

# IV

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## Related Sequences

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The following table is a summary of cellular proteins known or hypothesized to interact with or be affected by HIV and related viruses. We thank Dr. Kuan-Teh Jeang, NIAID, for his thoughtful review of this table and we apologize to those whose work or original publications were not cited because of space and time limitations.

Name	Description	Reference No.
AP-1	Transcription factor that appears to be involved in HIV gene expression; binding sites in LTR U3	1,2
ATN/TFIIS	Transcription elongation factor that acts synergistically with Tat	3
$\beta$ -COP	Protein from non-clathrin coated vesicles reported to interact with Nef	1,4
B23	Cell protein that binds the nuclear-localizing domain of Rev	1,5
Bel-1	Human foamy virus protein that can transactivate HIV LTR	6
c-Ets-1	Transcription factor said to be indispensable for HIV-1 enhancer function; see also Elf-1, LBP-1	7
c-Fos	Transcription factor that activates HIV provirus expression; see also NFAT and c-Jun	1,8
c-Jun	Transcription factor that activates HIV provirus expression; see also NFAT and c-Fos	1,8
c-myb	Transactivator of HIV through binding to high-affinity site in LTR	9
c-rel	Strong activator of basal HIV gene expression	10
CCR5	Regarded to be the major coreceptor for macrophage-tropic viruses	10a,10b
CD4	Primary receptor which interacts with and is sequestered by Nef	1,11
CKII	Casein kinase II, apparently inhibitory through phosphorylation of cell proteins involved in HIV transactivation	12
CXCR4	Regarded to be the major coreceptor for T-cell-tropic viruses	13a
COUP	Steroid/thyroid receptor family protein that interacts with LTR U3 (may compete with AP-1 for binding)	1,13
CyPA	Gag p24 binds cyclophilin A; cyclophilin B is also involved with Gag	1,14
DNA-PK	Binds Tat and possibly increases thereby the phosphorylation of SP-1	14a
E1A	Activator and repressor of HIV transcription	15
E2F-1	Cell cycle regulating protein that suppresses HIV LTR-directed transcription	16
EF-1A, SRB, PTB	Possible cofactors of Tat and TRP-185	17
eIF-5A	Initiation factor reported to be a cofactor for Rev	1,18

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Elf-1	Ets-related transcription factor required for HIV-2 transactivation; see also c-Ets-1, LBP-1	19
FBI-1	Protein that binds LTR elements and appears to be involved in abortive transcription complexes	20
FLK-1/KDR	Hypothesized to mediate Tat-induced angiogenesis in vascular endothelial cells	20a
GATA-3	Cellular zinc-finger transcriptional factor with binding sites in the LTR U3 (transcriptional activator of HIV)	21
GM-CSF	Granulocyte/macrophage colony stimulating factor suppresses HIV replication	22
HHR23A,D21235	Nucleotide excision repair protein that interacts with Vpr	23
HIP116	Transcription factor related to SNF2/SWI2 that binds HIV promoter; may act as ATPase	24
HIVEN86A	Tax-inducible protein that becomes an HIV enhancer-binding protein	25
hnRNP-49	RNP fraction (49 kDa) that binds RRE	1,26
HuChr12	Cellular protein (83 kDa) encoded by human chromosome 12 that targets TAR RNA	1,27
IE1, IE2	HCMV phosphoproteins that transactivate HIV synergistically with Tat	28
II10	Inhibitor of HIV replication in maturing monocytes; enhances viral production in the presence of TNF- $\alpha$	29
ILF	Interleukin binding factor that binds to HIV LTR and also interleukin 2 promoter	30
integrin	Alpha V Beta 5 integrin proposed as receptor for Tat	1,31
IRF	Interferon regulatory factor (family) that may bind to HIV	32
Ku	Lupus autoantigen binds TAR RNA with high affinity; Ku normally involved in transcriptional elongation and activation.	1,33
La	La autoantigen binds to TAR RNA and alleviates translational repression	1,34
lamin B	Member of a complex of nuclear envelope proteins that is reported to interact with Rev and Tat	35
LBP-1	DNA binding protein that can repress HIV transcription when bound to a site which overlaps TATA (inhibition of TFIID implied); see also Elf-1.	1,36
LEF-1	T-cell specific transcription factor that binds LTR U3	1
MBP1	Inhibits core promoter of HIV-1 LTR	37
MIP-1	Alpha and beta forms of this CC-beta chemokine inhibit infection by macrophage-tropic viruses	37a
MSS1	Cell protein similar (42%) to TBP-1 that binds to and modulates/suppresses Tat	1,38
NAK	A cellular serine kinase that associates with Nef	39
NF-IL6	LTR-mediated activator of HIV gene expression	40
NFAT	Nuclear factor from activated T-cells that interacts with LTR U3; see also Fos and Jun	1,41
NFkB	Primary HIV transcription factor activated by Tat	1,42

NFRRE	Nuclear factor (56 kDa) that binds RRE (Rev responsive element)	1,43
NRF	See USF43	1
Oct-2	Cellular transcription factor that interacts with and enhances Tat activity	44
p140	HeLa nuclear protein that binds specifically to TAR RNA	45
p32	Human homolog of the murine protein YL2 that interacts with Rev	1,46
p36	36 kDa protein that binds Tat and enhances transactivation	1,47
p56lck,Hck	Kinases which appear to be involved with Nef function; see also PAK	1,48
p68	Cellular protein that appears to modulate TAR activity	1,49
PAF	Platelet-activating factor, possible mediator of HIV gene expression	50
PAK	Member of the p21-activated kinase family that interacts with Nef; see also p56lck	1,51
pets factor	Cellular protein that binds the 'pets' site in the HIV-2 enhancer	52
PITALRE	Human transcription elongation factor; P-TEFb, its homolog in <i>Drosophila</i> , appears to be required for Tat transactivation <i>in vitro</i>	52a
PKC	Protein kinase C, inhibited by env gp41 peptide	53
PKR	RNA-activated kinase that binds to and phosphorylates Tat; also binds TAR RNA stem; formerly P1/dsI	1,54
PRDII-BF1	Transcription factor that binds to NfκB and Tar DNA elements and activates	1,55
prothymosin	Prothymosin alpha reported to bind Rev	1,56
Raf-1	Oncoprotein (serine/threonine kinase) that mediates HIV activation through binding to core enhancer sites	57
RANTES	CC-beta type chemokine that inhibits infection by macrophage-tropic viruses	37a
RBP9-27	RRE binding protein that inhibits REV-dependent posttranscriptional processing.	58
RIP	Vpr interactive protein (41 kDa) (not to be confused with RIP/RAB that interacts with Rev)	59
RIP/RAB	Human Rev-interacting protein, or Rev activation domain binding protein, a 58 kDa nucleoporin (not to be confused with RIP that interacts with Vpr)	1,60
RNA polIII	Binds TAR RNA as well as HIV-1 and HIV-2 Tat proteins	1,61
SBP	TAR stem binding protein	1,62
SC-35	Nuclear ribonucleoprotein RNA processing factor found in complex with Tat in the nucleus.	63
Sp1	Transcription factor that binds to LTR; interacts with Vpr and Tat; cooperates with NFκB (Sp3 form can be negative)	1,64
Staf-50	Transcriptional activator that down-regulates HIV LTR expression.(IFN-regulated)	65
T3R	Thyroid hormone receptor interacts with Tat; under certain conditions binds to LTR Sp-1 motifs	1,66

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TAK/TFIIH	Tat associated kinase, a cofactor in Tat activation; hyperphosphorylates the CTD of RNA polIII	1,67
TAP	Tat-associated protein, which appears to be a cofactor in Tat transactivation	68
TARBP-b	T-cell protein that binds to the bulge of TAR RNA	1,69
Tat-SF1	Cellular protein (140 kDa) that supports Tat-elongation of transcription; complex appears to also involve a kinase.	70
TBP	TATA binding protein that also binds to Tat and activates; see also TFIID	1,71
TDP-43	TAR DNA binding protein that represses LTR-directed transcription	72
TF1	Transcription factor (39 kDa) related to USF that binds to LTR U3	73
TFE3	Cellular factor that binds sites also bound by USF (NRF)	1
TFIID, TFIIB	Transcription factors which interact with Tat to support initiation; see also TBP	1,74
TFIIIC	Transcription factor activated by Tat	75
TGF- $\beta$	Cytokine (transforming growth factor beta) induced by gp160	76
Tip60	Tat interactive protein (60 kDa), may be a cofactor in Tat transactivation	1,77
TMF	TATA modulatory factor that inhibits LTR activation	78
TNF- $\alpha$	Inhibits HIV-1 transcription; inhibits HIV entry into macrophages	1,79
TNF- $\beta$	Growth regulatory factor transactivated by Tat	80
TRBP	TAR binding protein, said to be inhibitor of PKR; also binds RRE	1,81
TRP1/TRP185	TAR-binding protein involved in regulation of HIV gene expression	1,82
TRP2	Cell protein that binds to TAR RNA bulge	1,82
ubiquitin	A complex between ubiquitin and Gag p6 has been reported	83
USF43	Transcription factor that recognizes HIV-1 promoter; also called NRF	1,84
YY1	Transcriptional factor that represses HIV replication	1,85

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