Table 8: **gp41**

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(557-565 IIIB)	gp41(47-55)	RAIEAQQHL	HIV-1 infection	human(unk)	[Wilkes et al.(1996)]
• Epitope defined in the context of the Pediatric AIDS Foundation ARIEL project mother-infant HIV transmission study • RAIDAQQHL and RVIEAQQHL, naturally occurring variants, were found in mother and are recognized					
gp41(557-565 IIIB)	gp41(47-55)	RAIEAQQHL	HIV-1 infection	human(B51)	[Sipsas et al.(1997)]
• HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 lab workers accidentally infected with HIV-1 IIIB • KAIEAQQHL, a variant found in HIV-1 NY5CG, was also recognized • RAIEAQQHM, a variant found in HIV-1 JRCSF, was also recognized • RAIDAQQHL, a variant found in HIV-1 ETR, was also recognized • RAIKAQQHL, a variant found in HIV-1 CDC42, was also recognized					
gp41(571-590 LAI)	gp41(60-79)	VWGIKQLQARILAVE-RYLKD	rec LAI gp160 vaccinia HIVAC-1e and rgp160	human CD4+ CTL (DR-1)	[Kent et al.(1997)]
• VWGIKQLQARILAVERYLKD, present in HIV-1 LAI, was the immunizing strain • VWGIKQLQARVLAVERYLKD, present in HIV-1 MN, was also recognized • VWGIKQPQARVLAVERYLRD was the form carried by the autologous strain that infected the vaccinee • Lysis of the target cells by CD4+ CTL was inhibited with the addition of the peptide representing the autologous strain • The infecting virus epitope also antagonized the proliferative functions of the CD4+ CTL clone • The behavior of the autologous strain presents a possible mechanism for vaccine failure since the infecting virus not only escapes CTL activity, but inhibits the ability of CTL to recognize other variants					
gp41(572-590 BRU)	gp41(62-80)	GIKQLQARILAVERY-LKDQ	rgp160 BRU vaccine	human(DPw4.2)	[Hammond et al.(1991)]
• CD4+ CTL; I(9) to V and K(17) to R blocks T cell receptor binding					

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(575-599 IIIB)	gp41(65-89)	QLQARILAVERYLKD-QQLLGIWGCS	HIV-1 infection	human(B14)	[Jassoy et al.(1992)]
	• Epitope recognized by CTL clone derived from CSF				
gp41(583-592 PV22)	gp41(73-82)	VERYLKDQQL	HIV-1 infection	human(B14)	[Jassoy et al.(1993)]
	• HIV-1 specific CTLs release γ-IFN, and α- and β-TNF				
gp41(591-599 SF2)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Lieberman et al.(1997)]
	• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein • 11 subjects had CTL that could lyse vaccinia expressed LAI gp160 • One of these 11 had CTL response to this peptide • The responding subject was HLA-A3, -A32, -B7, -B14				
gp41(591-599 SF2)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Cao et al.(1997)]
	• The consensus sequence for clades B, C, and D is ERYLKDQQL • The consensus sequence for clade A is ERYLRDQQL and it is equally reactive • The consensus sequence for clade E is ERYLKDQKF and it is not reactive				
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Sipsas et al.(1997)]
	• HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 lab workers accidentally infected with HIV-1 IIIB				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Yang et al.(1996)]
	• CD4+ cell lines acutely infected with HIV were studied to determine their susceptibility to lysis by CTL • Clones specific for RT lysed HIV-1 infected cells at lower levels than Env or Gag specific clones • The distinction was thought to be due to lower expression of RT relative to Env and Gag • CTL can lyse infected cells early after infection, possibly prior to viral production				
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Yang et al.(1997)]
	• CTL inhibit HIV-1 replication at effector cell concentrations comparable to those found *in vivo* • CTL produced HIV-1-suppressive soluble factors – MIP-1α, MIP-1β, RANTES, after antigen-specific activation • CTL suppress HIV replication more efficiently in HLA-matched cells				
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(unk)	[Price et al.(1995)]
	• Study of cytokines released by HIV-1 specific activated CTL				
gp41(584-592 PV22)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Johnson et al.(1992)]
	• Two overlapping CTL epitopes were mapped with different HLA restriction (also see YLKDQQLL HLA-B8)				
gp41(584-592 PV22)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Jassoy et al.(1993)]
	• HIV-1 specific CTLs release γ-IFN, and α- and β-TNF				
gp41(584-592,HXB2)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Kalams et al.(1994), Kalams et al.(1996)]
	• Longitudinal study of T cell receptor usage in a single individual • Persistence of oligoclonal response to this epitope for over 5 years				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(584-592)	gp41(74-82)	ERYLKDQQL	no CTL shown	human(B14)	[DiBrino et al.(1994a)]
	• Epitope studied in the context of HLA-B14 binding				
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Hammond et al.(1995)]
	• This peptide can be processed for HLA-B14 presentation in a TAP-1/2 independent pathway				
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(unk)	[Borrow et al.(1994)]
	• Three out of five patients with HIV-1 symptomatic infection controlled their viral infection well and mounted an early, strong HIV-1 specific MHC restricted CTL response • One of the three, study subject BORI, specifically recognized this peptide				
gp41(584-592)	gp41(74-82)	ERYLKDQQL	HIV-1 infection	human(B14)	[Kalams et al.(1996)]
	• CTL response to this epitope was studied in 5 HLA-B14 positive persons • CTL responses were detected in all five, and CTL clones were isolated from 4/5 • A diverse repertoire of TCRs recognized this epitope, with similar fine specificities • 3/5 subjects showed no variation in viral sequence, 2/5 had a dominate variant that resulted in poor recognition, ERYLQDQQL • A minor CTL response specific for the ERYLQDQQL could be detected by two individuals, but the major CTL response was to the ERYLKDQQL form even when it was the minority form • Some single amino acid substitutions were well tolerated by most of the CTL clones tested, but others, particularly in the center three amino acids positions, abrogated peptide stimulatory activity.				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(586-593)	gp41(76-83)	YLKDQQLL	HIV-1 infection	human(B8)	[Johnson et al.(1992)]
	• Two overlapping CTL epitopes were mapped with different HLA restriction (also see ERYLKDQQL HLA-B14)				
gp41(586-593)	gp41(76-83)	YLKDQQLL	no CTL shown	human(B8)	[Sutton et al.(1993)]
	• Predicted epitope based on B8 binding motifs, QLQARILAVERYLKDQQLLGIWGCS			from larger	peptide
gp41(76-83)	gp41(76-83)	YLKDQQLL	?	human(B8)	[Goulder et al.(1997e)]
	• Included in a study of the B8 binding motif				
gp41(584-591 NL43)	gp41(76-83)	YLKDQQLL	HIV-1 infection	human(A24)	[Dai et al.(1992)]
	• The lysine (K) is critical for eliciting a HLA-A24 CTL response				
gp41(605-615 LAI)	gp41(96-104)	TAVPWNASW	gp160 vaccinia	human(B35)	[Johnson et al.(1994b)]
	• Epitope for vaccine induced CD8+ clone				
gp41(606-614 LAI)	gp41(96-104)	TAVPWNASW	gp160 vacc vaccine	human(B35)	[Johnson et al.(1994a)]
	• HLA restricted CTL response to epitope in HIV-1 vaccinia-env vaccinees				
gp41(606-614 LAI)	gp41(96-104)	TAVPWNASW	gp160 vaccinia vaccine	human(B35)	[Hammond et al.(1995)]
	• Peptide only processed by a TAP-1/2-dependent pathway				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(606-614 HXB2)	gp41(96-104)	TAVPWNASW	synthetic peptide	human(B*3501)	[Ferris et al.(1996)]
	• Natural form of this peptide is not glycosylated, suggesting initial Class I processing may occur in the cytosol				
gp41(641-655 SF2)	gp41(124-138)	EIDNYTNTIYTLLEE	HIV-1 infection	human(unk)	[Lieberman et al.(1997)]
	• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein • 11 subjects had CTL that could lyse vaccinia expressed LAI gp160 • One of these 11 had CTL response to this peptide • The responding subject was HLA-A1, A2, B51, and B57				
gp41(701-720 BH10)	gp41(191-210)	VLSIVNRVRQGYSPL-SFQTH	HIV-1 infection	human(A32)	[Safrit et al.(1994a)]
	• Recognized by CTL derived from acute seroconverter				
gp41(747-755)	gp41(237-245)	RLVNGSLAL	HIV-1 infection	human(A2)	[Parker et al.(1992)]
	• Studied in the context of HLA-A2 peptide binding				
gp41(606-614 LAI)	gp41(257-270)	SYHRLRDLLLIVTR	HIV-1 infection	human(A31)	[Hammond et al.(1995)]
	• Peptide only processed by a TAP-1/2-dependent pathway • CTL from an acute seroconverter				
gp41(769-777 BH10)	gp41(259-267)	HRLRDLLLI	HIV-1 infection	human(unk)	[Safrit et al.(1994a)]
	• Recognized by CTL derived from acute seroconverter				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(768-778 NL43)	gp41(260-270) • CD8+ T cell clone; not cross-reactive with MN	RLRDLLLIVTR	HIV-1 infection	human(A3.1)	[Takahashi et al.(1991)]
gp41(768-778 NL43)	gp41(260-270) • The consensus peptide of clade B is RLRDLLLIVTR • The consensus peptide of clades A, C and E is RLRDFILIVTR and it is less reactive • The consensus peptide of clade D is SLRDLLLIVTR and it is less reactive	RLRDLLLIVTR	HIV-1 infection	human(A3)	[Cao et al.(1997)]
gp41(770-780 BH10)	gp41(260-270) • Recognized by CTL derived from acute seroconverter	RLRDLLLIVTR	HIV-1 infection	human(A31)	[Safrit et al.(1994a), Safrit et al.(1994b)]
gp41(788-809 HXB2)	gp41(271-292) • CTL epitope defined by T cell line and peptide mapping	IVELLGRRGWEALKY-WWNLLQY	HIV-1 infection	human(B27)	[Lieberman et al.(1992)]
gp120(788-809)	gp41(271-292) • HIV-specific CTL lines developed by *ex vivo* stimulation with peptide	IVELLGRRGWEALKY-WWNLLQY	HIV infection	human(unk)	[Lieberman et al.(1995)]
gp41(791-799 LAI)	gp41(276-284) • Review of HIV CTL epitopes; defined by B27 motif found within a larger peptide • Also: J. Liebermann 1992 and pers. comm. J. Liebermann	GRRRGWEALK	HIV-1 infection	human(B27)	[McMichael & Walker(1994)]
gp41(802-823 HXB2)	gp41(285-306) • CTL epitope defined by T cell line and peptide mapping	YWWNLLQYWSQELKN-SAVNLLN	HIV-1 infection	human(unk)	[Lieberman et al.(1992)]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(814-823 LAI)	gp41(303-312)	SLLNATDIAV	MN rec gp160	human(A2)	[Dupuis et al.(1995)]
	• Of two CTL clones, one reacted only with 815-823, the other with 814-823 and 815-823				
gp41(815-823 LAI)	gp41(304-312)	LLNATDIAV	MN rec gp160	human(A2)	[Dupuis et al.(1995)]
	• Of two CTL clones, one reacted only with 815-823, the other with 814-823 and 815-823				
gp120(844-863)	gp41(327-346)	YRAIRHIPRRIRQGL-ERILL	HIV infection	human(unk)	[Lieberman et al.(1995)]
	• HIV-specific CTL lines developed by *ex vivo* stimulation with peptide				
gp120(844-863 SF2)	gp41(327-346)	YRAIRHIPRRIRQGL-ERILL	HIV infection	human(unk)	[Lieberman et al.(1997)]
	• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein • 11 subjects had CTL that could lyse vaccinia expressed LAI gp160 • One of these 11 had CTL response to this peptide • The responding subject was HLA-A2, A26, B7, and B38				
gp120(844-863 LAI)	gp41(327-346)	YRAIRHIPRRIRQGL-ERILL	HIV-1 infection	human(B35)	[Shankar et al.(1996)]
gp41(834-848 IIIB)	gp41(317-331)	DRVIEVVQGAYRAIR	vaccinia IIIB gp160	murine(H-$2^{d,p,u,q}$)	[Shirai et al.(1992)]
	• In a murine system multiple class I molecules can present to CTL				
gp41(834-848 IIIB)	gp41(317-331)	DRVIEVVQGAYRAIR	rec vaccinia gp160	murine(H-$2^{d,p,u,q}$)	[Shirai et al.(1996)]
	• Mutiple murine MHC can cross-present this epitope (HP53), and P18 RIQRGPGRAFVTIGK, to specific CTL				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(834-848 IIIB)	gp41(317-331)	DRVIEVVQGAYRAIR	HIV exposure	human(unk)	[Pinto et al.(1995)]
	• CTL and T helper cell reactivity in healthcare workers exposed to HIV				
gp41(834-848 IIIB)	gp41(317-331)	DRVIEVVQGAYRAIR	HIV-1 infection	human(A2)	[Clerici et al.(1991)]
	• Helper and cytotoxic T cells can be stimulated by this peptide (Th4)				
gp41(829-837 LAI)	gp41(318-326)	RVIEVLQRA	MN rec gp160	human(A2)	[Dupuis et al.(1995)]
	• CTL from HLA-A2 positive subject react with this peptide; peptide binds to HLA-A*0201 with high affinity				
gp41(831-853)	gp41(320-344)	IEVVQGAYRAIIRHI-PRRIRQGLERI	HIV-1 infection	human(unk)	[Price et al.(1995)]
	• Study of cytokines released by HIV-1 specific activated CTL				
gp41(844-863 HXB2)	gp41(327-346)	YRAIRHIPRRIRQGL-ERILL	HIV infection	human(B8)	[Lieberman et al.(1992)]
	• CTL epitope defined by T cell line and peptide mapping				
gp41(848-856 LAI)	gp41(333-341)	IPRRIRQGL	?	human(B7)	[Brander & Walker(1995)]
	• Epitope defined in the context of the Pediatric AIDS Foundation ARIEL project mother-infant HIV transmission study				
gp41(848-856 LAI)	gp41(333-341)	IPRRIRQGL	HIV-1 infection	human(B7)	[Cao et al.(1997)]
	• The consensus peptide of clades A, B, D, and F is IPRRIRQGL				
	• The consensus peptide of clade C is IPRRIRQGF, and it is equally reactive				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp41(852-863 HXB2)	gp41(335-346)	RRIRQGLERILL	HIV-1 infection	human(A30,B8)	[Lieberman et al.(1992)]
	• CTL epitope defined by T cell line and peptide mapping				
gp41(852-863 LAI)	gp41(335-346)	RRIRQGLERILL	HIV-1 infection	human(B7)	[Shankar et al.(1996)]