Table 10: **gp120**

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(39–51)	gp120(31–43)	EQLWVTVYYGVPV	peptide	murine(H-2^{bxk})	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
gp120(45–55)	gp120(37–47)	VYYGVPVWKEA	peptide	murine(H-$2^{bxk,sxd}$)	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
env(45–55)	gp120(37–47)	VYYGVPVWKEA	Peptide immunization	rhesus monkey	[Nehete et al.(1993)]
	NOTES: • Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice • Proliferative response to this peptide was observed in 3/3 immunized rhesus monkeys				
gp120(48–61)	gp120(40–53)	GVPVWKEATTLFC	peptide	murine(H-2^{sxd})	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
env(48–60)	gp120(40–53)	GVPVWKEATTLFC	Peptide immunization	rhesus monkey	[Nehete et al.(1993)]
	NOTES: • Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice • Despite the proliferative response to this peptide in mice, no response was observed in 3 rhesus monkeys				
gp120(72–82)	gp120(64–74)	AHKVWATHACV	peptide	murine(H-$2^{bxk,sxd}$)	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
gp120(51–70 HXB2)	gp120(79–98)	NPQEVVLVNTENFNMWKND	*in vitro* stimulation	human	[Li Pira et al.(1998)]
	NOTES: • Clonal heterogeneity was broad for a recall response to tetanus toxoid or PPD, but oligoclonal to primary HIV antigens, dominated in this case by TCR Vβ 13 usage • Donor of PBMC that recognized this epitope had HLA-DR alleles 2 and 7 • Documented location of epitope in strain HXB2 does not match corresponding location in Database				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(74–85 LAI)	gp120(73–84)	CVPTDPNPQEVV?	HIV infection	human	[Schrier et al.(1989)]
	NOTES: • Stimulates T-cell proliferation in HIV-infected donors				
gp120(81–92)	gp120(73–84)	CVPTNPVPQEVV	peptide	murine(H-$2^{bxk,sxd}$)	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
gp120(108–119 LAI)	gp120(107–118)	IISLWDQSLKPC?	HIV infection	human	[Schrier et al.(1989)]
	NOTES: • Stimulates T-cell proliferation in HIV-infected donors				
gp120(101–126)	gp120(100–125)	VEQMHEDIISLWDQSLK-PCVKLTPLC	glycosylated gp160	murine(H-2^{k})	[Sjolander et al.(1996)]
	NOTES: • Study showing that T cell determinants from glycoproteins can be dependent on the glycosylation of the protein				
gp120(109–121)	gp120(101–113)	EQMHEDIISLWDQ	peptide	murine(H-2^{bxk})	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
gp120(109–123 IIIB)	gp120(101–115)	EQMHEDIISLWDQSL	IIIB gp160	murine(H-$2^{d,i5}$)	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(112–130 IIIB)	gp120(104–122)	HEDIISLWDQSLKPCVKLT	HIV-1 exposure	human	[Furci et al.(1997)]
	NOTES: • 9/11 exposed uninfected individuals in this study had a proliferative response to a C5 peptide, but none reacted with this previously defined epitope				
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	HIV infection	human	[Clerici et al.(1997)]
	NOTES: • Epitope T2: used in a study of inluence of pentoxifyllines on HIV specific T cells				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	IIIB gp160	murine(H-2^{k})	[Hale et al.(1989)]
	NOTES: • Epitope T2: Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(112–124 BH10)	gp120(104–116)	HEDIISLWDQSLK	env fragment	murine(H-$2^{k,s}$)	[Cease et al.(1987)]
	NOTES: • Epitope T2: 1 of 2 functional epitopes identified using an amphipathic helix epitope prediction algorithm				
gp120(112–124 BH10)	gp120(104–116)	HEDIISLWDQSLK	gp160 (IIIB) vaccinia	human	[Berzofsky et al.(1988)]
	NOTES: • Epitope T2: Proliferative response to T1 and T2 peptides in 14 immunized, uninfected humans				
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	HIV infection	human	[Clerici et al.(1989)]
	NOTES: • Epitope T2: IL-2 production detection of T-helper lymphocytes from asymptomatic HIV-positive individuals				
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	HIV infection	human	[Clerici et al.(1991a)]
	NOTES: • Epitope T2: Peptides stimulate Th cell function and CTL activity in similar patient populations				
gp120(112–124)	gp120(104–116)	HEDIISLWDQSLK	rgp160	human	[Clerici et al.(1991b)]
	NOTES: • Epitope T2: Immunizing uninfected individuals with rgp160 results in stronger Th response than does natural infection				
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	HIV exposure	human	[Clerici et al.(1992)]
	NOTES: • Epitope T2: Cell-mediated immune response to HIV-1 peptides in HIV-1 exposed seronegative men				
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	peptide priming gp160 boost	rhesus monkeys	[Hosmalin et al.(1991)]
	NOTES: • Epitope T2: Peptide priming to induce T-cell help enhances antibody response to gp160 immunization				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(112–124 IIIB)	gp120(104–116)	HEDIISLWDQSLK	HIV exposure	human	[Pinto et al.(1995)]
	NOTES: • Epitope T2: CTL activity analyzed in parallel with T helper reactivity in exposed but uninfected health care workers				
gp120(115–126 LAI)	gp120(114–125)	SLKPCVKLTPLC?	HIV infection	human	[Schrier et al.(1989)]
	NOTES: • Stimulates T-cell proliferation in HIV-infected donors				
gp120(110–125)	gp120(109–124)	SLWDQSLKPCVKLTPL	HIV-1 infection	human	[Caruso et al.(1997)]
	NOTES: • T cells from HIV-1 infected individuals as they progress to disease show reduced ability to proliferate in response to HIV antigen, but retain the ability to express the activation antigens CD25 and CD71 • The ability to express activation markers in response to HIV is retained, but not in response to tetanus toxoid recall antigen • This study investigated CD25 and CD71 expression in PBMC from patients in various stages of progression, response to *in vitro* stimulation by peptide cocktail containing four antigenic Env peptides, or else p17 and p24				
gp120(118–130)	gp120(110–122)	LWDQSLKPCVKLT	Peptide immunization	rhesus monkey	[Nehete et al.(1993)]
	NOTES: • Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice • Proliferative response to this peptide was observed in 3/3 immunized rhesus monkeys				
gp120(115–129 LAI)	gp120(114–128)	SLKPCVKLTPLCVSL	none	human(HLA-DR)	[Gaudebout et al.(1997)]
	NOTES: • Peptide bound to both HLA-DR*1101 and HLA-DR*0401 with high affinity • Because of the distinctive binding pockets of HLA-DR*1101 and HLA-DR*0401, peptides that bound both affinity were considered candidates for promiscuous HLA-DR binding				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(160–174 LAI)	gp120(159–173)	KNCSFNISTSIRGKV	none	human(HLA-DR)	[Gaudebout et al.(1997)]
	NOTES: • Peptide binds to both HLA-DR*1101 and HLA-DR*0401 with high affinity • Because of the distinctive binding pockets of HLA-DR*1101 and HLA-DR*0401, peptides that bound both affinity were considered candidates for promiscuous HLA-DR binding				
gp120 (162–181 IIIB)	gp120 (166–185)	STSIRGKVQKEYAFFYKLDI	HIV-1 gp120 DNA vaccine	rhesus monkey	[Lekutis et al.(1997)]
	NOTES: • HIV-1 env DNA vaccine induced Th cell response to this epitope in a rhesus monkeys				
gp120 (172–191 IIIB)	gp120 (176–195)	EYAFFYKLDIIPIDNDTTSY	HIV-1 gp120 DNA vaccine	rhesus monkey	[Lekutis et al.(1997)]
	NOTES: • HIV-1 env DNA vaccine induced Th cell response to this epitope in a rhesus monkey				
gp120(193–218)	gp120(197–222)	LTSCNSVITQACPKVSF-EPIPIHYC	glycosylated gp160	murine(H-$2^{d,b}$)	[Sjolander et al.(1996)]
	NOTES: • Study showing that T cell determinants from glycoproteins can be dependent on the glycosylation of the protein				
gp120(204–216)	gp120(203–215)	SVITQACSKVSFE	peptide	murine(H-$2^{bxk,sxd}$)	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response in mice representing four haplotypes				
env(204–216)	gp120(203–215)	SVITQACSKVSFE	Peptide immunization	rhesus monkey	[Nehete et al.(1993)]
	NOTES: • Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice • A weak or transient proliferative response to this peptide was observed in 3/3 immunized rhesus monkeys				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(205–219 LAI)	gp120(204–218)	VITQACPKVSFEPIP	none	human(HLA-DR)	[Gaudebout et al.(1997)]
	NOTES: • Peptide binds to both HLA-DR*1101 and HLA-DR*0401 with high affinity • Because of the distinctive binding pockets of HLA-DR*1101 and HLA-DR*0401, peptides that bound both affinity were considered candidates for promiscuous HLA-DR binding				
gp120(206–230)	gp120(210–234)	PKVSFEPIPIHYCAPAG-FAILKCNN	glycosylated gp160	murine(H-$2^{d,b}$)	[Sjolander et al.(1996)]
	NOTES: • Study showing that T cell determinants from glycoproteins can be dependent on the glycosylation of the protein				
gp120(215–228)	gp120(214–227)	FEPIPIHYCAFPGF	peptide	murine(H-2^{bxk})	[Sastry & Arlinghaus(1991)]
	NOTES: • Peptides induced T-cell proliferative response to immunizing peptide and to gp160				
gp120(IIIB)	gp120(224–239)	PAGFAILKCNNKTFNY	Peptide priming, *in vitro*	human(DR2)	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein • gp120 priming induced T-cells that recognize this peptide				
gp120(220–235 HXB2)	gp120(224–239)	PAGFAILKCNNKTFNY	gp120 protein priming *in vitro*	human(DR2)	[Guzman et al.(1998)]
	NOTES: • Listeria monocytogenes, an intracellular pathogen which is ingested by macrophages and can escape from the phagosome to replicate in the cytoplasm, was used successfully as carrier to deliver this gp120 epitope to CD4+ T-cells				
gp120(225–240 SF2)	gp120(224–238)	PAGFAILKCNNKTFN	Peptide, *in vitro*		[Manca et al.(1993)]
	NOTES: • T-cell line derived from un-primed, uninfected individual • Responds to APC pulsed with either synthetic peptide or gp120 • Human MAbs 448-D and 450-D enhance APC gp120 uptake and presentation				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(194–202 HXB2)	gp120(227–235)	FAILKCNNK	gp120-APC protein priming *in vitro*	human(DR2,6)	[Manca et al.(1996)]
	NOTES: • This epitope was the minimal stimulatory sequence defined for two Th lines stimulated *in vitro* • One Th line was stimulated by gp120, one by a Glutathione-S-transferase (GST)-peptide fusion • Alanine substitutions at position 914, 196, and 202 abrogated activity for the GST-peptide stimulated line, but not for a gp120 stimulated line • Constructs combining GST and the PAGFAILKCNNKTFNY gp120 peptide at the C-term end of GST stimulated Th cells but not at the N-term end				
gp120(238–246 HXB2)	gp120(227–235)	FAILKCNNK	*in vitro* stimulation	human	[Li Pira et al.(1998)]
	NOTES: • Clonal heterogeneity was broad for a recall response to tetanus toxoid or PPD, but oligoclonal to primary HIV antigens, dominated in this case by TCR Vβ 22 usage • Donor of PBMC that recognized this epitope had HLA-DR alleles 2 and 6 • the only (detected) immunogenic variant of this epitope was derived from strain NOF (YAILKCNNK) • Location of epitope in strain HXB2 noted in paper does not match corresponding location in Database				
gp120(194–202 HXB2)	gp120(227–235)	FAILKCNNK	gp120-APC protein priming *in vitro*	human(DR2,6)	[Manca et al.(1996)]
	NOTES: • This epitope was the minimal stimulatory sequence defined for two Th lines stimulated *in vitro* • One Th line was stimulated by p66, one by a Glutathione-S-transferase (GST)-peptide fusion protein • Alanine substitutions at position 914, 196, and 202 abrogated activity for the GST-peptide stimulated line, but not for a gp120 stimulated line • Constructs linking GST to the PAGFAILKCNNKTFNY gp120 peptide at the C-term end of GST stimulated Th cells, constructs linking at the N-term end did not • The C and N termini of GST are not intrinsically permissive or non-permissive, presentation is epitope specific (see SSTVNDIQKLV for contrast)				
gp120(IIIB)	gp120(234–249)	NKTFNGKGPCTNVSTY	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(240–252)	gp120(239–251)	GTGPCTNVSTVQC	Peptide immunization	rhesus monkey	[Nehete et al.(1993)]
	NOTES: • Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice • Proliferative response to this peptide was observed in 1/3 immunized rhesus monkeys, with a weak transient response in the other two				
gp120(IIIB)	gp120(244–258)	TNVSTVQCTHGRPIY	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro*				
gp120(242–261 IIIB)	gp120(246–265)	VSTVQCTHGIRPVVSTQLLL	SHIV-89.6 infection	Macaca mulatta(DRB1*0406)	[Lekutis & Letvin(1997)]
	NOTES: • C2 region epitope that has not been previously described				
gp120(IIIB)	gp120(254–269)	GIRPIVSTQLLLNGSC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(269–283 IIIB B10)	gp120(273–287)	EVVIRSANFTDNAKT	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(IIIB)	gp120(274–289)	VVIRSDNFTNNAKTIC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(274–288 IIIB B10)	gp120(278–292)	SANFTDNAKTIIVQL	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(IIIB)	gp120(284–299)	NAKTIIVQLNESVAIC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(296–312 LAI)	gp120(295–311)	SVVEINCTRPNNNTRKS?	HIV infection	human	[Schrier et al.(1989)]
	NOTES: • Stimulates T-cell proliferation in HIV-infected donors				
gp120(292–300 SF2)	gp120(293–301)	NESVAINCT	env 2–3, SF2 gp120	human	[Botarelli et al.(1991)]
	NOTES: • A non-glycosylated form of gp120 was used as an immunogen – 20% of T-cell clones do not recognize the glycosylated form				
gp120(MN)	gp120(294–299)	ESVQIN	immunization	murine	[Veronese et al.(1994)]
	NOTES: • In a filamentous bacteriophage coat protein background, stimulated Ab production to the V3 loop tip				
gp120(303–321 IIIB)	gp120(300–316)	CTRPNNNTRKSIRIQRGPG(Y)	polyvalent peptide	goat	[Palker et al.(1989)]
	NOTES: • Goats were immunized with peptides containing V3 type-specific neutralizing determinants coupled to T1				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(V3 IIIB)	gp120(305–328)	NNTRKSIRIQRGPGRAF-VTIGKIGN	DNA vaccine IIIB env + rev	murine	[Sasaki et al.(1998)]
	NOTES: • The env response is what is being sought, but co-expression of rev is required – intramuscular versus nasal vaccination with DNA vaccine with a QS-21 adjuvant was studied – QS-21 enhanced the IgG2a response mediated via Th1 cytokines IFNγ and IL-2 – delayed type hypersensitivity (DTH) in response to the V3 peptide was measured by a foot pad swelling test [Sasaki et al.(1998)]				
gp120(307–322 IIIB)	gp120(306–317)	NTRKSIRIQRGPGR	peptide	murine	[Goodman-Snitkoff et al.(1990)]
	NOTES: • Identification of putative Th epitopes that can stimulate an antibody response in peptide-immunized mice				
gp120(312–329)	gp120(308–325)	(CG)KSIRIQRGPGRAFVTIG	HIV-1 infection	human	[Adams et al.(1997)]
	NOTES: • Used as positive control in study examining T-cell response to four p24 Gag peptides				
gp120(V3 C subtype)	gp120(310–321)	(CKR)KIHIGPGQAFYT	Peptide-ISCOM	murine(H-2^{b,d,k,s})	[Ahluwalia et al.(1997)]
	NOTES: • A V3 loop peptide modified to resemble an Indian form (GPGQ) was incorporated into ISCOMS (immune stimulating complexes) or liposomes, and used to immunize mice – the IgG2a/IgG2b antibody response was enhanced by the presentation in the ISCOM suggestive of a Th1 response				
gp120(306–325 MN)	gp120(310–329)	RIHIGPGRAFYTTKNIIGIT	HIV-1 infection	human(DRB1*0101)	[Hayball et al.(1997)]
	NOTES: • Tandem repeated presentation of epitope enhances binding to class II molecule and therefore induction of T cell proliferation • Tandem peptides are thought to enhance proliferation through improved recruiting of CD4 to the activation complex, which can counter-balance gp120's sequestering of CD4 and consequential inhibition of a proliferative response				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(308–322 IIIB)	gp120(310–324)	RIHIGPGRAFYTTKN	HIV-1 exposure	human	[Furci et al.(1997)]
	NOTES: • 9/11 exposed uninfected individuals in this study had a proliferative response to a C5 peptide, but only 1/11 exposed uninfected individuals recognized this peptide • 1/18 unexposed uninfected controls could recognize this peptide • Erroneously documented as IIIB sequence - most likely MN peptide				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	vaccinia IIIB gp160	murine(H-2 A^d)	[Takahashi et al.(1990)]
	NOTES: • Epitope P18: Induces both class II restricted CD4+ Th cells, and class I restricted CD8+ CTL				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	Peptide immunization	rhesus monkey	[Nehete et al.(1993)]
	NOTES: • Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice • Despite the proliferative response to this peptide in mice and humans, no response was observed in 3 rhesus monkeys				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV-1 infection	human	[Wasik et al.(1997)]
	NOTES: • The breadth and intensity of the CTL response and the type of Th response was studied in seven rapidly progressing HIV-1+ infants • IL-2 and γ IFN production from Th1 cells correlated with the CTLp frequency against HIV-1 Gag, Env, Nef and Pol • IL-4 production from Th 2 cells was inversely correlated with the CTLp frequency • The HIV-1+ children with strong CTL response had levels of anti-CD3 MAb induction of Th1 cells comparable to uninfected children • The children that did not mount a good CTL response had dramatically decreased numbers of Th1 relative to Th2 cells				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK		murine(H-2 I-A^d)	[Takeshita et al.(1995)]
	NOTES: • Epitope P18: Binds Class II H-2 I-A^d requiring riqrgPgRaFvti, and Class I H-2 D^d, requiring iGPgRaFvtI				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV infection	human(DR)	[Baier et al.(1995)]
	NOTES: • Epitope P18: Linked HIV-1 T1 and P18 peptides to anti-HLA-DR and IgD Fab fragments to enhance uptake by antigen presenting cells thus increase immunogenicity				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV exposure	human	[Pinto et al.(1995)]
	NOTES: • Epitope P18: CTL activity analyzed in parallel with T helper reactivity in exposed but uninfected health care workers				
gp120(315–329 MN)	gp120(310–324)	RIHIGPGRAFYTTKN	HIV exposure	human	[Pinto et al.(1995)]
	NOTES: • Epitope P18: CTL activity analyzed in parallel with T helper reactivity in exposed but uninfected health care workers				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV infection	human	[Clerici et al.(1989)]
	NOTES: • Epitope P18: IL-2 production detection of T-helper lymphocytes from asymptomatic HIV-positive individuals				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV infection	human	[Clerici et al.(1991a)]
	NOTES: • Epitope P18: Peptides stimulate Th cell function and CTL activity in similar patient populations				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	rgp160	human	[Clerici et al.(1991b)]
	NOTES: • Epitope P18: Immunizing uninfected individuals with rgp160 results in stronger Th response than does natural infection				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV exposure	human	[Clerici et al.(1992)]
	NOTES: • Epitope P18: Cell-mediated immune response to HIV-1 peptides in HIV-1 exposed seronegative men				
gp120(315–329 IIIB)	gp120(310–324)	RIQRGPGRAFVTIGK	HIV infection	human	[Clerici et al.(1997)]
	NOTES: • Epitope P18: used in a study of the influence of Pentoxifyllines on HIV specific T cells				
gp120(MN)	gp120(310–324)	RIHIGPGRAFYTTKN	HIV exposure	human	[Clerici et al.(1992)]
	NOTES: • Epitope P18 MN: Cell-mediated immune response to HIV-1 peptides in HIV-1 exposed seronegative men				
gp120(MN)	gp120(310–323)	RIHIGPGRAFYTTK	peptide	murine(H-2^d)	[Klinman et al.(1995)]
	NOTES: • Epitope SP10: Hybrid T1-V3 peptide activates IL-4 and IL-6 in a dose dependent manner • 10-mer from V3 contributes to this response				
gp120(309–323 IIIB B10)	gp120(311–325)	EQRGPGRAFVTIGKI	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(314–330)	gp120(311–327)	IQRGPGRAFVTIGKIGN	HIV-1 infection	human	[Caruso et al.(1997)]
	NOTES: • T cells from HIV-1 infected individuals as they progress to disease show reduced ability to proliferate in response to HIV antigen, but retain the ability to express the activation antigens CD25 and CD71 • The ability to express activation markers in response to HIV is retained, but not in response to tetanus toxoid recall antigen • This study investigated CD25 and CD71 expression in PBMC from patients in various stages of progression, response to *in vitro* stimulation by peptide cocktail containing four antigenic Env, peptides, or else p17 and p24				
gp120(314–328 IIIB B10)	gp120(316–331)	GRAFVTIGKIGNMRQ	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(324–338 IIIB)	gp120(319–334)	FVTIGKIGNMRQAHC	IIIB gp160	murine(H-$2^{k,d}$)	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(IIIB)	gp120(324–339)	RIIGDIRKAHCNISRY	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(327–341 HXB2)	gp120(330–344)	RQAHCNISRAKWNNT	rec HXB2 gp120	murine(I-A^d)	[Warren & Thomas(1992)]
	NOTES: • Murine T-cell clone – MHC restriction determined, minimum epitope defined, N terminal flank of the V3 loop.				
gp120(IIIB)	gp120(334–348)	CNISRAQWNNTLEQI	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(342–356 IIIB)	gp120(338–352)	RAKWNNTLKQICSKL	IIIB gp160	murine(H-$2^{k,t4,i5}$)	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(IIIB)	gp120(344–361)	TLEQIVKKLREQFGNC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(346–359)	gp120(347–360)	QIVKKLREQFGNNK	HIV infection	human	[Krowka et al.(1990)]
	NOTES: • Conjugation of HIV peptides to liposomes and rIL-2 stimulation may enhance cell-mediated responses				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(355–362 IIIB)	gp120(358–365)	FGNNKTII	SHIV-HXBc2 infection	Macaca mulatta	[Lekutis & Letvin(1997)]
	NOTES: • C3 region minimal epitope determined through fine epitope mapping • Cell line was lost prior to confirmation of MHC requirements				
gp120(364–378 IIIB B10)	gp120(368–382)	SSGGKPEIVTHSFNC	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(368–377 LAI)	gp120(367–376)	QSSGGDPEIV?	HIV infection	human	[Schrier et al.(1989)]
	NOTES: • Stimulates T-cell proliferation in HIV-infected donors				
gp120(369–383 IIIB B10)	gp120(373–387)	PEIVTHSFNCGGEFF	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(IIIB)	gp120(385–399)	EFFYCNTTQLFNNTW	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(IIIB)	gp120(395–410)	FNNTWRLNHTEGTKGC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(394–408 IIIB B10)	gp120(398–412)	TWFNSTWSTKGSNNT	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(399–413 IIIB B10)	gp120(398–412)	TWSTKGSNNTEGSDT	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(410–429 PV22)	gp120(410–430)	GSDTITLPCRIKQFINMWQE	HIV infection	human(DR4)	[Callahan et al.(1990)]
	NOTES: • Synthetic peptides representing natural variants were used to test for recognition in the context DR4				
gp120(410–429 PV22)	gp120(410–430)	GSDTITLPCRIKQFINMWQE	HIV infection	human(DR4(Dw10))	[Polydefkis et al.(1990)]
	NOTES: • Human CD4+ T-cell clones lyse recombinant vaccinia virus-infected cells that synthesize envelope gp160				
gp120(IIIB)	gp120(417–432)	LPCRIKQIINMWQEVY	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(424–438 IIIB B10)	gp120(425–439)	INMWQEVGKAMYAPP	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(426–441 IIIB)	gp120(422–437)	KQFINMWQEWGKAMYA	HIV-1 exposure	human	[Furci et al.(1997)]
	NOTES: • 9/11 exposed uninfected individuals in this study had a proliferative response to a C5 peptide, but none reacted with this previously defined epitope • IIIB position 435 listed as “W” in this epitope as opposed to “V” in the sequence				
gp120(428–443 IIIB B10)	gp120(422–437)	KQIINMWQEVGKAMYA	env fragment	murine(H-$2^{k,d,s}$)	[Cease et al.(1987)]
	NOTES: • Epitope T1: 1 of 2 functional epitopes identified using an amphipathic helix epitope prediction algorithm				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	peptide	murine(H-2$E\alpha E\beta^k$)	[Boehncke et al.(1993)]
	NOTES: • Epitope T1: C3H H2^k mice were used for immunization in the study because H-2^k mice are particularly good T1 responders – T1 can be presented by $E\alpha E\beta^k$ but not $E\alpha E\beta^b$ – the nature of the T1 class II molecular interaction was thoroughly explored • Alanine substitutions across peptide did not negatively affect MHC binding or effective presentation of epitope, except at three critical residues (432N, 435Q, 439K), however substitutions with larger side chains often diminished activity – only a few amino acids were found to be critical for class II interaction and for maintaining T cell receptor specificity • A gain in potency was observed when 436E was replaced with A – this suggests that substitutions in positions that interfere with binding might allow the design of a more potent vaccine				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	subcutaneous peptide immunization	murine(H-2^k)	[Ahlers et al.(1997)]
	NOTES: • T1 peptide: first identified helper epitope in HIV • Alanine at position 436 (instead of E in wild-type) enhances MHC binding and antigenicity of peptide by several orders of magnitude • Vaccines with a CTL epitope linked to a more potent helper epitope yielded greatly enhanced CTL response relative to the wildtype helper epitope • T1 peptide linked to CTL epitope in four vaccine constructs were used to immunize mice: KQIINMWQEVGKAMYAPPISGQIRRIQRGPGRAFVTIGK, KQIINMWQEVGKAMYAPPISGQIRRIQRGPGRAFVTI, KQIINMWQAVGKAMYAPPISGQIRRIQRGPGRAFVTIGK, KQIINMWQAVGKAMYAPPISGQIRRIQRGPGRAFVTI				
gp120(428–433 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV-1 infection	human	[Wasik et al.(1997)]
	NOTES: • Epitope T1: The breadth and intensity of the CTL response and the type of Th response was studied in seven rapidly progressing HIV-1+ infants • IL-2 and γ IFN production from Th1 cells correlated with the CTLp frequency against HIV-1 Gag, Env, Nef and Pol • IL-4 production from Th2 cells was inversely correlated with the CTLp frequency • The HIV-1+ children with a strong CTL responses had levels of anti-CD3 MAb induction of Th1 cells comparable to those of uninfected children				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	gp160 (IIIB) vaccinia	human	[Berzofsky et al.(1988)]
	NOTES: • Epitope T1: Proliferative response to T1 and T2 peptides in 14 immunized, uninfected humans				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	polyvalent peptide	goat	[Palker et al.(1989)]
	NOTES: • Epitope T1: Goats immunized with peptides containing V3 type-specific neutralizing determinants coupled to T1				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV infection	human	[Clerici et al.(1989)]
	NOTES: • Epitope T1: IL-2 production detection of T-helper lymphocytes from asymptomatic HIV-positive individuals				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	IIIB gp160	murine(H-$2^{k,d,t4}$)	[Hale et al.(1989)]
	NOTES: • Epitope T1: Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV infection	human	[Clerici et al.(1991a)]
	NOTES: • Epitope T1: Peptides stimulate Th cell function and CTL activity in similar patient populations				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	rgp160	human	[Clerici et al.(1991b)]
	NOTES: • Epitope T1: Immunizing uninfected individuals with rgp160 results in stronger Th response than does natural infection				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV exposure	human	[Clerici et al.(1992)]
	NOTES: • Epitope T1: Cell-mediated immune response to HIV-1 peptides in HIV-1 exposed seronegative men				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	immunization	murine	[Veronese et al.(1994)]
	NOTES: • Epitope T1: Engineered into a filamentous bacteriophage coat protein, stimulated for Ab production to the V3 loop				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	peptide	chimpanzee	[Haynes et al.(1993)]
	NOTES: • Epitope T1: Hybrid T1-V3 peptide immunogenicity reduced when the fusogenic domain of gp41 was added				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	peptide	murine(H-2^d)	[Klinman et al.(1995)]
	NOTES: • Epitope T1: Hybrid T1-V3 peptide activates IL-4 and IL-6 in a dose dependent manner				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV infection	human	[Clerici et al.(1997)]
	NOTES: • Epitope T1: used in a study of the influence of Pentoxifyllines on HIV specific T cells				
gp120(428–451 IIIB)	gp120(422–445)	KQIIMNWQEVGKAMYAP-PISGQIR	peptide	murine(H2^d)	[Shirai et al.(1996)]
	NOTES: • Linked to a CTL epitope from hepatitis C virus, induced CD4+ helper cells producing IL-2				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV exposure	human	[Pinto et al.(1995)]
	NOTES: • Epitope T1: CTL activity analyzed in parallel with T helper reactivity in exposed but uninfected health care workers				
gp120(428–443 IIIB)	gp120(422–437)	KQIINMWQEVGKAMYA	HIV infection	human(DR)	[Baier et al.(1995)]
	NOTES: • Linked HIV-1 T1 and P18 peptides to anti-HLA-DR and anti-IgD Fab fragments to enhance uptake by antigen presenting cells and thus increase immunogenicity				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(428–445)	gp120(424–441)	FINMWQEVGKAMYAPPIS	HIV-1 infection	human	[Caruso et al.(1997)]
	NOTES: • T cells from HIV-1 infected individuals as they progress to disease show reduced ability to proliferate in response to HIV antigen, but retain the ability to express the activation antigens CD25 and CD71 • The ability to express activation markers in response to HIV is retained, but not in response to tetanus toxoid recall antigen • This study investigated CD25 and CD71 expression in PBMC from patients in various stages of progression, response to *in vitro* stimulation by peptide cocktail containing four antigenic Env peptides, or else p17 and p24				
gp120(432–446 IIIB)	gp120(426–440)	NMWQEVGKAMYAPPI	IIIB gp160	murine(H-2^{t4})	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(IIIB)	gp120(427–442)	MWQEVGKAMYAPPIGC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(437–451 IIIB)	gp120(431–445)	VGKAMYAPPISGQIR	IIIB gp160	murine(H-$2^{k,d,i5,t4}$)	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(430–453)	gp120(431–454)	VGKAMYAPPISGQIRCS-SNITGLL	glycosylated gp160	murine(H-2^{b})	[Sjolander et al.(1996)]
	NOTES: • Study showing that T cell determinants from glycoproteins can be dependent on the glycosylation of the protein • Peptide stimulation of an *in vitro* proliferative response required *in vivo* priming with glycosylated protein • Local glycosylation sites not thought to be part of the epitope, rather thought to be important for epitope processing				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(IIIB)	gp120(437–452)	APPIGGQISCSSNITY	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(IIIB)	gp120(447–462)	SSNITGLLLTRDGGTC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(IIIB)	gp120(457–472)	RDGGTNVTNDTEVFRC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(459–473 IIIB B10)	gp120(460–475)	GNSNNESEIFRPGGG	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(466–481)	gp120(470–485)	FRPGGGDMRDNWRSEL	HIV infection	human	[Krowka et al.(1990)]
	NOTES: • Conjugation of HIV peptides to liposomes and rIL-2 stimulation may enhance cell-mediated responses				
gp120(474–488 IIIB B10)	gp120(476–490)	DMRDNWRSELYKYKV	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(483–497 IIIB)	gp120(478–492)	RDNWRSELYKYKVVK	IIIB gp160	murine(H-$2^{d,t4}$)	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(482–501 IIIB)	gp120(484–503)	ELYKYKVVKIEPLGVAPTKA	HIV-1 gp120 DNA vaccine	rhesus monkey	[Lekutis et al.(1997)]
	NOTES: • HIV-1 env DNA vaccine induced Th cell response to this epitope in a rhesus monkey • This epitope was recognized by both monkeys used in this study				
gp120(484–498 IIIB B10)	gp120(486–500)	YKYKVVKIEPLGVAP	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
gp120(492–506 IIIB)	gp120(486–501)	CKYKVVKIEPLGVAPT	IIIB gp160	murine(H-2^{d,k,t4,i5})	[Hale et al.(1989)]
	NOTES: • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types				
gp120(484–496 HXB2)	gp120(486–498)	YKYKVVKIEPLGV	HIV-1 env DNA vaccination	Macaca mulatta(DR*W201)	[Lekutis & Letvin(1998)]
	NOTES: • Variants of this epitope with substitutions at position 490(K) retained ability to bind to MHC class II, but failed to induce proliferation/cytokine secretion in HIV-1 env-specific CD4+ Th cells, the modified peptide antagonized the wildtype peptide-induced proliferative response				
gp120(IIIB)	gp120(487–502)	KYKVIKIEPLGIAPTC	Peptide priming *in vitro*	human	[Manca et al.(1995b)]
	NOTES: • Peptide stimulation of PBMC from non-infected individuals *in vitro* • Peptide priming does not always induce T-cells that recognize whole protein				
gp120(486–494 IIIB)	gp120(488–496)	YKVVKIEPL	SHIV-HXBc2 infection	Macaca mulatta(DRB*W201)	[Lekutis & Letvin(1997)]
	NOTES: • C5 region minimal epitope determined through fine epitope mapping				
gp120(494–518 IIIB)	gp120(489–514)	KVVKIEPLGVAPTKAKR-RVVQREKRC	peptide	murine	[Goodman-Snitkoff et al.(1990)]
	NOTES: • Identification of putative Th epitopes that can stimulate an antibody response in peptide immunized mice				

HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(IIIB)	gp120(501–513)	TKAKRRVVEREKR	*in vitro* stimulation	human(DR)	[Wilson et al.(1997)]
	NOTES: • Thought to be a mimic of a HLA class II DR β chain variable region • Response to this epitope may cause a breakdown of self-tolerance • Presentation of epitope induced autoreactive T-cell lines in PBMC from uninfected donors • Suppression of proliferation to soluble antigens by the CD8+ fraction of TKAKRRVVEREKR stimulated T cells was observed				
gp120(IIIB)	gp120		gp120 or gp160 DNA vaccine	murine	[Shiver et al.(1997)]
	NOTES: • DNA vaccinations of BALBc mice with a gp120 or gp160 DNA vaccine elicited a strong T cell proliferative response with Th1-like secretion of γ interferon and IL-2, with little or no IL-4, as well as antigen specific gp120 Abs • An intramuscular route of inoculation gave a stronger proliferative response than intradermal • A proliferative response could be detected in all lymph tissues tested: spleen, PBMC, and mesenteric, iliac, and inguinal lymph nodes				
gp120	gp120		DNA gag/pol, or env vaccine	murine	[Kim et al.(1997b)]
	NOTES: • A gp160 DNA vaccine, when delivered in conjuction with the plasmid encoding the co-stimulatory molecule CD86, gives an increase in the proliferative responses to gp120 in mice				
gp120	gp120			human	[De Berardinis et al.(1997)]
	NOTES: • Sequences flanking helper T cell immunogenic domains can be important for immunogenicity				
gp120(gp160)	gp120	polyclonal	HIV-1 infection	human	[Rosenberg et al.(1997)]
	NOTES: • A strong proliferative response to p24 and gp160 was found in a healthy long term survivor				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(gp160)	gp120	polyclonal	HIV-1 infection	Macaca nemestrina	[Kent et al.(1997)]
	NOTES: • Macaca nemestrina can be infected with HIV, and clear the infection within 6 months, so it is of interest to examine their initial immune response • A strong proliferative response against gp160 with IL-4 production, indicating a Th2 response, was found with 4 weeks of infection • The gp160 proliferative response by 8 weeks produces both IL-4 and γ interferon, indicating both Th1 and Th2 responses				
gp120(gp160 HXBc2)	gp120	polyclonal	gp160 DNA vaccine, env protein boost	Macaca mulatta	[Letvin et al.(1997)]
	NOTES: • Vaccination of Macaca mulatta (Rhesus monkeys) with an HXBc2 env DNA prime and a protein boost elicited a T-cell proliferative response, a CTL response, and type-specific neutralizing antibodies • Vaccinated animals challenged with SHIV-HXB2 were protected from infection				
gp120(MN)	gp120	polyclonal	env + rev MN DNA vaccine	human	[MacGregor et al.(1998)]
	NOTES: • An HIV DNA env and rev vaccine given to 15 asymptomatic HIV+ individuals at three different dosages, 30, 100 or 300 μg, was safe • All three groups showed an increased proliferative response after vaccination				