Table 2: **p24**

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
p24(1–11)	p24(1–11 SF2)	PIVQNLQGQMV	HIV-1 infection	human(DR1)	[Harcourt (1998)]
	• 43 asymptomatic HIV+ individuals were screened for proliferative responses to HIV – 12 showed a response, and dominant epitopes were mapped for two individuals, one in p24 and one in p17 • Out of five truncated versions of peptide PIVQNLQGQMVHQAISPRTL, only p24-1/11 elicited a proliferative response • Nine naturally occurring variants of this epitope were found within the individual who made this response – all bound to HLA-DR1, but three did not stimulate the CD4+ T-cell line that recognized the index peptide, suggestive of immune escape				
p24(1–15)	p24(133–147 IIIB B10)	PIVQNIQGQMVHQAI	HIV-1 infection	human( )	[Wahren (1989b), Wahren (1989a)]
	• Peptides were identified that commonly evoke T-cell responses – 62% of 90 HIV+ people had a T-cell response to this peptide				
p24(1–22)	p24(133–154 SF2)	PIVQNIQGQMVHQAISPRTLNA	HIV-1 infection	human( )	[Rosenberg (1997)]
	• While anti-HIV CD4 T helper responses are characteristically undetectable in chronic infections, strong p24-specific proliferative responses were inversely correlated with low viral load in 10 chronically infected people • The dominant proliferative response in one of two long term survivors was to this peptide				
p24(11–26)	p24(143–157)	VHQAISPRTLNAWVKC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors • Matches 3/3 anchor residues for HLA DR: **V**HQAI**S**PR**T**				
p24(11–30)	Gag(143–152 SF2)	VHQAISPRTLNAWVKVVEEK	Listeria moncyto-genes vaccine ex-pressing HIV-1 p24 protein (Lm-Gag)	murine(H-2d and H-2b)	[Mata & Paterson(1999)]
	• *Listeria moncytogenes* is an intracellular bacterium that lives in the cytoplasm and generates a cell-mediated immune response • *Listeria moncytogenes* vaccine expressing HIV-1 p24 protein (Lm-Gag) was used to stimulate gag specific CD4+ T cell proliferative responses in BALB/c(H-2d) and C57BL/6(H-2b) mice • Two of three reactive p24 peptides (out of 22 overlapping peptides that span p24) were recognized by both murine strains – this epitope is immunodominant in C57BL/6 mice and also can stimulate a BALB/c response • The proliferative response is due to CD4+, IFN-γ producing cells, a Th1 response				

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HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
p24(21–36)	p24(153–167)	NAWVKVVEEKAFSPEC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
• Epitope elicits a primary proliferative response in PBMC from uninfected donors					
p24(31–46)	p24(163–177)	AFSPEVIPMFSALSEC	Peptide priming *in vitro*	human(A*0201)	[Bedford (1997)]
• Epitope elicits a primary proliferative response in PBMC from uninfected donors • This peptide contains a CTL epitope identified in HIV-positive patients • Peptide binds to HLA A*0201 and causes regulation of class I expression on T2 cells • Matches 3/3 anchor residues for HLA DR: **V**IPMF**S**AL**S**					
p24(31–52)	p24(163–184 SF2)	AFSPEVIPMFSALSEGATPQDL	HIV-1 infection	human( )	[Rosenberg (1997)]
• Low viral load correlated with strong HIV-1-specific proliferative response • A proliferative response to this epitope was detected in two long term survivors					
p24(41–56)	p24(173–187)	SALSEGATPQDLNTMC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
• Epitope elicits a primary proliferative response in PBMC from uninfected donors					
p24(48–62)	p24(180–194)	TPQDLNTMLNTVGGH	HIV-1 infection	human( )	[Adams (1997)]
• One of four immunogenic Gag peptides used in study of proliferative response to p24 • Homology to an SIV epitope recognized by macaque T-cells • T-cells from 8 of 19 HIV+ individuals responded to this epitope • Improved assay system (increase in culture time to 8 days and addition of IL-2 to cultures) gave increased detection of proliferative response					
p24(51–66)	p24(183–197)	DLNTMLNTYGGHQAAC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
• Epitope elicits a primary proliferative response in PBMC from uninfected donors					
p24(51–82)	Gag(183–214 LAI)	DLNTMLNTVGGHQAAMQ-MLKETINEEAAEWDR	Lipopeptide vaccine	human( )	[Gahery-Segard (2000)]
• Anti-HIV lipopeptide vaccine consisting of six long peptides derived from Nef, Gag and Env HIV-1 proteins modified by a palmitoyl chain was administered in a phase I trial • A CD4+ T cell proliferative response to at least one of the six peptides was observed in 9/10 vaccinees – 2/10 reacted to this peptide • 9/12 tested mounted a CTL responses to at least one of the six peptides, each of the six peptides elicited a CTL response in at least one individual • None of the 12 tested had an IgG response to this peptide					

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
p24(71–86)	p24(203–217)	ETINEEAAEWDRVHPC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors				
p24(76–85)	p24(208–217)	EAAEWDRVHP	HIV-1 infection	human( )	[Adams (1997)]
	• One of four immunogenic Gag peptides used in study of the proliferative response to p24 • T-cells from 11 of 24 HIV+ individuals responded to this epitope • Improved assay system (increase in culture time to 8 days and addition of IL-2 to cultures) gave increased detection of proliferative response				
p24(76–90)	p24(208–222 IIIB B10)	EAAEWDRVHPVHAGP	HIV-1 infection	human( )	[Wahren (1989b), Wahren (1989a)]
	• 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
p24(81–95)	p24(215–229 SF2)	DRVHPVHAGPIAPGQ	SF2 p24:Ty-VLP	macaque( )	[Mills (1990)]
	• Responses to 3 T-cell and multiple linear B-cell epitopes were found in vaccinated macaques				
p24(81–102)	p24(213–234 SF2)	DRVHPVHAGPIAPGQMR-EPRGS	HIV-1 infection	human( )	[Rosenberg (1997)]
	• While anti-HIV CD4 T helper responses are characteristically undetectable in chronic infections, strong p24-specific proliferative responses were inversely correlated with low viral load in 10 chronically infected people • The dominant proliferative response in one of two long term survivors was to this peptide				
p24(87–101)	p24(219–233 BRU)	HAGPIAPGQMREPRG	peptide	murine(H-2^b)	[Vaslin (1994)]
	• Peptide G2: could prime for *in vitro* immunoproliferative responses and for subsequent IgG responses				
p24(96–103)	p24(228–235 LAI)	MREPRGSD	HIV-1 infection	human( )	[Schrier (1989)]
	• Stimulates T-cell proliferation in HIV-infected donors				
p24(96–110)	p24(228–242 IIIB B10)	MREPRGSKIAGTTST	HIV-1 infection	human( )	[Wahren (1989b), Wahren (1989a)]
	• 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
p24(101–115)	p24(235–249 SF2)	GSDIAGTTSTLQEQI	SF2 p24:Ty-VLP	macaque( )	[Mills (1990)]
	• Responses to 3 T-cell and multiple linear B-cell epitopes were found in vaccinated macaques – epitope response defined by T-cell clone				
p24(101–116)	p24( )	GSDIAGTTSTLQEQIC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors				

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HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
p24(111–132)	p24(243–264 SF2)	LQEQIGWMTNNPPIPVGEIYKR	HIV-1 infection	human( )	[Rosenberg (1997)]
	• Low viral load correlated with strong HIV-1-specific proliferative response • A proliferative response to this epitope was detected in two long term survivors				
p24(121–136)	p24(253–267)	NPPIPVGEIYKRWIIC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors				
p24(121–140)	Gag(253–272 SF2)	NPPIPVGEIYKRWILGLNK	Listeria moncyto-genes vaccine ex-pressing HIV-1 p24 protein (Lm-Gag)	murine(H-2d)	[Mata & Paterson(1999)]
	• *Listeria moncytogenes* is an intracellular bacterium that lives in the cytoplasm and generates a cell-mediated immune response • *Listeria moncytogenes* vaccine expressing HIV-1 p24 protein (Lm-Gag) was used to stimulate gag specific CD4+ T cell proliferative responses in BALB/c(H-2d) and C57BL/6(H-2b) mice • Two of three reactive p24 peptides (out of 22 overlapping peptides that span p24) were recognized by both murine strains – this epitope is immunodominant in BALB/c mice and did not stimulate a C57BL/6 response • The proliferative response is due to CD4+, IFN-γ producing cells, a Th1 response				
p24(121–152)	Gag(183–214 LAI)	NPPIPVGEIYKRWIILG-LNKIVRMYSPTSILD	Lipopeptide vaccine	human( )	[Gahery-Segard (2000)]
	• Anti-HIV lipopeptide vaccine consisting of six long peptides derived from Nef, Gag and Env HIV-1 proteins modified by a palmitoyl chain was administered in a phase I trial • A CD4+ T cell proliferative response to at least one of the six peptides was observed in 9/10 vaccinees – 9/10 reacted to this peptide • 9/12 tested mounted a CTL responses to at least one of the six peptides, each of the six peptides elicited a CTL response in at least one individual – this peptide was particularly immunogenic, eliciting a CTL response in four vaccinees • All of the 12 tested had an IgG response to this peptide				
p24(131–145)	p24(265–279 SF2)	KRWIILGLNKIVRMY	SF2 p24:Ty-VLP	macaque( )	[Mills (1990)]
	• Responses to 3 T-cell and multiple linear B-cell epitopes were found in vaccinated macaques – epitope response defined by T-cell clone				
p24(131–152)	p24(263–284 SF2)	KRWIILGLNKIVRMYSPTSILD	HIV-1 infection	human( )	[Rosenberg (1997)]
	• Low viral load correlated with strong HIV-1-specific proliferative response • A proliferative response to this epitope was detected in two long term survivors				

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
p24(135–154)	p24(267–286)	ILGLNKIVRMYSPTSILDIR	HIV-1 infection	human( )	[Adams (1997)]
	• One of four immunogenic Gag peptides used in study of the proliferative response to p24 • 8 of 24 HIV+ individuals responded to this epitope • Improved assay system (increase in culture time to 8 days and addition of IL-2 to cultures) gave increased detection of proliferative response				
p24(141–156)	p24(273–287)	IVRMYSPTSILDIRQC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors • Matches 3/3 anchor residues for HLA DR: **I**VRMY**S**PT**S**				
p24(146–160)	p24(278–292 IIIB B10)	SPTSILDIRQGPKEP	HIV-1 infection	human( )	[Wahren (1989b), Wahren (1989a)]
	• 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
p24(150–169)	p24(282–301)	ILDIRQGPKEPFRDYVDRFY	HIV-1 infection	human( )	[Schrier (1989)]
	• Stimulates T-cell proliferation in HIV-infected donors				
p24(151–166)	p24(283–297)	LDIRQGPKEPFRDYVC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors				
p24(155–177)	p24(287–309)	QGPKEPFRDYVDRFYKT-LRAEQA	Peptide immunization	murine( )	[Nakamura (1997)]
	• Mice immunized with this peptide generated proliferative responses, CTLs and antibodies • This immunogenic domain is from a highly conserved region of p24				
p24(156–170)	p24(288–302 IIIB B10)	GPKEPFRDYVDRFYK	HIV-1 infection	human( )	[Wahren (1989b), Wahren (1989a)]
	• 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses				
p24(156–174)	p24(287–306)	QPKEPFRDYVDRFYKTLRA	HIV-1 infection	human( )	[Adams (1997)]
	• One of four immunogenic Gag peptides used in study of the proliferative response to p24 • T-cells from 5 of 21 HIV+ individuals responded to this epitope • Improved assay system (increase in culture time to 8 days and addition of IL-2 to cultures) gave increased detection of proliferative response				

HIV Helper-T Cell Epitopes

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
p24(161–180)	Gag(293–312 SF2)	FRDYVDRFYKTLRAEQASQD	Listeria moncytogenes vaccine expressing HIV-1 p24 protein (Lm-Gag)	murine(H-2d and H-2b)	[Mata & Paterson(1999)]
	• *Listeria moncytogenes* is an intracellular bacterium that lives in the cytoplasm and generates a cell-mediated immune response • *Listeria moncytogenes* vaccine expressing HIV-1 p24 protein (Lm-Gag) was used to stimulate gag specific CD4+ T cell proliferative responses in BALB/c(H-2d) and C57BL/6(H-2b) mice • Two of three reactive p24 peptides (out of 22 overlapping peptides that span p24) were recognized by both murine strains – this peptide stimulated a response in both BALB/c and C57BL/6 mice • The proliferative response is due to CD4+, IFN-γ producing cells, a Th1 response				
p24(181–196)	p24(313–327)	VKNWMTETLLVQNANC	Peptide priming *in vitro*	human( )	[Bedford (1997)]
	• Epitope elicits a primary proliferative response in PBMC from uninfected donors • Matches 3/3 anchor residues for HLA DR: **V**KNWM**T**ET**L**				