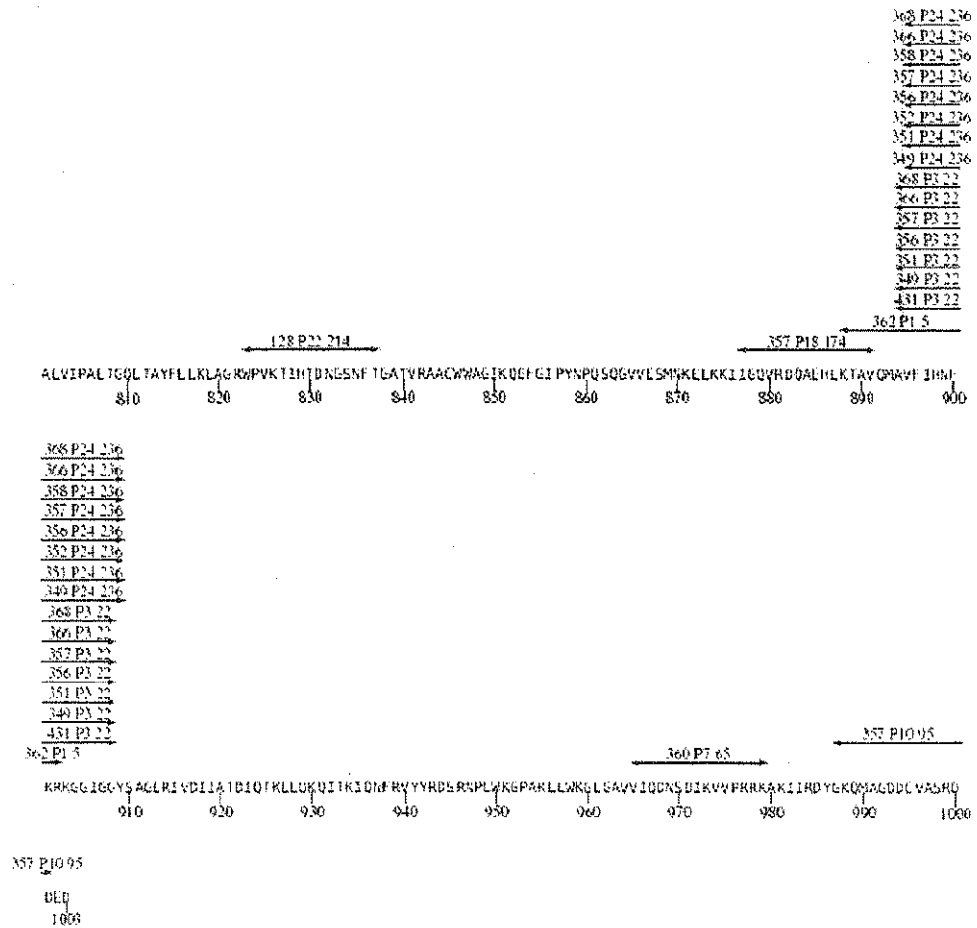


Figure 21A

CD4 Gag

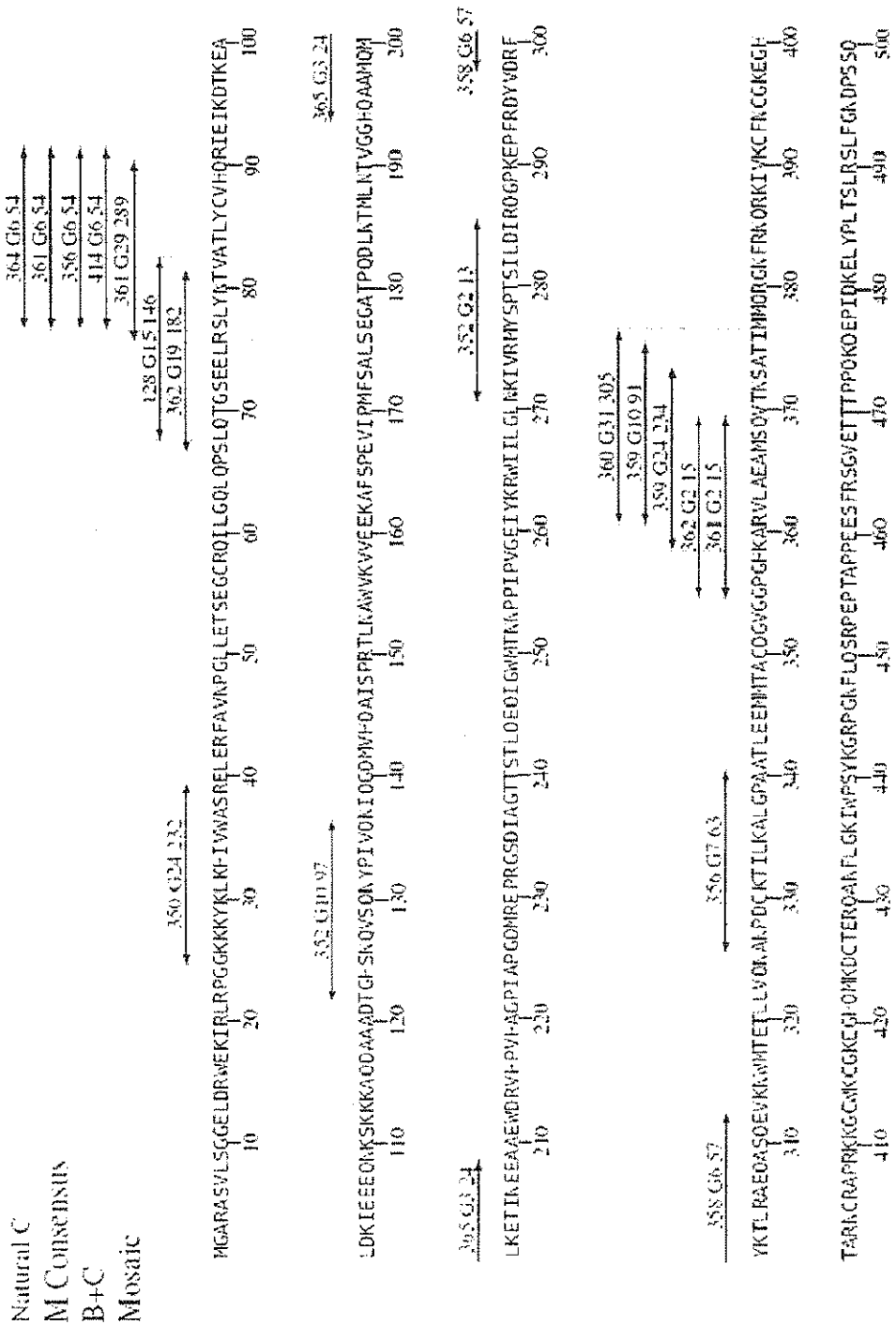


Figure 21B

CD4 Pol

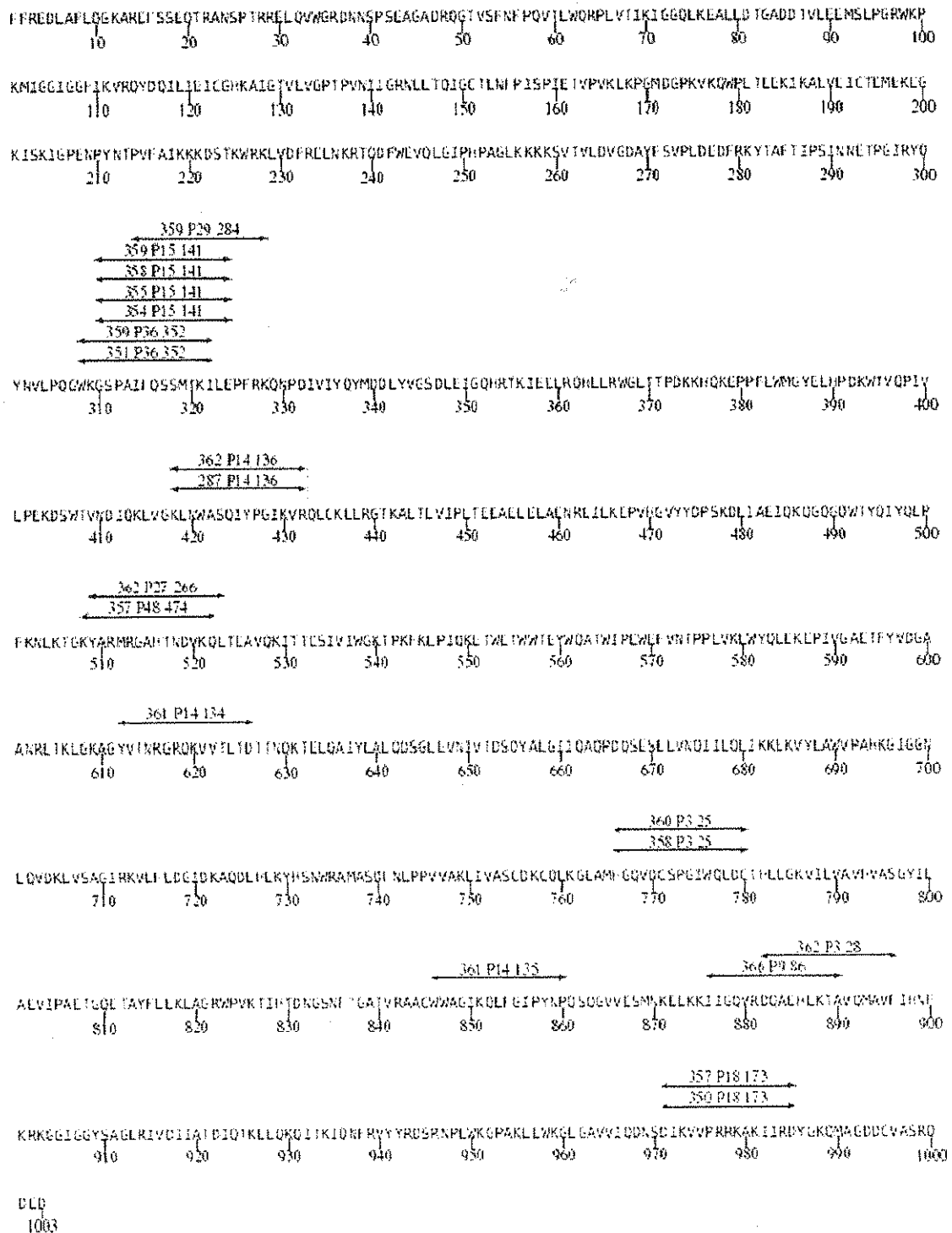


Figure 21C

CD4 Env

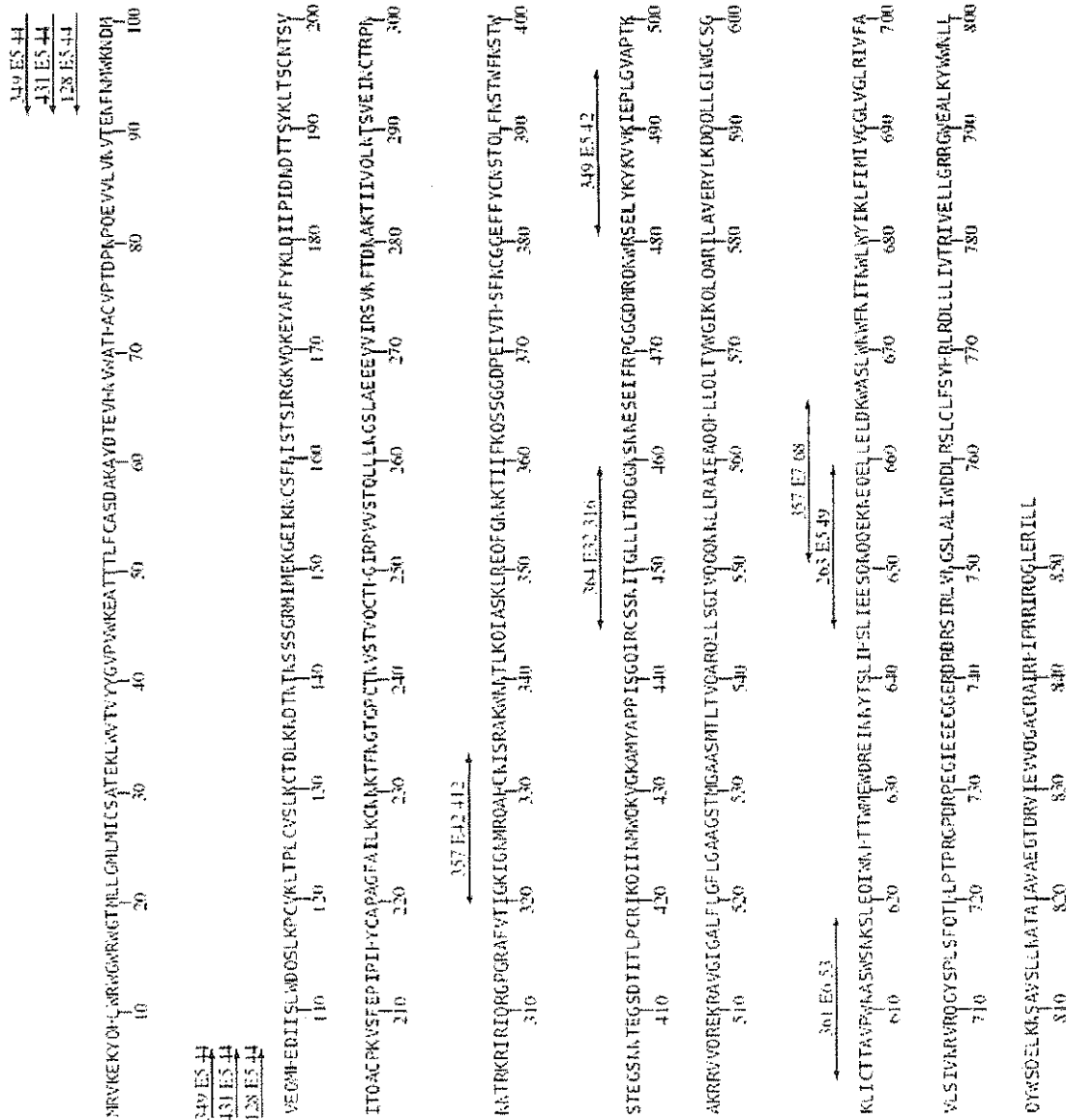


Figure 22

Reactive peptides and breadth and depth of responses: Clade B+C Vaccine

Clade B+C 287-95:

3 CD8 PTE+, 1 CD4 PTE+

2 CD8+ regions, 1 CD4+ region

Number of overlapping peptides per region: CD8: 1 2 CD4: 1

3 CD8 responses:

C AAEWDRLEHPVHAGPIA

B AAEWDRLEHPVHAGPIA

G319 AAE-DRLHPVHAGPIPGag 209 225

C EQMHEDIISLWDQSLK

B EQMHEDIISLWDQSLK

E28 EQMHEDIISLWDQSL Env 102 116

E282 HMHEDIISLWDESLK Env 103 117

1 CD4 response:

C KLNWASQIYSGIKVR

B KLNWASQIYPGIKVR

P136 KLNWASQIYAGIKVK Pol 416 432

Clade B+C 128-92:

5 CD8 PTE+, 2 CD4 PTE+

5 CD8+ regions, 2 CD4+ regions

Number of overlapping peptides per region: CD8: 1 1 1 1 1 CD4: 1 1

5 CD8 responses:

C KHLVWASRELERFAL

B KHLVWASRELERFAV

G20 KHLVWASRELERFAL Gag 32 46

C LQEQIAWMTNPPFVP

B LQEQIGWMTNPPPIF

G174 LAEQIAWMTSNPPPIF Gag 243 257

C QMHEDIISLWDQSLK

B QMHEDIISLWDQSLK

E282 HMHEDIISLWDESLK Env 103 117

C DIWDNMTWMQWDREI

B EIWDNMTWMEWEREI

E297 EIWNMTWMENEKEI Env 621 635

C WPKVIHTANGSNFT

B WPKTIHTANGSNFT

P214 WPKVVTHTDNGSNFT Pol 823 837

2 CD4 responses:

C AQTGTEELRSLYNTV

B LQTGSEELRSLYNTV

G146 LQTGSEELKSLNTV Gag 88 92

C YFNMWKNDMVDQMHE

B NFNMWKNNMVEQMHE

E344 NFNMWKNNMVEQMHE Env 92 106

Figure 22 (con't)

Clade B+C 263-00:

3 CD8 PTE+, 1 CD4 PTE+

3 CD8+ regions, 1 CD4+ region

Number of overlapping peptides per region: CD8: 1 1 1 CD4: 1

3 CD8 responses:

C	GRFGNFLQSRPEPT			
B	GRFGNFLQSRPEPT			
G86	GRFGNFLQNRPEPT	Gag	442	456

C	PVHAGPIAPGQMREP			
B	PVHAGPIAPGQMREP			
G213	PVQAGPIAPGQMREP	Gag	217	231

C	VQQQSNLLRAIEAQQ			
B	VQQQNNLLRAIEAQQ			
E72	VQQQNNLLRAIEAQH	Env	549	563

1 CD4 response:

C	LLEESQNQQEKNEKD			
B	LLEESQNQQEKNEQE			
E49	LLEESQNQQEKNEQD	Env	645	659

Clade B+C 311-00:

5 CD8 PTE+, 0 CD4 PTE+

5 CD8+ regions, 0 CD4+ region

Number of overlapping peptides per region: CD8: 1 1 1 1 1 CD4: 0

5 CD8 responses:

C	DRLHPVHAGPIAPGQ			
B	DRLHPVHAGPIAPGQ			
G102	DRVHPVHAGPIPPGQ	Gag	213	227

C	GDIIGDIRQAHCNIS			
B	GEIIGDIRQAHCNIS			
E64	GDIIGDIRQAHCNIS	Env	321	334

C	TGMLRNCQPWWIWGI			
B	KGIRKNYQHLWRWGT			
E459	KEIRKNYQHLWRWGT	Env	4	16

C	MTKILEPFRKNPEI			
B	MTKILEPFRKQNPDI			
P144	MTKILEPFRKQNPDI	Pol	319	323

C	RAMASEFNLPVVAK			
B	RAMASDFNLPVVAK			
P193	KAMASDFNLPPIVAK	Pol	735	749

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Figure 22 (con't)

Clade B+C 335-96:

6 CD8 PTE+, 0 CD4 PTE+

2 CD8+ regions, 0 CD4+ region

Number of overlapping peptides per region: CD8: 3 3 CD4: 0

6 CD8 responses:

C	AAEWDRLHPVHAGPIAPGQ			
B	AAEWDRLHPVHAGPIAPGQ			
G319	AAE-DRLHPVHAGPIP	Gag	209	225
G44	AEWDRLHPVHAGPIA	Gag	210	224
G102	DRVHPVHAGPIPPGQ	Gag	213	227

C	QLINKERVYLSWVPAHKGIG			
B	QLIKKEKVYLAWVPAHKGIG			
P316	KLIEKDKVYLSWVPA	Pol	679	693
P223	LIKERVYLSWVPAH	Pol	680	694
P83	EKVYLSWVPAHKGIG	Pol	684	698

Clade B+C 414-95:

0 CD8 PTE+, 1 CD4 PTE+

0 CD8+ regions, 1 CD4+ region

Number of overlapping peptides per region: CD8: 0 CD4: 1

1 CD4 responses:

C	SLYNTVATLYCVHAG			
B	SLYNTVATLYCVHQK			
G54	SLYNTVATLYCVHQK	Gag	77	91

Clade B+C 431-01:

3 CD8 PTE+, 1 CD4 PTE+

2 CD8+ regions, 1 CD4+ region

Number of overlapping peptides per region: CD8: 2 1 CD4: 1

3 CD8 responses:

C	HQAAMQMLKDTINEE			
B	HQAAMQMLKETINEE			
G24	HQAAMQMLKDTINEE	Gag	194	208
G51	HQAAMQMLKETINEE	Gag	194	208

C	AVFIHNFKRKGGIGG			
B	AVFIHNFKRKGGIGG			
P22	AVFIHNFKRKGGIGG	Pol	894	908

1 CD4 response:

C	YFNMWKNDMVDQMHE			
B	NFNMWKNNMVEQMHE			
E44	NFNMWKNNMVEQMHE	Env	92	106

Figure 22 (con't)

Reactive peptides and breadth and depth of responses: M Consensus Vaccine

M consensus 349-07:

7 CD8 PTE-, 2 CD4 PTE+

3 CD8+ regions, 2 CD4+ regions

Number of overlapping peptides per region: CD8: 3 2 2 CD4: 1 1

3 CD8 responses:

Moon	EQATQDVKNWMTDTLLVQANAF			
G197	EQSTQEVKNWMTDTL	Gag	307	321
G128	---TQEVKNWMTDTLLIQ	Gag	310	324
G55	-----KNWMTDTLLVQANAF	Gag	314	323

Moon	IVQQQSNLLRAIEAQQ			
E54	IVQQQSNLLRAIEAQ	Env	548	562
E72	-VQQQSNLLRAIEAQH	Env	549	563

Moon	AVFIHNEFKRKGIGGY			
P22	AVFIHNEFKRKGIGG	Pol	894	908
P236	-VLIHNEFKRKGIGGY	Pol	895	909

2 CD4 responses:

Moon	SELYKYKVVKIEPLG			
E40	SELYKYKVVKIEPLG	Env	481	495

Moon	NFNMWKNNMVEQMHE			
E44	NFNMWKNNMVEQMHE	Env	92	106

M consensus 350-07:

2 CD8 PTE-, 2 CD4 PTE+

3 CD8+ regions, 2 CD4+ regions

Number of overlapping peptides per region: CD8: none CD4: 1 1

2 CD4 responses:

Moon	GKKKYRLKHLVWASR			
G232	GKKKYRLKHLVWASR	Gag	25	39

Moon	DIKVVPRRKAKIIRD			
P173	DIKVVPRSKVKIIRD	Pol	971	985

M consensus 351-07:

7 CD8 PTE-, 1 CD4 PTE+

4 CD8+ regions, 1 CD4+ regions

Number of overlapping peptides per region: CD8: 2 2 2 1 CD4: 1

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4 CD8 responses:

Mcon	KHLVWASRELERFALNPGLL			
G20	KHLVWASRELERFAL	Gag	32	46
G68	-----ASRELERFAVNPGLL	Gag	37	5
Mcon	IVQQQSNLLRAIEAQQ			
E6	VVQQQSNLLRAIEAQ	Env	548	562
E8	-VQQQNNLLRAIEAQH	Env	549	563
Mcon	AVFIHNFKRKGGIGGY			
P22	AVFIHNFKRKGGIGG	Pol	894	908
P236	-VLIHNFKRKGGIGGY	Pol	895	909
Mcon	KNWMTDTLLVQNANP			
G55	KNWMTDTLLVQNANP	Gag	314	328

1 CD4 response:

Mcon	WKGSPAIFQSSMTKI			
P352	WKGSPAIFQASMTKI	Pol	308	322

M consensus 352-07:

6 CD8 PTE+, 2 CD4 PTE+

6 CD8+ regions, 2 CD4+ regions

Number of overlapping peptides per region: CD8: 1 1 1 1 1 1 CD4: 1

6 CD8 responses:

Mcon	QPALQTGSEELRSLY			
G268	LPALKTGSEELRSLY	Gag	65	79
Mcon	IVQQQSNLLRAIEAQ			
E54	VVQQQSNLLRAIEAQ	Env	548	562
Mcon	CSGKLICTTTVPWNS			
E73	CSGKLICTTAVPWNS	Env	598	612
Mcon	AKAYDTEVHNVWATH			
E215	AKAYEKEVENVWATH	Env	58	72
Mcon	KKDSTKWRKLVDFRE			
P23	KKDSTKWRKLVDFRE	Pol	220	234
Mcon	VFIHNFKRKGGIGGY			
P236	VLIHNFKRKGGIGGY	Pol	895	909

2 CD4 responses:

Mcon	NKIVRMYSFVSILDI			
G13	NKIVRMYSFVSILDI	Gag	271	285
Mcon	KGNSSKVSQNYPIVQ			
G97	TENSSQVSQNYPIVQ	Gag	102	136

Figure 22 (con't)

M consensus 353-07:

2 CD8 PTE+, 0 CD4 PTE+

2 CD8+ regions, 0 CD4+ regions

Number of overlapping peptides per region: CD8: 1 1 CD4: none

2 CD8 responses:

Mcon GCKQIIGQLQFALQT

G151 GCRQILGQLQPSLQT Gag 56 70

Mcon PVHAGPIPPGQMREP

G213 PVQAGPIAPGQMREP Gag 217 231

M consensus 354-07:

5 CD8 PTE+, 1 CD4 PTE+

3 CD8+ regions, 1 CD4+ regions

Number of overlapping peptides per region: CD8: 2 2 1 CD4: 1

3 CD8 responses:

Mcon EQATQDVKNWMTDTLLVQNANF

G197 EQSTQEVKNWMTDTL Gag 307 321

G55 -----KNWMTDTLLVQNANF Gag 314 328

Mcon IVQQQSNNLLRAIEAQQ

E54 VVQQQSNNLLRAIEAQ Env 548 562

E72 -VQQQNNLLRAIEAQH Env 549 563

Mcon HSNWRAMASDFNLPP

P93 HSNWRAMASDFNLPP Pol 731 745

1 CD4 response:

Mcon GSPAIFQSSMTKILE

P141 GSPAIFQSSMTKILD Pol 310 324

M consensus 355-07:

3 CD8 PTE+, 1 CD4 PTE-

2 CD8+ regions, 1 CD4- regions

Number of overlapping peptides per region: CD8: 1 3 CD4: 1

2 CD8 responses:

Mcon IIGDIRQAHCNISGT

E325 ITGDIRQAHCNVRS Env 322 336

Mcon SNWRAMASDFNLPPIVAK

P93 SNWRAMASDFNLPP Pol 731 745

P149 ---RTMASDFNLPPVAK Pol 735 749

P193 ---KAMASDFNLPPIVAK Pol 735 749

1 CD4 response:

Mcon GSPAIFQSSMTKILE

P141 GSPAIFQSSMTKILD Pol 310 324

Figure 22^{33/51} (con't)

Reactive peptides and breadth and depth of responses: Mosaic Vaccine

Mosaic 356-07:

15 CD8 PTE+, 2 CD4 PTE+

8 CD8+ regions, 2 CD4+ regions

Number of overlapping peptides per region: CD8: 5 3 1 2 1 1 1 2 CD4: 1 1

8 CD8 responses:

Mos1	AAEWDRVHPVHAGPIAFGQ			
Mos2	AAEWDRLHPVHAGPVAFGQ			
G319	AAE-DRLEPVPVHAGPIF	Gag	209	225
G44	-AEWDRLHPVHAGPIA	Gag	210	224
G242	-AEWDRLHPVHAGPVA	Gag	210	224
G277	---WDRVHPVHAGPNPPG	Gag	212	226
G102	----DRVHPVHAGPIPPGQ	Gag	213	227

Mos1	IVQQQNNLLRAIEAQQ			
Mos2	IVQQQSNLLRAIEAQQ			
E54	VVQQQSNLLRAIEAQ	Env	549	562
E72	-VQQQNNLLRAIEAQH	Env	549	563
E191	-VQQQSNLLRAIEAQQ	Env	549	563

Mos1	ASQDVKNWMTETLLV			
Mos2	ATQDVKNWMTDTLLV			
G66	ASQEVKNWMTETLLI	Gag	309	323

Mos1	AVFIHNFKRKGGIGGY			
Mos2	AVFIHNFKRKGGIGGY			
P22	AVFIHNFKRKGGIGG	Pol	894	908
P236	-VLIHNFKRKGGIGGY	Pol	895	909

Mos1	PLVKLWYQLEKDPIA			
Mos2	PLVKLWYQLEKEPIV			
P73	PLVKLWYQLEKEPIV	Pol	576	590

Mos1	TIPSTNNETPGIRYQ			
Mos2	TIPSINNETPGIRYQ			
P79	TIPSINNETPGIRYQ	Pol	286	300

Mos1	YPGIKVRQLCKLLRG			
Mos2	YAGIKVRQLCKLLRG			
P156	YPGIKVRQLCKLLRG	Pol	426	440

Mos1	LIKKERVYLSWVPAHKGIG			
Mos2	LIKKERVYLSWVPAHKGIG			
P223	LIKKERVYLSWVPAH	Pol	680	694
P83	----EKVYLSWVPAHKGIG	Pol	684	698

2 CD4 responses:

Mos1	SLYNTVATLYCVHQR			
Mos2	SLFNTVATLYCVHAE			
G54	SLYNTVATLYCVHQR	Gag	77	91

Mos1	ANPDCKTILKALGPA			
Mos2	ANPDCKTILRALGPG			
G63	ANPDCKTILRALGPG	Gag	326	340

Figure 22 (con't)

Mosaic 357-07:

29 CD8 PTE+, 4 CD4 PTE+

14 CD8+ regions, 4 CD4+ regions

Number of overlapping peptides per region: CD8: 5 2 2 5 5 0 1 1 1 1 1 1 1 1 CD4: 1 1 1 1

14 CD8 responses:

Mcs1 EQLIKKEKRVYLSWVPAHKGIG

Mcs2 EQLIKKEKRVYLSWVPAHKGIG

P350 EPLIKKEKRVYLSWVPAH

Pol 678 692

P316 -KLIKKEKRVYLSWVPAH

Pol 679 693

P223 --LIKKEKRVYLSWVPAH

Pol 680 694

P169 -----EKVYLSWVPAHKGIG

Pol 684 698

P93 -----EKVYLSWVPAHKGIG

Pol 684 698

Mcs1 IVQQQNNLLRAIEAQQ

Mcs2 IVQQQNNLLRAIEAQQ

E54 VVQQQNNLLRAIEAQQ

Env 549 562

E72 -VQQQNNLLRAIEAQQ

Env 549 563

Mcs1 EQASQDVKNWMTETLLVQNANP

Mcs2 EQATQDVKNWMTETLLVQNANP

G197 EOSTQDVKNWMTETLL

Gag 307 321

G55 -----KNWMTETLLVQNANP

Gag 314 328

Mcs1 HSNWRAMASDFNLPPVAK

Mcs2 HSNWRAMASDFNLPPVAK

P93 HSNWRAMASDFNLPP

Pol 731 745

P262 -SNWRAMASDFNLPP

Pol 732 746

P473 --NWRAMASDFNLPPVI

Pol 733 747

P149 ----RTMASDFNLPPVAK

Pol 735 749

P193 ----KAMASDFNLPPVAK

Pol 735 749

Mcs1 AEWDRVHPVHAGPIAPGQ

Mcs2 AEWDRLHPVHAGPVAPGQ

G319 AEDRLHPVHAGPIAP

Gag 209 225

G242 AEWDRLHPVHAGPVAP

Gag 210 224

G44 AEWDRLHPVHAGPIAP

Gag 210 224

G277 --WDRVHPVHAGPIAPGQ

Gag 210 226

G102 ---DRVHPVHAGPIAPGQ

Gag 213 227

Mcs1 AVFIHNFKRKGIGGY

Mcs2 AVFIHNFKRKGIGGY

P22 AVFIHNFKRKGIGG

Pol 894 908

P236 -VLIHNFKRKGIGGY

Pol 895 909

Mcs1 PLDEGFRKYTAFTIP

Mcs2 PLDEDFRKYTAFTIP

P242 PLDEGFRKYTAFTIP

Pol 274 288

Mcs1 TRILEPFRKQNPDIIV

Mcs2 TKILEPFRKQNPDIIV

P394 TKILEPFRKQNPDIIV

Pol 320 334

Mcs1 ICEEMEKEGKITKIG

Mcs2 ICTEMEKEGKITKIG

P112 ICTEMEKEGKITKIG

Pol 292 306

Mcs1 VKLWYQLEKDPVAGV

Mcs2 VKLWYQLEKEPIVGA

P200 VKLWYQLEKDPVAGV

Pol 573 590

Mcs1 GDIIGDIRQAHCNIS

Mcs2 GDIIGDIRQAHCNLS

E764 GDIIGDIRQAHCNIS

Env 321 334

Mcs1 ICTTTVPWNASWSNK

Mcs2 ICTTAVPWNTWSNK

E334 ICTTTVPWNASWSNR

Env 633 647

Figure 22 (con't)

X181	IGQVRDQAEHLKAV		
X182	IGQVRDQAEHLKAV		
E174	IFQVRQAEHLKAV	201	577 592
X181	GKQAGACDVAGRQD		
X182	GKQAGACDVAGRQD		
E185	GKQAGACDVAGRQD	201	587 601
4 CD4 responses:			
X181	KYAKRTAHTNDVKQ		
X182	KYAKRTAHTNDVKQ		
E174	KYAKRTAHTNDVKQ	201	502 522
X181	AGDIIGDIQAHCNL		
X182	AGDIIGDIQAHCNL		
E181	AGDIIGDIQAHCNL	EVV	300 333
X181	NOEKNEKDLALDS		
X182	NOEKNEKDLALDS		
E181	NOEKNEKDLALDS	EVV	651 685
X181	DIKVPFRKVKIKD		
X182	DIKVPFRKVKIKD		
E172	DIKVPFRKVKIKD	201	571 595
Mosaic 358-07:			
19 CD8 P1E4, 3 CD4 P1E-			
7 CD8 regions, 3 CD4 regions			
Number of overlapping peptides per region: CD8: 14 - 1 1 1 CD4: 1 1 1			
7 CD8 responses:			
X181	LIRKERVYLSVPAHKG13		
X182	LIRKERVYLSVPAHKG13		
E182	LIRKERVYLSVPAH	201	680 694
E183	-----EYVLSVPAHKG13	201	684 698
X181	IVQGNILRAIERQCHH10L		
X182	IVQGNILRAIERQCHH10L		
E184	IVQGNILRAIERQ	EVV	546 580
E185	IVQGNILRAIERQ	EVV	549 583
E186	IVQGNILRAIERQ	EVV	549 583
E187	IVQGNILRAIERQ	EVV	554 588
X181	AVFIHNEKKGIGG1		
X182	AVFIHNEKKGIGG1		

Figure 22 (con't)

P222	AVFIHNEKPKGGIGG	Pol	894	908
P236	-VLHNEKPKGGIGG	Pol	895	909
Mos1	EQASQVKNMTETLLVQANP			
Mos2	EQATQVKNMTETLLVQANP			
G122	EQASQVKNMTETLL	Gag	307	321
G187	EQSTQVKNMTETLL	Gag	307	321
G66	---ASQVKNMTETLL	Gag	309	323
G128	---EQVKNMTETLLIQ	Gag	310	324
G30	-----KNMTETLLVQANP	Gag	314	328
G55	-----KNMTETLLVQANP	Gag	314	328
Mos1	AEWDRVHVHAGPIAPGQ			
Mos2	AEWDRVHVHAGFVAPGQ			
G319	AEEDRLHPVHAGPIP	Gag	209	225
G44	AEWDRVHVHAGPIA	Gag	210	224
G11	---DRVHVHAGPIPPGQ	Gag	213	227
Mos1	WKGSPAIQCMTRI			
Mos2	WKGSPAIQSSMTKI			
P238	WKGSPAIQCMTKI	Pol	308	322
Mos1	MTKILEPFRKNPEI			
Mos2	MTKILEPFRKNPEI			
P144	MTKILEPFRKNPEI	Pol	319	333
3 CD4 responses:				
Mos1	GSPAIQCMTRI			
Mos2	GSPAIQSSMTKI			
P141	GSPAIQCMTKI	Pol	310	324
Mos1	HQVDCSPGIWQIAC			
Mos2	HQVDCSPGIWQIAC			
P25	HQVDCSPGIWQIAC	Pol	766	780
Mos1	DREYTLRAEQASQD			
Mos2	DREYTLRAEQATQD			
G57	DREYTLRAEQASQ	Gag	298	312
Mosaic 359-07:				
12 CD8 PTE+, 5 CD4 PTE+				
10 CD8+ regions, 2 CD4+ regions				
Number of overlapping peptides per region: CD8: 2 2 1 1 1 1 1 1 1 1 CD4: 3 2				
10 CD8 responses:				
Mos1	LKKERVYLSWVFAHKGIG			

Figure 22 (con't)

X081	LIRKERVYLANVPAHKGIS	Pol	680	694
F003	LIRKERVYLSWVPAH	Pol	684	698
F13	----EKVYLSWVPAHKGIS			
X081	AEWDVHFVHAGPIRAGQ	Gay	214	224
X082	AEWDRHFVHAGVAFGQ	Gay	218	227
G44	AENDRLHFVHAGPIA			
G100	---DRVHFVHAGPIEFBQ			
X081	ALFQCSMTIRILEPFR	Pol	313	327
X082	ALFQSSMTKILERFR			
F359	ALFQSSMTIRILEPFR			
X081	ASQIYEGIKVRQOLCK	Pol	421	436
X082	ASQIYAGIKVRQOLCK			
F365	WSQIYAGIKVRQOLCK			
X081	RELNKTQDFWEVQL	Pol	133	147
X082	RELNKTQDFWEVQL			
F139	RELNKTQDFWEVQL			
X081	LIRAIERQOHLQOLT	Env	555	569
X082	LIRAIERQOHLQOLT			
E007	LMALERQOHLQOLT			
X081	LICTTVFVNASWSN	Env	602	616
X082	LICTTAVFWNTSWSN			
E432	LICTTVFVNASWSN			
X081	KHIVWASRELERFV	Gay	32	46
X082	KHIVWASRELERFAL			
G11	KHIVWASRELERFAL			
X081	RSINYVATLYCVHQ	Gay	76	90
X082	RSINYVATLYCVHA			
G123	RSINYVATLYCVHQ			
X081	ERAFSPREVIFMESA	Gay	160	174
X082	ERAFSPREVIFMFTA			
G14	ERAFSPREVIFMESA			
2 CD4 responses:				
X081	WXSPALFQCSMTIRILEPFR	Pol	338	350
X082	WXSPALFQSSMTKILERFR	Pol	342	354
F350	WXSPALFQASMTKIL	Pol	346	354
P141	--SPALFQSSMTKIL			

[illegible]

Figure 22 (con't)

E47	CIHGIREVSIQLLL	ENV	247	261
M081	ICTTVFNNASWSNKS			
M082	ICTTAVPNTSWSNKS			
E084	ICTTVFNNASWSNR	ENV	603	617
E014	CTTVFNNASWSNKC	ENV	604	618
E106	CTTAVFNNASWSNKS	ENV	605	619
E190	CTTAVPNTSWSNKS	ENV	605	619
M081	ACQYGGGPGHKARVLAEMS			
M180	ACQYGGGPGSHKARVLAEMS			
G160	ACQYGGGPGHKARVL	Gag	349	363
G176	-----GGFSGHKARVLAEMS	Gag	354	368
M081	AEEDRVHPVHAGPIAFGQ			
M080	AEEDRLHPVHAGPVAFGQ			
G019	AEEDRLHPVHAGPIF	Gag	209	225
G040	AEEDRLHPVHAGPIA	Gag	210	224
G44	AEEDRLHPVHAGPIA	Gag	210	224
G177	AEEDRVHPVHAGPIFPG	Gag	210	225
G100	AEEDRVHPVHAGPIFPG	Gag	210	226
M081	HSNWRAMASDENLPP			
M080	HSNWRAMASENLPP			
E90	HSNWRAMASDENLPP	Pol	731	745
M081	KGRPGNFLOSRPEPT			
M080	KGRPGNFLOSRPEPT			
G06	KGRPGNFLOSRPEPT	Gag	440	456
S CD4 responses:				
M081	RSLYNTVATLYCVHQR			
M080	RSLYNTVATLYCVHAE			
G019	RSLYNTVATLYCVHA	Gag	76	80
G54	RSLYNTVATLYCVHQR	Gag	77	91
M081	YVDRGRQKIVSLTE			
M080	YVDRGRQKIVSLTD			
E134	YVDRGRQKIVSLTE	Pol	610	626
M081	CTTVFNNASWSNKS			
M080	CTTAVPNTSWSNKS			
E53	CITNVPNNSSWSNKS	ENV	604	616
M081	HWAGIQEPFGIPYNP			
M080	HWAGIKQEPFGIPYNP			

Figure 22 (con't)

P135	WWAGIQQEFQIPYNP	Pol	846	860
Mos1	GPCHKARVLAERMSQ			
Mos2	GPCHKARVLAERMSQ			
G15	GPCHKARVLAERMSQ	Gag	355	369
Mosaic 362-07:				
13 CD8 PTE+, 5 CD4 PTE+				
7 CD8+ regions, 5 CD4+ regions				
Number of overlapping peptides per region: CD8: 2 2 4 2 1 1 1 CD4: 1 1 1 1 1				
7 CD8 responses:				
Mos1	CTHGIRPVVSTQILL			
Mos2	CTHGIRPVVSTQILL			
E15	CTHGIRPVVSTQILL	Env	247	261
E47	CTHGIRPVVSTQILL	Env	247	261
Mos1	KHIVWASRELERFAVNPGLL			
Mos2	KHIVWASRELERFALNPGLL			
G20	KHIVWASRELERFAL	Gag	32	46
G68	-----ASRELERFAVNPGLL	Gag	37	51
Mos1	QPSLQTGSEELRSLYNTVATL			
Mos2	QPALQTGTEELRSLENTVATL			
G268	CPALKTGSEELRSLY	Gag	65	79
G249	--ALQTGSEELRSLENT	Gag	67	81
G132	---LQTGTEELRSLENTV	Gag	68	82
G120	-----GSEELRSLYNTVATL	Gag	71	85
Mos1	ACQGVGGPGCHKARVLAERMS			
Mos2	ACQGVGGPGSHKARVLAERMS			
G166	ACQGVGGPGCHKARVL	Gag	349	363
G76	-----GGPSHKARVLAERMG	Gag	354	368
Mos1	RELNKRRTQDFWEVQL			
Mos2	RELNKRRTQDFWEVQL			
P233	RELNKRRTQDFWEVQL	Pol	233	247
Mos1	LLRAIEAQQHLLQLT			
Mos2	LLRAIEAQQHLLQLT			
E227	LLMAIEAQQHLLQLT	Env	555	569
Mos1	KTAVQMAVFIHNEKR			
Mos2	KTAVQMAVFIHNEKR			
P5	KTAVQMAVFIHNEKR	Pol	888	902

Figure 22 (con't)

5 CD4 responses:
X061 KLNWASQIYFGIKVR
X062 KLNWASQIYRGIKVR
E136 KLNWASQIYRGIKVR
P01 418 432

X061 YAKMTAHTNDVKQL
X062 YAKMTAHTNDVKQL
E136 YAKMTAHTNDVKQL
P01 509 523

X061 DQAEHLKTAVMQAVF
X062 DQAEHLKTAVMQAVF
E136 DQAEHLKTAVMQAVF
P01 662 896

X061 SLQTGSEELRSLYNT
X062 ALQTGSEELRSLYNT
E136 ALQTGSEELRSLYNT
GAG 67 31

X061 GFCHKARVLAERMSQ
X062 GFCHKARVLAERMSQ
G15 GFCHKARVLAERMSQ
GAG 355 369

Reactive peptides and breadth and depth of responses: Optimal Natural Clade C Vaccine

Natural Clade C 363-07:
2 CD8 FIE+, 3 CD4 FIE+
1 CD8- regions, 0 CD4+ regions
Number of overlapping peptides per region: CD8: 2 CD4: none

1 CD8 responses:
C QPALTGTSEELRSLYNTVAIL
G165 LPAKMTGSEELRSLY
G120 -----GSEELRSLYNTVAIL

Natural Clade C 364-07:
3 CD8 FIE+, 2 CD4 FIE+
3 CD8- regions, 2 CD4+ regions
Number of overlapping peptides per region: CD8: 1 1 1 1 1 CD4: 1 1

5 CD8 responses:
C ARTNDVKQLTEAVQK
E10 ARTNDVKQLTEAVQK P01 515 529

C GDIIGDIRQAHCHNIS
E84 EDIIGDIRQAHCHNIS ERV 321 334

Figure 22 (con't)

C	SEKSAVGIGAVELGF		
E11C	PERKAVGLAVELGF	Env	506 502
C	PASILGGCKLDWEK		
G133	SASLRSCKLDWEK	Gag	4 10
C	TNNPFVFGDIYRW		
G135	ISNPFVFGDIYRW	Gag	231 263
2 CD4 responses:			
C	CKSNITGLLITRDGG		
E310	CTSNITGLLITRDGG	Env	445 459
C	SLNIVATLYCVHAG		
G54	SLNIVATLYCVHQR	Gag	77 91
Natural Clade C 365-07:			
C	CD8 P1E+, 1 CD4 P1E+		
2 CD8+ regions, 1 CD4+ regions			
Number of overlapping peptides per region: CD8: 1 1 CD4: 1			
2 CD8 responses:			
C	EQLINKERVYLSWVP		
P053	EPLKKKRVYLSWVF	P01	678 690
C	AEMDRLHPVHAGPIA		
G44	AEMDRLHPVHAGPIA	Gag	210 224
1 CD4 response:			
C	HQAAQMLEDITNEE		
G14	HQAAQMLEDITNEE	Gag	194 208
Natural Clade C 366-07:			
C	CD8 P1E+, 1 CD4 P1E+		
4 CD8+ regions, 1 CD4+ regions			
Number of overlapping peptides per region: CD8: 2 1 1 1 CD4: 1			
4 CD8 responses:			
C	IVQQSNLLRAIEHQ		
E54	IVQQSNLLRAIEHQ	Env	549 562
E72	IVQQSNLLRAIEHQ	Env	549 563
C	AVFIHNPKKGGIGGY		
E44	AVFIHNPKKGGIGG	P01	394 908
E336	AVFIHNPKKGGIGGY	P01	393 909

Figure 22 (con't)

C	MAICEMEREGKIK	Pol	190	204
EC04	TAICEMEREGKIK			
C	GGPSHKARVLAAMS	Seq	354	368
GT6	GGPSHKARVLAAMG			
1 CD4 response:				
C	LIQVRDQAEHLKTA	Pol	876	890
EC6	LIQVRDQAEHLKTA			
Natural Clade C 367-07:				
C	CD8 PTE+, 0 CD4 PTE+			
C	CD8- regions, 0 CD4+ regions			
Number of overlapping peptides per region: none				
0 CD8 responses				
0 CD4 responses				
Natural Clade C 368-07:				
C	CD8 PTE+, 0 CD4 PTE+			
C	CD8- regions, 0 CD4+ regions			
Number of overlapping peptides per region: CD8: 0 CD4: 0				
1 CD8 response				
C	AVFIHNERKGGIGG	Pol	894	908
EC1	AVFIHNERKGGIGG			
EC36	-VLIHNERKGGIGG	Pol	893	909

Figure 23

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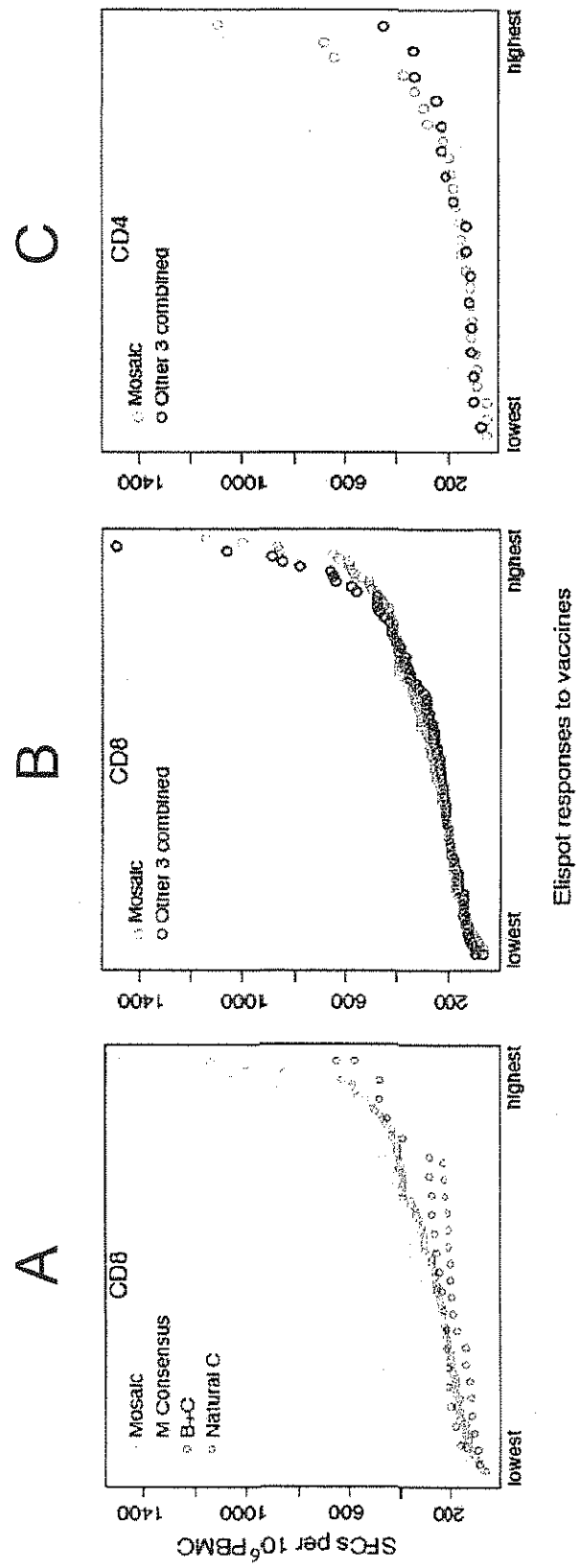


Figure 24

A

Monkey 366 (Natural C)

OptC IVQQQSNLLRAIERAQ
 E54 VVQQQSNLLRAIERAQ
 E72 -VVQQNLLRAIERAQ

OptC AVFIHNFRRKGGIGGY
 P22 AVFIHNFRRKGGIGG
 P236 -VLIHNFRRKGGIGGY

OptC MAICEEMEKEGKITK
 P224 TAICEEMEKEGKITK

OptC GGPSHKARVLAEAMS
 G76 GGPSHKARVLAEAMG

B

Monkey 361 (Mosaic)

Mos1 EQLIKKERVYLSWVPAHKGIG
 Mos2 EQLIKKERVYLSWVPAHKGIG
 P221 EELIKKERVYLSWVP
 P250 EPLIKKERVYLSWVP
 P316 -KLIKKDKVYLSWVPA
 P223 --LIKKERVYLSWVPAH
 P169 -----EKVYLSWVPAHKGIG
 P83 -----EKVYLSWVPAHKGIG

Mos1 CTHGIRPVVSTQLLL
 Mos2 CTHGIRPVVSTQLLL
 E15 CTHGIRPVVSTQLLL
 E47 CTHGIRPVVSTQLLL

Mos1 ICTTVPWNASWSNKSLL
 Mos2 ICTTAVPWNTSWNSKSQ
 E334 ICTTVPWNASWSNR
 E214 -CTTVPWNSWSNKT
 E158 --PTAVPWNASWSNKSLL
 E290 --TTAVPWNTSWNSKSLL

Mos1 ACQGYGGPGGHKARVLAEAMS
 Mos2 ACQGYGGPSHKARVLAEAMS
 G166 ACQEVGGPGGHKARVL
 G76 -----GGPSHKARVLAEAMG

Mos1 AEWDRLHPVHAGPIAPGQ
 Mos2 AEWDRLHPVHAGVPAGQ
 G319 AAE-DRLHPVHAGPIP
 G242 -ADWDRLHPVHAGVPA
 G44 -AEWDRLHPVHAGPIA
 G277 ---WDRVHPVHAGNPFG
 G102 ----DRVHPVHAGPIPPGQ

Mos1 HSNWRAMASDFNLPP
 Mos2 HSNWRAMASEFNLPP
 P93 HSNWRAMASDFNLPP

Mos1 KGRPGNFQNRPEPT
 Mos2 KGRPGNFQSRPEPT
 G86 KGRPGNFQNRPEPT

Figure 24 (con't)

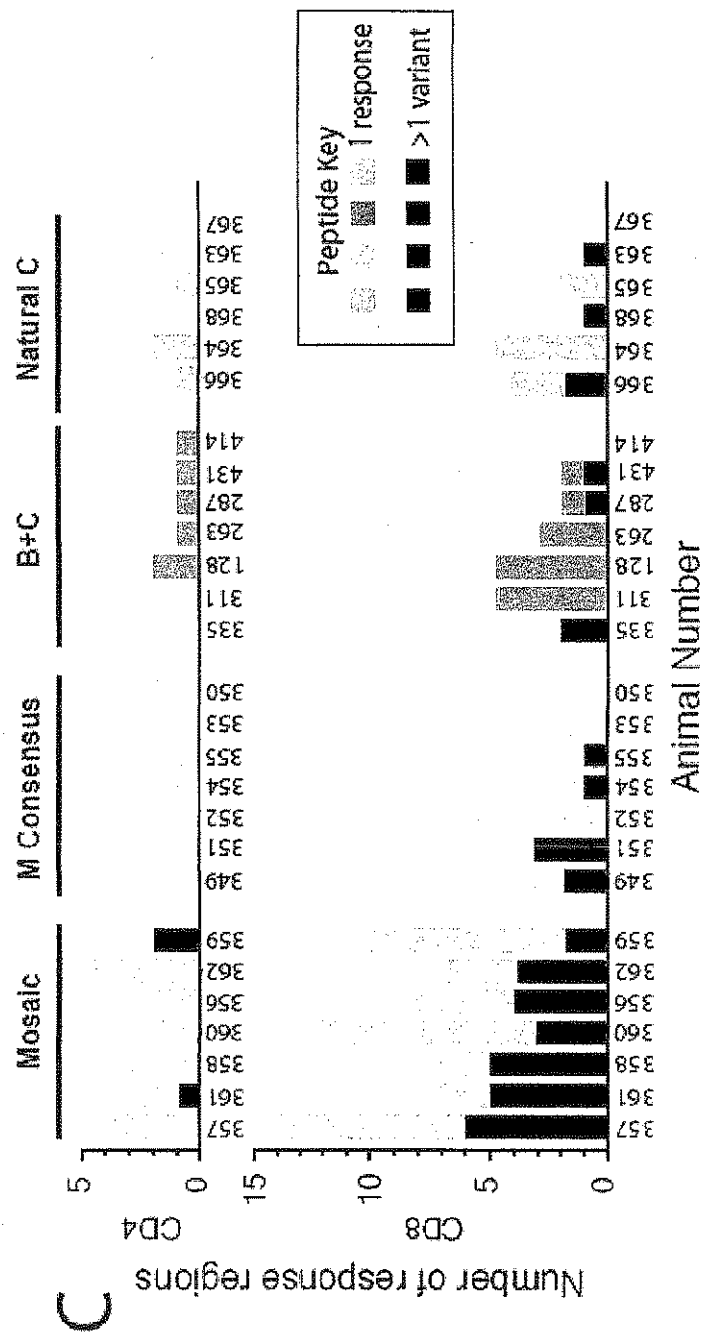


Figure 25

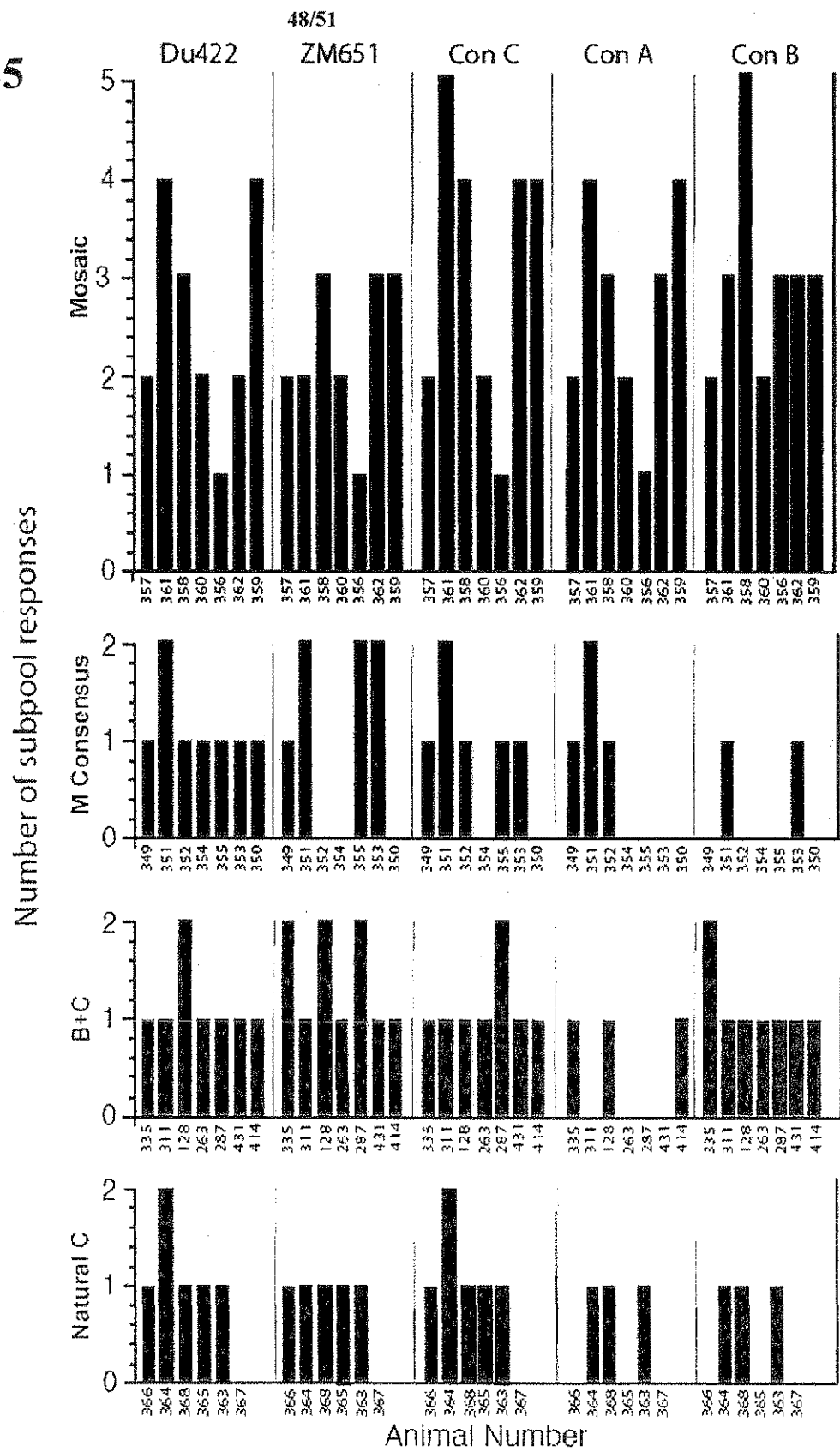


Figure 26

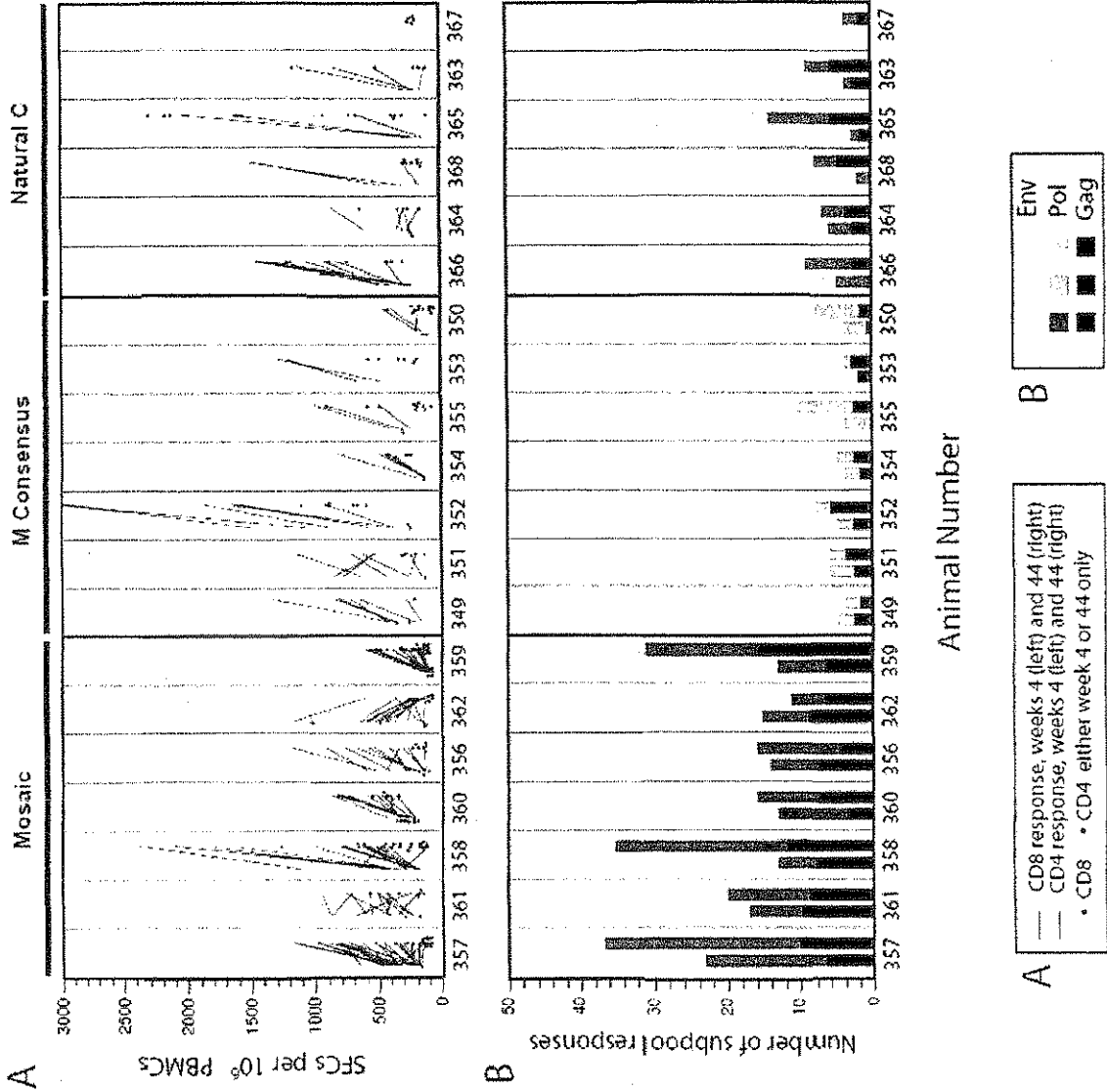
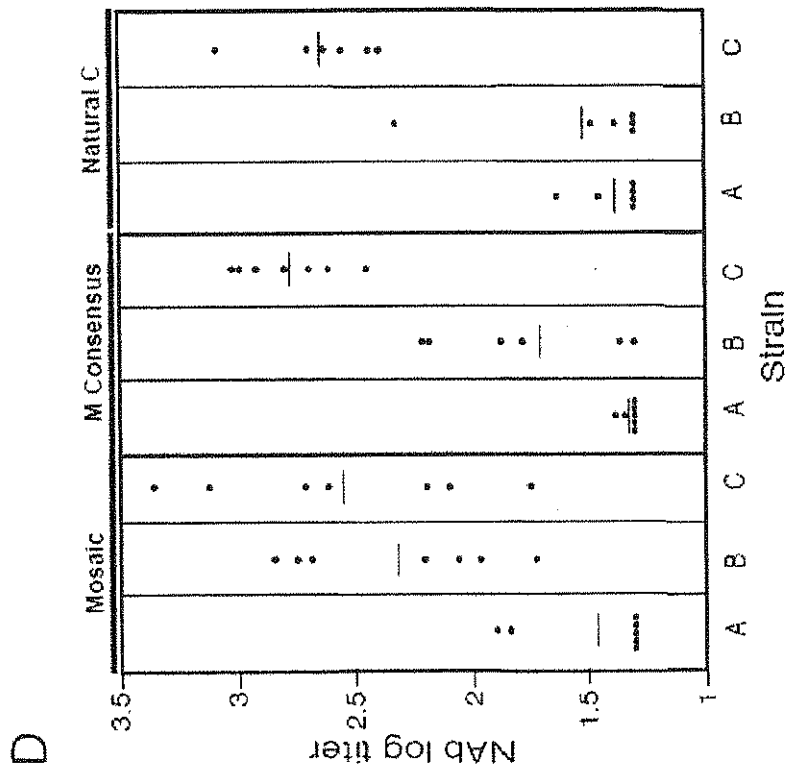
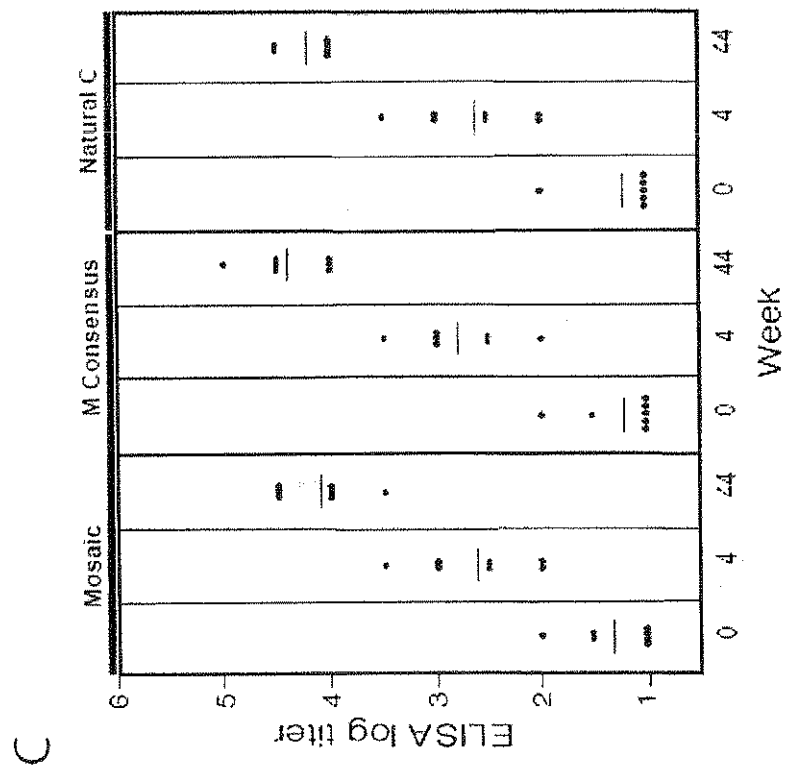


Figure 26 (con't)



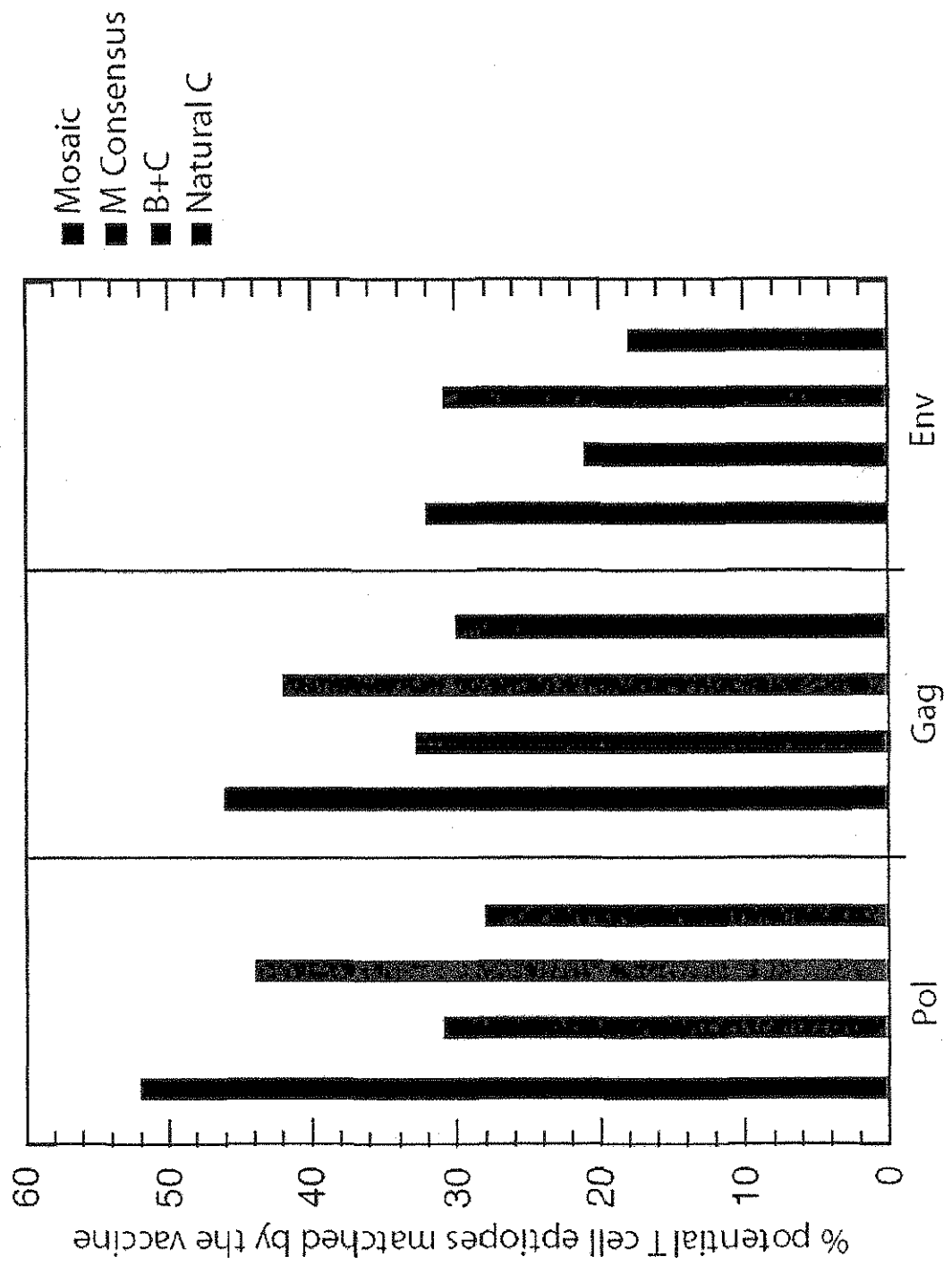


Figure 27