

Table 10: **Nef**

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
Nef(13-20 LAI)	Nef(13-20) NOTES: ² Unusual epitope for HLA-B8, but compatible with crystal structure predictions	WPTVRRRM	HIV-1 infection	human(B8)	[Goulder97c]
Nef(61-80)	Nef(60-79) NOTES: ² HIV-specific CTL lines developed by vivostimulation with peptide	EEEEVGFPVTPQVPLRPMTY	HIV infection	human	[Lieberman95]
Nef(61-80 SF2)	Nef(60-79) NOTES: ² Of 25 patients, most had CTL specific for more than 1 HIV-1 protein ² 12 subjects had CTL that could recognize vaccinia expressed LAI Nef ² Two of these 12 had CTL response to this peptide ² The responding subjects were HLA-A11, A24, B8, B35, and HLA not determined	EEEEVGFPVTPQVPLRPMTY	HIV infection	human	[Lieberman97]
Nef(61-80 SF2)	Nef(60-79) NOTES: ² CTL expanded ex vivo were later infused into HIV-1 infected patients	EEEEVGFPVTPQVPLRPMTY	HIV-1 infection	human	[Lieberman97b]
Nef(66-80 BRU)	Nef(64-78) NOTES: ² HIV-1 specific CTLs detected in lymphoid organs of HIV-1 infected patients	VGFPVTPQVPLRMT	HIV-1 infection	human(A1,B8)	[Hadida92]
Nef(68-77 LAI)	Nef(66-75) NOTES: ² There was a high degree of variation in three CTL epitopes in Nef in four slow and non-progressors, and variant specific CTLs arose over time to eliminate variants, indicating immune selection	FPVTPQVPLR	HIV-1 infection	human(B7)	[Haas96]
Nef(72-80 SF2)	Nef(66-74) NOTES: ² Binds HLA-B*3501	FPVVRPQVPL	HIV-1 infection	human(B35)	[Shiga96]

HIV CTL Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
Ne f (72-80 SF2)	Ne f (66-74) NOTES: <ol style="list-style-type: none"> A CTL clone responsive to this epitope was obtained 3/7 B35 positive individuals had a CTL response to this epitope An R to T substitution at position 4 abrogates specipc lysis, but not binding to B*3501 	FPV R PQVPL	HIV-1 infection	human(B*3501)	[Tomiyama97]
Ne f (75-85 SF2)	Ne f (69-79) NOTES: <ol style="list-style-type: none"> Binds HLA-B*3501 	RPQVPLRPM T Y	HIV-1 infection	human(B35)	[Shiga96]
Ne f (75-85 SF2)	Ne f (69-79) NOTES: <ol style="list-style-type: none"> A CTL clone responsive to this epitope was obtained 4/7 B35 positive individuals had a strong CTL response to this epitope An R to T substitution at position 1 abrogates specipc lysis, but not binding to B*3501 An R to H substitution at position 7 did not alter reactivity 	RPQVPLRPM T Y	HIV-1 infection	human(B*3501)	[Tomiyama97]
Ne f (71-90 SF2)	Ne f (70-89) NOTES: <ol style="list-style-type: none"> Of 25 patients, most had CTL specipc for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI Nef Three of these 11 had CTL response to this peptide The responding subjects were HLA-A3, A32, B51, B62; HLA-A11, A24, B8, B53 	PQVPLRMTYKAAVDLSHFL	HIV-1 infection	human	[Lieberman97]
Ne f (71-90 SF2)	Ne f (70-89) NOTES: <ol style="list-style-type: none"> CTL expanded ex vivo were later infused into HIV-1 infected patients 	PQVPLRPM T YKAAVDLSHFL	HIV-1 infection	human	[Lieberman97b]
Ne f (73-82 LAI)	Ne f (71-80) NOTES: <ol style="list-style-type: none"> Optimal epitope mapped by peptide titration 	QVPLRPM T YK		human(B27)	[CulmannPerCom]

HIV CTL Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
NeF(73-82)	NeF(71-80) NOTES: ² Cross-clade CTL response was studied by determining the CTL activity in seven patients from Bangui, (6 A subtype, and 1 AG recombinant infections) and one A subtype infection from a person living in France originally from Togo, to different antigens expressed in vaccinia ² Pol reactivity: 8/8 had CTL to A subtype, and 7/8 to B subtype, and HIV-2 Pol was not tested ² Gag reactivity: 7/8 reacted with A or B subtype gag, 3/8 with HIV-2 Gag ² NeF reactivity: 7/8 reacted with A subtype, and 5/8 with B subtype, none with HIV-2 NeF ² Env reactivity: 3/8 reacted with A subtype, 1/8 with B subtype, none with HIV-2 Env ² One of the patients was shown to react to this epitope: QVPLRPMITYK	QVPLRPMITYK	HIV-1 infection	human(A3)	[Dural198]
NeF(73-82 NL43)	NeF(71-80) NOTES: ² Tyr is critical for binding to A3.1	QVPLRPMITYK	HIV-1 infection	human(A3.1)	[Koenig90]
NeF(73-82 BRU)	NeF(71-80) NOTES: ² NeF CTL clones from HIV+ donors	QVPLRPMITYK	HIV-1 infection	human(A3,A11, B35)	[Culmann91]
NeF(73-82 LAI)	NeF(71-80) NOTES: ² Development of a retroviral vector (pNeoNeF) to generate autologous CTL targets ² [Hunziker98] suggests that HLA-A2 does not in fact present this epitope, in spite of the suggestion in this study that it did D also see [Brander98b]	QVPLRPMITYK	HIV-1 infection	human(A2?)	[Robertson93]
NeF(73-82 LAI)	NeF(71-80) NOTES: ² Mutational variation in HIV epitopes in individuals with appropriate HLA types can result in evasion of CTL response ² [Goulder97e] is a review of immune escape that summarizes this study	QVPLRPMITYK	HIV-1 infection	human(A11)	[Coullin94, Goulder97e]
NeF(73-82 LAI)	NeF(71-80) NOTES: ² Mutations found in this epitope in HLA-A11 positive and negative donors were characterized	QVPLRPMITYK	HIV-1 infection	human(A11)	[Coullin95]

HIV CTL Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
Ne _f (73-82 LAI)	Ne _f (71-80) NOTES: <ul style="list-style-type: none"> ² Identical twin hemophiliac brothers were both infected with the same batch of factor VIII ² Both had a response to this epitope ² [Goulder97e] is a review of immune escape that summarizes this study 	QVPLRPM _{TYK}	HIV-1 infection	human(A3)	[Goulder97, Goulder97e]
Ne _f (73-82)	Ne _f (71-80) NOTES: <ul style="list-style-type: none"> ² 82 HIV-1-specific CTL clones from 5 long term non-progressors were isolated and analyzed for breadth of response ² A sustained Gag, Env and Ne_f response was observed, and clones were restricted by multiple HLA epitopes, indicating a polyclonal response ² An A3+ subject had a strong response to this epitope, with 10/11 CTL clones being specific for this epitope, isolated at two time points, 1 year apart 	QVPLRPM _{TYK}	HIV-1 infection	human(A3)	[Lubaki97]
Ne _f (73-82)	Ne _f (71-80) NOTES: <ul style="list-style-type: none"> ² The anti-Ne_f CTL line P1 specific for this epitope is able to kill target cells via two mechanisms ² First: Ca²⁺-dependent, perforin-dependent Ne_f-specific lysis ² Second: C₃^γ-independent, CD95-dependent apoptosis that could also kill non-specific targets ² Findings indicate that the two mechanisms are not mutually exclusive in human CTL, as they are in mice ² CTL mediated CD95-dependent apoptosis may play a role in pathogenesis 	QVPLRPM _{TYK}	HIV infection	human	[Garcia97]
Ne _f (73-82 LAI)	Ne _f (71-80) NOTES: <ul style="list-style-type: none"> ² Alanine substitutions L76A, R77A, M79A, T80A significantly decreased immunogenicity of peptide ² Ne_f CTL clones (4N225) were infused into an HIV-1 infected volunteer to evaluate effects of infusion on viral load/patient health ² Infusion led to outburst of escape variants which resulted in higher viral load/accelerated disease progression 	QVPLRPM _{TYK}	HIV-1 infection	human(A3.1)	[Koenig95]
Ne _f (73-82)	Ne _f (72-80) NOTES: <ul style="list-style-type: none"> ² Exploration of A11 binding motif 	VPLRPM _{TYK}	no CTL shown	human(A11)	[Zhang93]

HIV CTL Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
NeF(73-82 LAI)	NeF(72-79)	VPLRPMTY	HIV-1 or HIV-2 infection	human(B35)	[McMichael94]
NOTES: ² Review of HIV CTL epitopes D depicted by B35 motif found within a larger peptide					
NeF(73-82 LAI)	NeF(72-79)	VPLRPMTY	HIV-1 or -2 infection	human(B35)	[RowlandJones95]
NOTES: ² VPLRPMTY also recognized by CTL from HIV-2 seropositives, epitope is conserved					
NeF	NeF(72-79)	VPLRPMTY	HIV-1 exposure	human(B35)	[RowlandJones98]
NOTES: ² A CTL response was found in exposed but uninfected prostitutes from Nairobi using previously depicted B clade epitopes that tended to be conserved in A and D clades D such cross-reactivity could protect against both A and D and confer protection in Nairobi where both subtypes are circulating ² The A and D subtype consensus are identical to the B clade epitope					
NeF(75-82)	NeF(72-79)	VPLRPMTY	none	human(B35)	[Lavani97]
NOTES: ² A peptide based protocol was optimized for restimulation of CTLp using optimized peptide and IL-7 concentrations D importantly this protocol does not stimulate a primary response, only secondary D peptide-specific CTLp counts could be obtained via staining with peptide-Class I tetramers ² This peptide was one of the B35 presented test peptides used in control experiments showing that the assay gave no activity using lymphocytes from 21 healthy B35 seronegative donors					
NeF(75-82)	NeF(72-79)	VPLRPMTY	no CTL shown	human(B*3501)	[Smith96]
NOTES: ² Crystal structure of VPLRPMTY-class B allele HLA-B*3501 complex					
NeF(74-82)	NeF(72-79)	VPLRPMTY		human(A3)	[Carreno92]
NOTES: ² Included in HLA-A3 binding peptide competition study					

