



## HIV Helper-T Cell Epitopes

| Location               | WEAU          | Sequence                               | Immunogen               | Species(HLA)                | References   |
|------------------------|---------------|--|-------------------------|-----------------------------|--|
| gp41(576-591)          | gp41(66-81)   | LQARILAVERYLKDQQ                       | peptide                 | murine(H-2 <sup>d,b</sup> ) | [Brown et al.(1995)]   |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>This peptide was a poor immunogen in BALB/c and CBA mice used in this experiment, producing a weak proliferative response</li> </ul>  |
| gp41(585-615<br>IIIB)  | gp41(68-98)   | ARILAVERYLKDQQLLGI-<br>IWGCSSGKLICTTAV | peptide                 | murine                      | [Goodman-Snikoff<br>et al.(1990)]  |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>Identification of putative Th epitopes that can stimulate an antibody response in peptide immunized mice</li> </ul>   |
| gp41(579-601)          | gp41(69-91)   | RILAVERYLKDQQLLGG-<br>IWGCSSGK         | peptide                 | murine(H-2 <sup>d,b</sup> ) | [Brown et al.(1995)]   |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>This peptide was a good immunogen in BALB/c and CBA</li> <li>This peptide produced a strong Th response in both mice strains which was more responsive towards GIKQLQAR-ILAVERYLKDQQ and LQARILAVERYLKDQQ than to itself</li> </ul>   |
| env(586-598)           | gp41(76-88)   | YLRDQQLLGIWGC                          | Peptide<br>immunization | murine, rhesus<br>monkeys   | [Nehete et al.(1993)]  |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>Synthetic peptide derived from conserved region of the HIV-1 envelope that stimulates a proliferative response in mice</li> <li>Proliferative response to this peptide was observed in 1/3 immunized rhesus monkeys, with a weak transient response in the other two</li> </ul> |
| gp41(env<br>consensus) | gp41(84-94)   | GIWGCSSGKLIIC                          | HIV infection           | human                       | [Mutch et al.(1994)]   |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>Core region of peptides that can stimulate proliferative responses from seronegative and seropositive people</li> </ul>   |
| gp41(598-609<br>LAV-1) | gp41(83-94)   | LGLWGCSSGKLIIC                         | peptide                 | murine(H2 <sup>d</sup> )    | [Schrier et al.(1988)]   |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>Murine T-dependent B-cell response – 7/29 had a proliferative response to this peptide</li> </ul>   |
| gp41(593-604<br>IIIB)  | gp41(83-94)   | LGIWGCSSGKLIIC                         | HIV infection           | human                       | [Bell et al.(1992)]  |
|                        | <b>NOTES:</b> |  |                         |                             | <ul style="list-style-type: none"> <li>Elicits T-cell proliferation and B cell responses, but only during the asymptomatic phase of HIV infection</li> </ul>   |

## HIV Helper-T Cell Epitopes

| Location   | WEAU          | Sequence          | Immunogen                       | Species(HLA) | References              |
|--|---------------|-------------------|---------------------------------|--------------|-------------------------|
| gp41(594-603 IIB)  | gp41(84-93)   | GIWGCSSGKLI       | HIV-1 infection                 | human        | [Kelleher et al.(1998)] |
| <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• Epitope documented as a "previously described" epitope [Bell et al.(1992)], but in Bell et al. it was described as gp41(594-603 IIB), LGIWGCSSGKLI</li> <li>• Immunization with a p24-VLP virus-like particle did not significantly impact CD4+ lymphocyte count, viral load, or p24 antibody titre</li> <li>• Immunization with p24-VLP did not increase the proliferative response to this gp41 epitope, however, there was a modest, short-lived increased proliferative response to p24</li> </ul> |               |                   |                                 |              |                         |
| gp41(603-614 LAI)  | gp41(88-99)   | CSGKLICTTAVP?     | HIV infection                   | human        | [Schnier et al.(1989)]  |
| <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• Stimulates T-cell proliferation in HIV-infected donors</li> </ul>  |               |                   |                                 |              |                         |
| gp41(609-620 LAI)  | gp41(94-105)  | CTTAVPWNASWS?     | HIV infection                   | human        | [Schnier et al.(1989)]  |
| <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• Stimulates T-cell proliferation in HIV-infected donors</li> </ul>  |               |                   |                                 |              |                         |
| gp41(env consensus)  | gp41(99-106)  | PWNASWSN          | HIV infection                   | human        | [Mutch et al.(1994)]    |
| <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• Core region of peptides that can stimulate proliferative responses from seronegative and seropositive people</li> </ul>  |               |                   |                                 |              |                         |
| gp41(IIB)  | gp41(104-119) | WSNKSLIEDIWDNMTWC | Peptide priming <i>in vitro</i> | human        | [Manca et al.(1995b)]   |
| <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• Peptide stimulation of PBMC from non-infected individuals <i>in vitro</i></li> <li>• Peptide priming does not always induce T-cells that recognize whole protein</li> </ul>  |               |                   |                                 |              |                         |
| gp41(IIB)  | gp41(124-139) | EIDNYTNTTYTLLEEC  | Peptide priming <i>in vitro</i> | human        | [Manca et al.(1995b)]   |
| <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• Peptide stimulation of PBMC from non-infected individuals <i>in vitro</i></li> <li>• Peptide priming does not always induce T-cells that recognize whole protein</li> </ul>  |               |                   |                                 |              |                         |

## HIV Helper-T Cell Epitopes

| Location                  | WEAU          | Sequence        | Immunogen     | Species(HLA)                   | References   |
|---------------------------|---------------|-----------------|---------------|--------------------------------|--|
| gp41(647-661<br>IIIB B10) | gp41(137-151) | EESQNNQEKNEQELL | HIV infection | human                          | [Wahren et al.(1989b),<br>Wahren et al.(1989a)]  |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses    |
| gp41(655-667<br>LAI)      | gp41(140-152) | QNQQEKNEQELLE?  | HIV infection | human                          | [Schrier et al.(1989)]   |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • Stimulates T-cell proliferation in HIV-infected donors                                       |
| gp41(667-681<br>IIIB B10) | gp41(157-171) | ASLWNNWFNTNWLWY | HIV infection | human                          | [Wahren et al.(1989b),<br>Wahren et al.(1989a)]  |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses    |
| gp41(682-696<br>IIIB B10) | gp41(172-186) | IKLFIMIVGGLVGLR | HIV infection | human                          | [Wahren et al.(1989b),<br>Wahren et al.(1989a)]  |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses    |
| gp41(737-749<br>LAI)      | gp41(222-234) | GIEEEGGERDRDR?  | HIV infection | human                          | [Schrier et al.(1989)]   |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • Stimulates T-cell proliferation in HIV-infected donors                                       |
| gp41(787-801<br>IIIB)     | gp41(270-284) | RIVELLGRRGWALK  | IIIB gp160    | murine(H-2 <sup>d,k,t4</sup> ) | [Hale et al.(1989)]  |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types |
| gp41(801-815<br>IIIB)     | gp41(284-298) | KYWWNLLQYWSQELK | IIIB gp160    | murine(H-2 <sup>k</sup> )      | [Hale et al.(1989)]  |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types |
| gp41(806-820<br>IIIB)     | gp41(289-303) | LLQYWSQELKNSAVS | IIIB gp160    | murine(H-2 <sup>k,d,t4</sup> ) | [Hale et al.(1989)]  |
|                           | <b>NOTES:</b> |                 |               |                                |  |
|                           |               |                 |               |                                | • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types |

## HIV Helper-T Cell Epitopes

| Location              | WEAU          | Sequence           | Immunogen                       | Species(HLA)                                | References   |
|-----------------------|---------------|--------------------|---------------------------------|---|--|
| gp41(806-820<br>IIIB) | gp41(289-303) | LLQYWSQELKNSAVS    | IIIB gp160                      | murine(H-2 <sup>k</sup> .d.t <sup>4</sup> ) | [Hale et al.(1989)]  |
|                       | <b>NOTES:</b> |                    |                                 |   |  |
|                       |               |                    |                                 |   | • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types   |
| gp41(IIIB)            | gp41(304-319) | WLNATAIAVTEGTRC    | Peptide priming <i>in vitro</i> | human                                       | [Manca et al.(1995b)]  |
|                       | <b>NOTES:</b> |                    |                                 |   |  |
|                       |               |                    |                                 |   | • Peptide stimulation of PBMC from non-infected individuals <i>in vitro</i>  |
|                       |               |                    |                                 |   | • Peptide priming does not always induce T-cells that recognize whole protein  |
| gp41(827-843)         | gp41(311-328) | YVAEGTDRVIEVVQGACR | HIV-1 infection                 | human                                       | [Caruso et al.(1997)]  |
|                       | <b>NOTES:</b> |                    |                                 |   |  |
|                       |               |                    |                                 |   | • 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 <i>in vitro</i> stimulation by peptide cocktail containing four antigenic Env peptides, or else p17 and p24 |
| gp41(828-842<br>IIIB) | gp41(311-325) | AVAEGTDRVIEVVQG    | IIIB gp160                      | murine(H-2 <sup>k</sup> )                   | [Hale et al.(1989)]  |
|                       | <b>NOTES:</b> |                    |                                 |   |  |
|                       |               |                    |                                 |   | • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types   |
| gp41(834-842<br>IIIB) | gp41(317-325) | DRVIEVVQG          | IIIB gp160                      | murine(H-2 <sup>k</sup> )                   | [Hale et al.(1989)]  |
|                       | <b>NOTES:</b> |                    |                                 |   |  |
|                       |               |                    |                                 |   | • Suggested H-2 <sup>k</sup> epitope based on region of overlap  |
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR    | IIIB gp160                      | murine(H-2 <sup>k</sup> .i <sup>5</sup> )   | [Hale et al.(1989)]  |
|                       | <b>NOTES:</b> |                    |                                 |   |  |
|                       |               |                    |                                 |   | • Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types   |
|                       |               |                    |                                 |   | • Called Th4.1 and TH4   |

## HIV Helper-T Cell Epitopes

| Location              | WEAU          | Sequence        | Immunogen                      | Species(HLA)   | References   |
|-----------------------|---------------|-----------------|--------------------------------|----------------|--|
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR | peptide priming<br>gp160 boost | rhesus monkeys | [Hosmahn et al.(1991)]   |
|                       | <b>NOTES:</b> |                 |                                |                |  |
|                       |               |                 |                                |                | <ul style="list-style-type: none"> <li>• Epitope TH4: Peptide priming to induce T-cell help enhances antibody response to gp160 immunization</li> <li>• Called Th4.1 and TH4</li> </ul>                    |
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR | HIV infection                  | human          | [Clerici et al.(1997)]   |
|                       | <b>NOTES:</b> |                 |                                |                |  |
|                       |               |                 |                                |                | <ul style="list-style-type: none"> <li>• Epitope TH4: used in a study of the influence of Pentoxifyllines on HIV specific T cells</li> </ul>   |
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR | HIV exposure                   | human          | [Pinto et al.(1995)]   |
|                       | <b>NOTES:</b> |                 |                                |                |  |
|                       |               |                 |                                |                | <ul style="list-style-type: none"> <li>• Epitope TH4: CTL activity analyzed in parallel with T helper reactivity in exposed but uninfected health care workers</li> <li>• Called Th4.1 and TH4</li> </ul>  |
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR | HIV infection                  | human          | [Clerici et al.(1991a)]  |
|                       | <b>NOTES:</b> |                 |                                |                |  |
|                       |               |                 |                                |                | <ul style="list-style-type: none"> <li>• Epitope TH4: Peptides stimulate Th cell function and CTL activity in similar patient populations</li> <li>• Called Th4.1 and TH4</li> </ul>                       |
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR | rgp160                         | human          | [Clerici et al.(1991b)]  |
|                       | <b>NOTES:</b> |                 |                                |                |  |
|                       |               |                 |                                |                | <ul style="list-style-type: none"> <li>• Epitope TH4: Immunizing uninfected individuals with rgp160 results in stronger Th response than does natural infection</li> <li>• Called Th4.1 and TH4</li> </ul> |
| gp41(834-848<br>IIIB) | gp41(317-331) | DRVIEVVQGAYRAIR | HIV exposure                   | human          | [Clerici et al.(1992)]   |
|                       | <b>NOTES:</b> |                 |                                |                |  |
|                       |               |                 |                                |                | <ul style="list-style-type: none"> <li>• Epitope TH4: Cell-mediated immune response to HIV-1 peptides in HIV-1 exposed seronegative men</li> <li>• Called Th4.1 and TH4</li> </ul>                         |

## HIV Helper-T Cell Epitopes

| Location                  | WEAU          | Sequence        | Immunogen      | Species(HLA)                    | References  |
|---------------------------|---------------|-----------------|----------------|---------------------------------|---|
| gp41(834-848<br>IIIB)     | gp41(317-331) | DRVIEVVQGAYRAIR | HIV infection  | human                           | [Clerici et al.(1989)]  |
|                           | <b>NOTES:</b> |                 |                |                                 |   |
|                           |               |                 |                |                                 | <ul style="list-style-type: none"> <li>• Epitope TH4: IL-2 production detection of T-helper lymphocytes from asymptomatic HIV-positive individuals</li> <li>• Called Th4.1 and TH4</li> </ul>   |
| gp41(841-855<br>IIIB)     | gp41(324-338) | QGAYRAIRHPPRRIR | IIIB gp160     | murine(H-2 <sup>d,t4,t5</sup> ) | [Hale et al.(1989)]   |
|                           | <b>NOTES:</b> |                 |                |                                 | <ul style="list-style-type: none"> <li>• Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types</li> </ul>  |
| gp41(841-848<br>IIIB)     | gp41(324-331) | QGAYRAIR        | IIIB gp160     | murine(H-2 <sup>t5</sup> )      | [Hale et al.(1989)]   |
|                           | <b>NOTES:</b> |                 |                |                                 | <ul style="list-style-type: none"> <li>• Suggested H-2<sup>k</sup> epitope based on region of overlap</li> </ul>  |
| gp41(846-860<br>IIIB)     | gp41(329-343) | AIRHPPRRIRQGLER | IIIB gp160     | murine(H-2 <sup>d,t4</sup> )    | [Hale et al.(1989)]   |
|                           | <b>NOTES:</b> |                 |                |                                 | <ul style="list-style-type: none"> <li>• Six multideterminant helper T-cell regions are recognized by mice of three or four MHC types</li> </ul>  |
| gp41(846-855<br>IIIB)     | gp41(329-338) | AIRHPPRRIR      | IIIB gp160     | murine(H-2 <sup>d,t4</sup> )    | [Hale et al.(1989)]   |
|                           | <b>NOTES:</b> |                 |                |                                 | <ul style="list-style-type: none"> <li>• Suggested H-2<sup>d,t4</sup> epitope based on region of overlap</li> </ul>   |
| gp41(842-856<br>IIIB B10) | gp41(332-346) | HPPRRIRQGLERILL | HIV infection  | human                           | [Wahren et al.(1989b),<br>Wahren et al.(1989a)]   |
|                           | <b>NOTES:</b> |                 |                |                                 | <ul style="list-style-type: none"> <li>• 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses</li> </ul>   |
| Env                       | Env           |                 | HIV-1 exposure | human                           | [Mazzoli et al.(1997)]  |
|                           | <b>NOTES:</b> |                 |                |                                 | <ul style="list-style-type: none"> <li>• Study of HIV-specific immunity in seronegative partners of HIV-positive individuals – Env peptides could stimulate IL-2 production in 9/16 HIV-exposed seronegative individuals, and only 1/50 low-risk controls</li> <li>• Exposed uninfected produced more IL-2 and less IL-10 than HIV-infected individuals</li> <li>• 8/9 of those whose PBMC produce IL-2 in response to Env peptides had concomitantly detected urinary or vaginal tract anti-HIV IgA</li> </ul> |