

	1	10			20		30 35
	 MENRW	V M I V V	w g v	DRMR	IRTW	K S L V K	H H M Y V S G K A
	ATG GAA AAC AGA <mark>TG</mark>		<mark>GG</mark> CAA GTA	GAC AGG ATG AGG		<mark>g</mark> aaa agt tta gta aa <i>f</i>	CAC CAT ATG TAT GTT TCA GGG AAA GCT
MX033 MX050			G		<mark></mark>		G AGAC A-A A A AA
MX066						T	T TGC AA
MX071			GG				A AA
MX071_2 MX077		C	G			G	A C AA TCA C A AA
MX078			G			c	A C AT AA
MX081					C -A	c	G-T AA A C A AA
MX086 MX089				A-			A AA A
MX091			G		G <mark></mark>	c	AA
MX101 MX109		G				G	A-C AA AT AA
MX110					C -A		A C A AA
MX110_2		C			C -A		A C A AA
MX111 MX112					G		AGA AA T AT AA
MX118				TA			AAT AA
MX119 MX122					T <mark></mark>		C A A A A T-T C A A C
MX123							T A
MX125					G	- C-C	AGA AA
MX131 MX133					G		TC AA TA C A-G AA A
MX158						C C	T AA
MX160 MX166							A C A-A AAC C A-G AA
MX168					G 		
MX172					AT	G (T A-C AA
MX176 MX186			C-				C AAGC A A-A AA
MX190							
MX196					G		0
MX207 MX207 2					AT	C	T A AA T A AA
MX230					A- <mark></mark>	C	A A-C AA
MX313 MX324		A					T C A AA Y A
MX327							T AA AA
MX350						C	AC AA
MX350_2 MX350_3						C	AA AA
MX351		C- <mark>-</mark> -			A- G <mark></mark>	CG	A AA A
MX354 MX355			G			G	TT AA T AT AAG-
MX370							A A-A AAA
MX375	G <mark></mark> -					 c-c c	G AT AA AA AA A
MX376 MX381							AA A AA A
MX381_2					AT <mark></mark>	C	T A AA AA
MX385 MX385 2							T-T TG A A T-T TG A
MX390							AAT-
MX399						c c	TA T AA
MX399_2 MX401							AGA
MX403	C						A-A
MX409 MX450				A_			AT AA T A AA
MX463					A <mark></mark>	-T	A AA
MX464 MX469					A		TC C A AA AA AA
MX409 MX470				A	G	C-C	A AA
MX473							
MX474 MX540		CA	G	A	G-	- C-C A C	TC A C
MX542						c	T A AA
MX546						C	A AA
MX554 Consensus D							A'' AA T AA
MX141 -		G <mark>-</mark> -					A AA
MX210 MX352				A		0 c-c	
MX395						CG	A-A AA
MX396						c	
Consensus_A Consensus_G							
MX384 —				A		c c	TC AA
MX384_2 MX384_3				A A			TC AA TC AA
			J				



SURe v1.0 nucleotide sequence unanimity alignments for HIV-1 Vif encoding region (created Jun 23, 2015; reformatted Nov 19, 2018, v6) Viral and Human Genomics Laboratory, Facultad de Medicina UASLP (http://midasmap.uaslp.mx/suretool/). Ave. Venustiano Carranza #2405 Col. Filtros Lomas CP 78210 San Luis Potosi, SLP. Mexico

	36 			40 	50 60 67
	Ŕ G		F	Y R H H Y	
HXB2 Reference MX033	AGG GGA	TGG T	TT.	TAT AGA CAT CAC TAT	GAA AGC CCT CAT CCA AGA ATA AGT TCA GAA GTA CAC ATC CCA CTA GGG GAT GCT AGA TTG GTA ATA ACA
MX050	-A	0		A	AT- A A G G G G G G
MX066 MX071	 -A		 	A	A A GC T
MX071_2	-A		-A	A	T T A AA
MX077 MX078	-AA -AA		 	A A	A AT
MX081	-AA		-A-	G	A
MX086 MX089	-A- AA- GA- AA-		-C-		AA
MX091	A				AA G
MX101 MX109	-A		-C- A-	A	A A GA
MX109 MX110	-A -A- AA-		-C-		$\begin{array}{cccccccccccccccccccccccccccccccccccc$
MX110_2	-A- AA-		-C-		AA
MX111 MX112	-AA- -A		-C- -G-	 C	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
MX118	-AA			G	T
MX119 MX122	-A -A- AA-	0		C	A A
MX123	-AC	•	!	C	AT AT
MX125 MX131	-AA- -A		-C-	G	-CT TA- GG TG T
MX133	-A- AA-	G			T A T
MX158 MX160	-A- A -A- A	_	 -C-	C	A A- A CA
MX166	-A- AA-	G		T	A- AA
MX168	CA -AA		 	CT	A
MX172 MX176	-AA -A- AA-			CA	A- AT
MX186	-AAC			C C	CAGG TAG T
MX190 MX196	-AA -A- A	A		 A	C- ATA T
MX207	-AA				T A A
MX207_2 MX230	-AA A AAC				T A A
MX313	-A			c	C AA
MX324 MX327	 -AA		·		A A
MX350	-A		-C-		G -A- A
MX350_2 MX350_3	-A		-C- -C-		A
MX351	-AG			A	
MX354 MX355	-A- A -A- A		-G- -G-	C -AG	G A A
MX370	-A- A		lg- 		A AT
MX375	-AA		-G-	G	A A
MX376 MX381	-AA -AA		-C	A	
MX381_2	-AA				T A A
MX385 MX385 2	-A- AA- -A- AA-				AC A
MX390	-AA-			T	A C C G-C
MX399 MX399 2	-A- AA- -A- AA-	_			A AC
MX401	-A- AA-		-G-	A	GT A A
MX403 MX409	-A- A -AA		-G- -G-	A AG	G A A
MX450	-A	A	G-	c	G A A AA A
MX463 MX464	-AA -AA		-G	T	TAA
MX469	-AAG	-		A	
MX470 MX473	-A- AA- -A		-C-	 π	AT A AC AC
MX474	-A- AA-		-C-		
MX540	-A		CC		ATT
MX542 MX546	-A	A	-C	A	YAT SY- A G G G G
MX554	-AA		-G- G		A A
Consensus_D MX141	-AA -A- A		-G IC-	A	
MX210	-A				A
MX352 MX395	-A- AA- -A		-G		A C G G
MX396	-A	G			C
Consensus_A Consensus G	-AA -AT -AAC				AGGA- G
MX384	CAAC				T AGAA- GC G
MX384_2 MX384_3	CAAC CAAC				T AGAA- GC G



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	68	70		80		90	100 102
HXB2 Referenc		Y W G L TAT TGG GGT CTG	H T G E R D W		L G Q G V S I E W	R K K R Y S	T Q V D P E L ACA CAA GTA GAC CCT GAA CTA
MX033			$$ $$ $$ $$ $$ $$ $$ $$				A A-T A-G
MX050 MX066		c	A			G_CCC <mark></mark>	A TTAC
MX071 MX071_2						- A G - AC- G	AGC AGC
MX077 MX078					C CC	C A G	CAC T-G GC
MX081 MX086	T 				AAC 	GA <mark>-A-</mark> GC <mark></mark>	A-CG GC A
MX089 MX091			AA	G C	T 		C
MX101 MX109			T		C G 		A-C A CC
MX110 MX110 2						GC <mark></mark>	GC A GC A
MX111 MX112			A <mark></mark>		AGT	G GA	C AC- ACC
MX118			C		C	GG	AGC AGC
MX119 MX122						GG <mark>-A-</mark> GGA	C
MX123 MX125					AGT	 GA	ACG C AC-
MX131 MX133						GG <mark>-A-</mark> GGAG <mark>-A-</mark>	CG
MX158 MX160			A	G	T 	GGT <mark>-T-</mark> G-GAC <mark></mark>	C
MX166 MX168		 G-	GAG C		 	CA	ACC GCG
MX172 MX176		 G			G 	AT <mark></mark>	A-C GC AC-
MX186 MX190		G 		 C		GA C-T	A-T A G T T
MX196 MX207					C	G	TC- A-C
MX207_2		A			C	A -GA RA-	A-C A
MX230 MX313						CGA	AC
MX324 MX327				C		GA AGC-	GY
MX350 MX350_2					 	GA GA	G ACC ACC
MX350_3 MX351		A			A 	RA GTA	ACC ACC
MX354 MX355						G-G -GC <mark>GA-</mark> G-G -GC <mark>GA-</mark>	ACC ACC
MX370 MX375				 G		GC <mark>-A-</mark> G-G -GCA-	C T ACC
MX376 MX381			A	G	AT C	GC <mark>-TA</mark> GGA-	C -A- GC
MX381_2 MX385		A	A		c	A -GA R <mark>-</mark> A-	A-C A
MX385_2 MX390			GA			A-	
MX399 MX399 MX399 2			A	A A			
MX401	C					A -G- G G	AGC
MX403 MX409	C					A -G- G GA- G-G -GC GA-	ACC
MX450 MX463		A			A G-G	G-G -GCT- G	A-C T
MX464 MX469		T-A			C-A AC	AG CA- G G <mark>-</mark> A-	TC T A-C
MX470 MX473			T 		A-TT CAT	A -GAC <mark>-A-</mark> A GG <mark></mark>	T T
MX474 MX540			G C		A-TC 	G-A	C TC- A-T A-C
MX542 MX546		 	A 		GT AC		C
MX554 Consensus D			 				ACC C
MX141 MX210					C	GT <mark>-A-</mark>	
MX352			-T -T	A C	 AT 	A- G-GT <mark>-C-</mark>	A-C
MX395 MX396			A <mark>-</mark> -	C		A- GTA-	AC
Consensus_A Consensus_G			A 	C	T G	C-G -GA <mark></mark>	AT CG ATC
MX384 MX384_2						<mark> CTG -GAG</mark> C <mark>A</mark>	TC T-G TC T-G
MX384_3			<mark></mark>		G	CTG -GAGC <mark>A</mark>	TC T



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	103	110	120	130	137
HVP2 Deference	A D Q L I I GCA GAC CAA CTA ATT		CFSDSAIRKALL		E Y Q A GAA TAT CAA GCA
MX033	A	T	C-A C	GGA T	
MX050 MX066	T		C-G 	A-T -GA	C-C
MX071 MX071_2	A	GGTTTT	G-T G-T G-T		
MX077 MX078	G	GGTT	A	A-A	
MX081 MX086		A-T A-T	AGA A		C
MX089		- C	AT A A	T -G T A	
MX091 MX101	GC	-C CT	A A A G	TT T	C
MX109 MX110			G T A 		
MX110_2 MX111		TT CTT			 GCG A
MX112		TT		T T T T T	
MX118 MX119			C 	TT	
MX122 MX123		C	A A A	CTTTT	G
MX125 MX131		-C CTT -CT			GCG A
MX133 MX158		-CA	C A 	T-T -GT	 T
MX160		CT	AT A	GTAA	
MX166 MX168		CTT T	A 	T-T -G T	G-G A AC- A
MX172 MX176		C	A 		C
MX186 MX190		- C	GA G 		A G
MX196	TC		A G A A	AGA	
MX207 MX207_2	G	T -	G A-C G-GT A-C GA G-GT A-C	ATT -GT	
MX230 MX313	C	T			G
MX324 MX327		C A	-C A A 		
MX350	C	- 		GTT	
MX350_2 MX350_3	C	T -	A YWT A		
MX351 MX354	C	TT			
MX355 MX370			A A G		
MX375 MX376		CT - -C C T -	A C 		
MX381		-CT	AGT A	T-T -G T	-CC
MX381_2 MX385	G	T	G A G -GT A-C 		G
MX385_2 MX390					G
MX399 MX399 2		-CAT -CAT			
MX401 MX403	A AG			GTT TT	G G
MX409	AG	A-T			G
MX450 MX463		T - -CT -	A C 	T -G T T T	GC- A
MX464 MX469	T	C			 G
MX470 MX473		- 	GCT 	T-T -GAT	 C
MX474		CTA	CA GCT	TA	C
MX540 MX542		C	A G 	-AG -GT	
MX546 MX554		T - -CT -	A A 		C
Consensus_D MX141		- ATT TCT	GA A A 		A-T
MX210	 	TT	ACA C GA A	T -GT	
MX352 MX395	T	TTTTTT	A T C A T A	A-A C	
MX396 Consensus_A	T	TT A		A G	
Consensus_G MX384	G	CT	C A A A		
MX384_2		C-CT	C G A	M-T -GT	
MX384_3		C-CT	C G A	1-T -GT	



	138	140						150						160	170
	G	H N	к	v	G	SLQ	Y L A	 L	A A	LI	т	РК.	. к	IKPPLPS	V T K L T
HXB2 REFERENCE		AT AAC		-		TCT CTA CAA				A TTA AT	_	CCA AAA		ATA AAG CCA CCT TTG CCT AGT	
MX033 MX050		G-				CG			A				···	-CA -G	AA
MX066						G			A-G	A	G-T		c		CA
MX071 MX071 2		T				G		 م		Г ГС	-A- -A-	G	••••	-G C C-A	CA T
MX077 MX077						C			-T	C				-C	A
MX078			·		 G	G			(G CG		G	••••	-cc	C <mark>T</mark> G -AA T
MX081 MX086					G	T-GG			A					C	
MX089			·			G								-C	
MX091 MX101					C	TG					-A- -G-		•••• -G-	-GC -GC	GAG
MX109			i	A	G	CG			A	- A G-			G-	GCG	A
MX110 MX110 2					G G	T-GG			A					A	GG
MX111						CG	(3				G	c	-GG	GA
MX112		T	·			G	-C			G	-AC		••••		GT <mark></mark>
MX118 MX119		-G-				G		C		0				GA -G	GT
MX122						G	-C- C	T	A	- c	-A-		GG-	-GC	A
MX123 MX125		 YY					A		A A		-A-		···· C-F	 -G	G RGA
MX131		-C -G-				TG			-T					-GCC	A
MX133	G	 -G-	·			CG	T(-GC	A	G	G			CC	C -A
MX158 MX160					G	1G		1	A	G				-G C	AG
MX166		-G													C <mark></mark>
MX168 MX172		TC -G- GT				G		T					•••	C	GA T
MX176						G				G-				-G	C
MX186		A	C			CGG			A	G	-A-		•••• -G-	-G	G G-A C
MX190 MX196	G	T				G				G	-A-	c		-G -C	G T
MX207	T					CG					<mark>C</mark>				GT <mark></mark>
MX207_2 MX230		 -GA			 C	CG			A		G			 -C	GT
MX313					-A-	TG			A					-CA C	A
MX324 MX327		T -G-	·						T		-A- -A-	G	•••	-G	A <mark></mark>
MX327 MX350						G					-A-				A T
MX350_2	=		·			TG			T-G				•••	-G C-A C-A	C -G <mark></mark>
MX350_3 MX351						TG TG			Т-G	M		M		-G C-A	C -G
MX354						G				G	-A-			T	A GT
MX355 MX370		 -G-	·			TG	 m		A		-A-		•••• -G-	-G C -C	A C -A
MX375		G-				G				CA	r			GA	
MX376		G-	A ·			G		т	тт	G-			•••	-G	AA
MX381 MX381 2		T			G	CG								-GG	C GA
MX385			·		-A-	CG	C			C			G-	C	AA
MX385_2 MX390		 СТ			-A-	CG				G			•••• -G-	C -GC	AA
MX399		GA			G	G		т	T	G		A		-GG	AAA
MX399_2			·		G	G		т	T	G		A		-GG	AAA
MX401 MX403		T								C			C	-G	CAA
MX409			·					т	R	- C-G CA	r	R	···I	GA	GT
MX450 MX463		T A				G			AT	G	-A- -A-		G	-C	GTA
MX464		T		P	A	G		-	A		G	-AG		-AA	AA
MX469	=					GG		C	A					GGG C	G
MX470 MX473		G-				CG			A	G	-A-		C	-GAG -G	
MX474						G			-T	- A				-GAA	
MX540 MX542		A				G CG	Y		-T		G			-G CC -G C	
MX546			·	0	2	AG	Y		A R		GY-			-G	G <mark></mark>
MX554 Consensus_D		G-				G	 T			- C CA'				GA A	
MX141						1G	-		A	G		cc			GA <mark></mark>
MX210	=					G			A					-cc	
MX352 MX395	 -C-					G G		-		- CG - CG				-G	
MX 3 9 6			·			G		т		- CG	-A-	c		-G	A <mark></mark>
Consensus_A Consensus_G		— —Т					T			G				 -CG	
MX384		T				T	T C T		-TG	G-	т			-CA	G T-A <mark></mark>
MX384_2		T								G	т			-CA	
MX384_3		1'				<u>T</u>	T C-A T		-16	K G-	1			-CA	6 T-A <mark></mark>



	171						180 I													193			
	E	D	R	W	N	к	Р	Q	к	T	к	G	н	R	G	s	н	т	М	N	G	н	x
HXB2 REFERENCE	GAG	GAT	AGA	TGG	AAC	AAG	ccc	CAG		ACC	AAG	GGC		AGA				ACA	ATG	AAT	GGA	CAC	TAG
MX033 MX050			C						GT-				-G-			-A-	т т				G		
MX066						-G-							-G-				T				T		
MX071 MX071 2									-G-						-A-		т				 Т-Т		
MX077														C									
MX078 MX081									A	 C		 -A-		 CA-			T						
MX086	A								A			-A-					т					T	
MX089																	T	T				A	
MX091 MX101					-C-	C									-A-	-T-	T T	G	C		Т	G	
MX109							т										T						
MX110 MX110 2	A		 7						G								T					T	
MX111																	T						
MX112						G							-G-			 -A-	 T				C		
MX118 MX119									-G-						-A-	-A-	T						
MX122					-T-	C											T						
MX123 MX125											-G-						т т				C		
MX131					C									-A-			T						
MX133 MX158										-T-							A				C		
MX160																	T	т					
MX166									A G	G G				 C		-A-	T						
MX168 MX172	A		C			TTA			G	G	-G-						T				T		
MX176										C				-A-		T	T	C					
MX186 MX190						T						-A-					т т	-G-		G		-T- T	
MX196																	T		G				
MX207 MX207 2				-C-			 -A-		GG- GG-				-G- -G-				T T						
MX230																	T						
MX313 MX324												-A-					т	* * *	***	***	***	*** TG-	***
MX327						A						-A-					T			-G-		T	
MX350 MX350 2														 -A-		 -A-							
MX350_2 MX350_3											-C-			-A-		-A-	T						
MX351					C	 G					-C-			-A-		-A-	T						
MX354 MX355					A	G									-A-		T					A	
MX370									-G-	-T-						 -A-	T			C			
MX375 MX376	A										-CA			c	A	-A-	T	т	T		T		
MX381										C					-A-		T				G		
MX381_2 MX385							-A-		GG– CG–				-G-				T T				G		
MX385_2									-G-								T				G		
MX390 MX399																-A-	-GT	 T					
MX399_2																	-	T					
MX401 MX403																	T						
MX403 MX409						G										-A-	T				T		
MX450						G							-G-										
MX463 MX464					-C-	 Т			A		 -T-				 -A-	-A-	T T				с-с		
MX469		C														-A-		-T-				-T-	
MX470 MX473																	T	*** _T_		***	*** G	***	***
MX474	A					C		-G-			-T-						T			-G-			
MX540 MX542																							
MX542 MX546									A				A		-A-		T	-T-					
MX554																							
Consensus_D MX141																							
MX210																							
MX352 MX395																							
MX396	A																T						
Consensus_A Consensus G																					G		
MX384		C											-G-		-A-		T	т				A	
MX384_2																					G G		
MX384_3		c													-A-	кA-	1	T			G	A	



Key to annotations

The following Vif protein motifs descriptions are based on criteria established by Bell et al, 2007.

- Tryptophans (W⁵, W¹¹, W²¹, W³⁸ & W⁷⁹) involved in APOBEC3G recognition and suppression are shown in cyan highlight).
- APOBEC3 binding motifs are shown in dark blue highlight; the C-terminal APOBEC3F-binding motif (¹⁷¹EDRWN¹⁷⁵) is not highlighted for simplicity.
- The ⁸⁸EW⁸⁹ motif located in central hydrophilic region known to be involved in enhancing steady state expression is shown in yellow highlight and red font.
- The nuclear localization inhibitory signal (⁹⁰RLRR⁹³) is shown in red highlight. Sequences not having the consensus RLRR motif but having residues with conservative physicochemical properties are also shown in highlight.
- The ⁹⁵ST⁹⁶ CKII and p44/42 Mitogen-Activated Protein Kinase (MAPK) phosphorylation sites are shown in magenta highlighting. Residues other than ST that can also be phosphorylated are aslo shown in highlight.
- In any case, clinical isolate or subtype consensus sequences not having the aforementioned functional sites or motifs are shown without highlight in the corresponding region (i.e. W¹¹ which in MX071_2 is represented by an R¹¹).
- The zinc-binding motif (H¹⁰⁸C¹¹⁴C¹³³H¹³⁹) is shown in black highlight and white font.
- Viral BC Box (¹⁴⁴SLQYLALAALITPK..K¹⁵⁸) is shown in green highlight and based on the criteria suggested by Bizinoto et al, 2013.
- The protease processing site (L¹⁵⁰) is also shown in black highlight.
- Threonine phosphorylation sites (T¹⁵⁵ and T¹⁷⁰) are shown in yellow highlight.
- The Cullin-binding box (¹⁵⁹KPPLPSVTKLTEDR¹⁷³) is shown in grey highlight.

References

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