Table 4: **Gag**

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
Gag( )	p24( )		p24-VLP virus-like particle	human( )	[Kelleher (1998b)]
• Immunization of HIV+ people with a p24-VLP virus-like particle did not significantly impact CD4+ lymphocyte count, viral load, or p24 antibody titre • Immunization with p24-VLP showed a modest, short-lived increased proliferative response to p24					
Gag( )	p24( )		HIV-1 infection and immunotherapy	human( )	[Maino (2000)]
• 18 HIV-1-seropositive patients with a low frequency or no detectable CD4+ T cell response to HIV-1 antigen received an HIV-1 immunogen consisting of 10 units of native p24 and 100 ug of HZ321, a gp120 depleted antigen • Using flow-cytometric methods, HIV-1 specific CD4+ T cells were shown to increase in response to immunization – in many patients significant enhancement was observed after a single immunization • The frequency of CD4+ T cells expressing cytokines in response to antigen by FACS was correlated with a lymphoproliferation assay					
Gag( )	p24( )		HIV-1 infection	human( )	[Ruiz (2000)]
• Structured treatment interruption in chronically infected patients allowed recovery of p24 Th proliferative responses after HAART therapy discontinuation in 2/12 patients • The Th response to p24 was identified during peak viremia in one patient, while in the second it was noted when viremia was controlled after restarting antiviral therapy					
Gag( )	p24( )		HIV-1 gag DNA vaccine with secreted gag protein	murine(H-2^d)	[Qiu (2000)]
• Mice were injected with plasmid DNA at 0, 2 and 4 weeks and lymphocyte proliferation was measured after 6 weeks with recombinant p24 protein • Secreted HIV-1 Gag expression vectors generated a stronger response than standard Gag or cytoplasmic Gag expression vectors • IFN-γ levels were increased compared to an undetectable IL-4 response • CTL levels were also increased in secreted Gag expression vaccination studies					

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
Gag( )	p24( )		HIV-1 infection	human( )	[Lori (1999)]
• Ten patients with acute, pre-seroconversion HIV-1 infections were treated with didanosine, indinavir and hydroxyurea – this treatment is associated with normalization of immune parameters • A vigorous HIV-specific T helper response (stimulation index greater than 8) was observed in 7/8 patients treated before complete WB seroconversion, but in only 1/5 controls treated after seroconversion • Vigorous T helper responses were detected as early as 34 days after treatment begin • Patients treated prior to seroconversion had no loss of naive CD4 T lymphocytes, recovery of up to 35% of the naive CD8 cells in several weeks, and a reduced latent viral reservoir					
Gag( )	p24( )		HIV-1 infection	human( )	[Haslett (2000)]
• 11/22 adult patients on HAART showed strong CD4+ T-cell IFN-γ producing Th1 responses to HIV p24 • The magnitude of the Th1 response correlated with previous interruptions in HAART, suggesting the interruptions primed or boosted the response • In contrast, the magnitude of the CD8+ CTL response did not correlate with interruptions in therapy, although a greater breadth in response was associated with interruptions in HAART					
Gag( )	p24( )		p24-VLP virus-like particle	human( )	[Klein (1996)]
• Immunization of HIV+ people with a HIV-1 p17/p24 Ty virus-like particle (p24-VLP) resulted in a marginal, short-lived increased proliferative response to p24 and p17 and a transient elevation in viral load • Two of four subjects that received 500 or 1000 ug of p24-VLP had an increase in gag-specific CTL					
Gag( )	p24( )		gp120 depleted HZ321	human( )	[Moss (1998)]
• Immunization with gp120 depleted HZ321 virus (REMUNE^{TM}) triggered an increase in lymphocyte proliferative response to native p24, a clade B virus and clade E viral antigens – Z321 is clade A in env and clade G in gag. [Moss (1998)]					
Gag( )	p24( )		HIV-1 infection	human( )	[Rosenberg (1999)]
• This paper reviews the role of T-cells in viral control and HIV disease outcome • Strong anti-p24 lymphoproliferative responses were found in seven persons who were treated with potent anti-viral therapy during acute HIV-1 infection syndrome • This suggests that Th cells are part of the normal response to HIV-1 infection, but their numbers are rapidly diminished by either being infected during the peak viremia or by activation-induced cell death – if peak viremia can be controlled, a robust anti-p24 Th response can be maintained					

HIV Helper-T Cell Epitopes

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
Gag( )	p24( )		HIV-1 infection	human( )	[Rosenberg & Walker(1998)]
• Strong Th responses have been found in rare individuals who effectively maintain low viral loads • If aggressive anti-retroviral therapy is given prior to sero-conversion, strong helper responses can be maintained.					
Gag( )	p17( )		purified p17	murine( )	[Birk (1998)]
• Different p17 genes derived from the same quasispecies and expressed and purified in *E. coli* primed different Th 1 and Th 2 subsets in mice, depending on their H-2 type.					
Gag( )	Gag( )		HIV-1 infection	human( )	[Schiller (2000)]
• Study of parameters that might influence the performance or reproducibility of clinical Th proliferative assays • HIV-1 replication *in vitro* is unlikely to influence the assay • Gag proteins including p17 and possibly p7 as well as p24 perform better than p24 alone • Frozen samples can be used in T-proliferative assays, but with lower radiolabled thymidine incorporation					
Gag( )	Gag( )		HIV-1 infection	human( )	[Pitcher (1999)]
• In contrast to earlier studies suggesting that HIV-1 specific Th responses were eliminated in the early stages of infection in most HIV+ individuals, this paper shows using flow cytometric detection of antigen-induced cytokines that Th-1 CD4+ memory gag-specific Th cells are detectable in most HIV+ subjects • Effective anti-viral therapy reduces the frequency of these cells, presumably due to reduced antigenic stimulus					
Gag( )	Gag( )		HIV-1 infection	human( )	[Plana (1998)]
• Patients from later stages of infection given HAART do not show restoration of HIV-1 specific Th proliferative responses					
Gag( )	Gag( )		HIV-1 infection	human( )	[Kelleher (1998a)]
• Env and gag Th epitopes were pooled and used to test Th proliferative responses after IL2 therapy – while IL2 therapy causes an increase in CD4+ lymphocyte count, it does not increase HIV-1 specific proliferative responses					
Gag( )	Gag( )		HIV-DNA prime - HIV vaccinia boost	*Macaca nemest-rina*( )	[Kent (1998)]
• Priming with an HIV-DNA vaccine and boosting with a vaccinia construct induced greater levels of HIV T-cell immunity than either vaccine alone. • The proliferative response to Env and Gag after the DNA vaccination had a mean SI of 1.5-4, but after boosting with rHIV-fowlpox virus, there was a 6–17 fold increase in the mean SI for HIV Gag and Env – the Th response happened despite a fall in antibody titers, suggesting that the Th response was primarily Th1, not Th2. The CTL response was also enhanced.F					

HXB2 Location	Author Location	Sequence	Immunogen	Species(HLA)	References
Gag( )	( )		10 different vaccines	*Macaca mulatta*( )	[Heeney (1999)]
	• Ten different vaccine strategies were evaluated for their ability to protect from infection in a rhesus macaque model using a non-pathogenic SHIV challenge • Protection correlated with the magnitude of NAb responses, beta-chemokines, and a balanced Th response • DNA, protein+adjuvant, VLP and ISCOM vaccines were tested • HIV-1/ISCOMS gave the highest NAb titers, Th1 and Th2 responses, was the only vaccine formulation tested with a detectable CTL response, and gave enhanced beta-chemokine production				
Gag( )	Gag/Pol( )		DNA vaccine + CD80 and CD86 expression vectors	chimpanzee( )	[Kim (1998)]
	• Co-stimulatory molecules co-expressed with an HIV-1 immunogen in a DNA vaccine used to enhance the immune response – co-expression of CD86, but not CD80, dramatically increased both HIV Env and Gag/Pol specific CTL and Th proliferative responses				
Gag( )	Gag/Pol( )		ALVAC-HIV vaccine	human( )	[Salmon-Ceron (1999)]
	• A live attenuated canarypox vector expressing MN gp120 and LAI gp41/gag/protease could induce CTL and a lymphoproliferative response in healthy uninfected volunteers				