

Phylogenetic and Immune Epitope Analysis of Hepatitis B Surface Antigen in Chronic Carriers from Tabriz, Northwest of Iran

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Table S1. Pattern of genotype, subtypes and mutations in HBsAg gene.

Patients	Genotype-Subtype	Silent mutants	Missense mutants	Number of silent mutants	Number of missense mutants	Total number of mutants
CHB-1	D-ayw2	C345T	{G611A S204K T612A A617G Y206C T637A L213I	1	3	4
CHB-2	D-ayw2	A303G		1	0	1
CHB-3	D-ayw2			0	0	0
CHB-4	D-ayw2	T135C C345T	C88A Q30K	2	1	3
CHB-5	D-ayw2			0	0	0
CHB-6	D-ayw2	T378C C420A	T612A S204R A617G Y206C T623C I208T	2	3	5
CHB-7	D-ayw2		{T11C I4T C12A	0	1	1
CHB-8	D-ayw2	A360C	A328C I110L	1	1	2
CHB-9	D-ayw2		A303C Q101H	0	1	1
CHB-10	D-ayw2			0	0	0
CHB-11	D-ayw2			0	0	0
CHB-12	D-ayw2			0	0	0
CHB-13	D-ayw2			0	0	0
CHB-14	D-ayw2	C345T C369A C618T	A619C S207R	3	1	4

CHB-15	D-ayw2	T213G C513A	A585G T630G T637A	I195M S210R L213I	2	3	5
CHB-16	D-ayw2				0	0	0
CHB-17	D-ayw3	T318G T378A	C379A C407A	P127T S136Y	2	2	4
CHB-18	D-ayw2	T135C A342G C345T T378G	T146G C178T A179C	L49R H60S	4	2	6
CHB-19	D-ayw2	C219T T318G T339G C408A	G227A	C76Y	4	1	5
CHB-20	D-ayw2				0	0	0
CHB-21	D-ayw2				0	0	0
CHB-22	D-ayw2				0	0	0
CHB-23	D-ayw2	A303G			1	0	1
CHB-24	D-ayw2	C414T C465T			2	0	2
CHB-25	D-ayw2	C246A	G611A T612A	S204K	1	1	2
CHB-26	D-ayw2		T311G A652T T656C C657T	L104W I218F F219S	0	3	3
CHB-27	D-ayw2				0	0	0
CHB-28	D-ayw2				0	0	0
CHB-29	D-ayw2				0	0	0
CHB-30	D-ayw2				0	0	0
CHB-31	D-ayw2				0	0	0
CHB-32	D-ayw2				0	0	0
CHB-33	D-ayw2	C345T			1	0	1
CHB-34	D-ayw2	C345T A462G	G71A C88A G620A T623T	R24K Q30K S207N I208T	2	4	6
CHB-35	D-ayw2	T339A A360C	A610C T626C T630G	S204R L209S S210R	2	3	5
CHB-36	D-ayw2	T318A	T146G C578T C608G	L49R S193L P203R	1	3	4
CHB-37	D-ayw2				0	0	0
CHB-38	D-ayw2		A599T	Y200F	0	1	1
CHB-39	D-ayw2				0	0	0

CHB-40	D-ayw4	C345A	C380T P127L	1	1	2
CHB-41	D-ayw2			0	0	0
CHB-42	D-ayw2	C465T	C173G S58C	1	1	2
CHB-43	D-ayw2	A303G		1	0	1
CHB-44	D-ayw2			0	0	0
CHB-45	D-ayw2			0	0	0
CHB-46	D-ayw2			0	0	0
CHB-47	D-ayw2	A303G		1	0	1
CHB-48	D-ayw2	C345T C420A		2	0	2
CHB-49	D-ayw2	C246A	G611A T612A S204K	1	1	2
CHB-50	D-ayw2	A303G		1	0	1
CHB-51	D-ayw2	G36A T318G	C368T T123I	2	1	3
CHB-52	D-ayw2			0	0	0
CHB-53	D-ayw2	C513T T666C		2	0	2
CHB-54	D-ayw2		A599T Y200F A617G Y206C T637A L213I	0	3	3
CHB-55	D-ayw2	A303G		1	0	1
CHB-56	D-ayw2	A303G		1	0	1
CHB-57	D-ayw2	T135C	C88A Q30K T612A S204R C650T P217L	1	3	4
CHB-58	D-ayw2	A303G		1	0	1
CHB-59	D-ayw2	A303G		1	0	1
CHB-60	D-ayw2	A303G		1	0	1
CHB-61	D-ayw2	A303G		1	0	1
CHB-62	D-ayw2		A599T Y200F	0	1	1
CHB-63	D-ayw2			0	0	0
CHB-64	D-ayw2	A303G		1	0	1
CHB-65	D-ayw2		A599T Y200F	0	1	1
CHB-66	D-ayw2			0	0	0
CHB-67	D-ayw2	C465T C513T	T59C F20S T638C L213S	2	2	4
CHB-68	D-ayw2	A303G		1	0	1
CHB-69	D-ayw3	T318G	C379A P127T	2	1	3

		T378A				
CHB-70	D-ayw2	C345T C465A G492A	{C134A T45N T135C I110L A328C P111L C332T S167L C500T T189I C566T S193L C578T	3	6	9
CHB-71	D-ayw2	C348A C465T		2	0	2
CHB-72	D-ayw2		T275C I92T C578T S193L T637A L213I	0	3	3
CHB-73	D-ayw2	A303G		1	0	1
CHB-74	D-ayw2		A152G Q51R T659G F220C	0	2	2
CHB-75	D-ayw2			0	0	0
CHB-76	D-ayw2	A303G		1	0	1
CHB-77	D-ayw2	A303G		1	0	1
CHB-78	D-ayw2			0	0	0
CHB-79	D-ayw4	C345A	C380T P127L	1	1	2
CHB-80	D-ayw2	G354A	T667A W223R	1	1	2
CHB-81	D-ayw2			0	0	0
CHB-82	D-ayw2			0	0	0
CHB-83	D-ayw2			0	0	0
CHB-84	D-ayw2			0	0	0
CHB-85	D-ayw3	T318G T378A	C379A P127T	2	1	3
CHB-86	D-ayw2	T135C C513A T310C	{T16C S6L C17T R24S A72C Q30K C88A M103I G309C E164D G492T I195M A585G G611A S204K T612A Y206C A617G L213I T637A	3	9	12
CHB-87	D-ayw2	A168G	G131A G44E	1	1	2
CHB-88	D-ayw2	T213G C246A A303G A342C C513A A534C	G587T W196L	6	1	7
CHB-89	D-ayw2	C465T	A387C Q129H	1	1	2

Patients	Major hydrophilic region (100-160)
CHB-8	I110L
CHB-9	Q101H
CHB-17	P127T / S136Y
CHB-26	L104W
CHB-40	P127L
CHB-51	T123I
CHB-69	P127T
CHB-70	I110L / P111L
CHB-79	P127L
CHB-85	P127T
CHB-86	M103I
CHB-89	Q129H
CHB-90	P120T
CHB-91	G145R

CHB-90	D-ayw2		C88A C358A	Q30K P120T		2	2
CHB-91	D-ayw2	A303G	G433A T638C	G145R L213S	1	2	3
CHB-92	D-ayw2	C345T A462G	G71A C88A	R24K Q30K	2	2	4
CHB-93	D-ayw2	T339A A360C			2	0	2
CHB-94	D-ayw2	A303G			1	0	1
CHB-95	D-ayw2	A303G T666C			2	0	2
					88	81	169

Table S2. Pattern of mutation in MHR region of HBsAg gene.

Table S3. Pattern of mutation in “a” determinant region of HBsAg gene.

Patients	“a” determinant (124-147)
CHB-17	P127T / S136Y
CHB-40	P127L
CHB-51	T123I
CHB-69	P127T
CHB-79	P127L
CHB-85	P127T
CHB-89	Q129H
CHB-91	G145R

Table S4. Pattern of mutation in immune epitopes of HBsAg gene.

Sequence	R Cell subsets	HLA restriction	Mutation	Number mutants
100–160	B	Not HLA restriction	CHB-8: I110L CHB-9: Q101H CHB-17: P127T / S136Y CHB-26: L104W CHB-40: P127L CHB-51: T123I CHB-69: P127T CHB-70: I110L / P111L CHB-79: P127L CHB-85: P127T CHB-86: M103I CHB-89: Q129H CHB-90: P120T CHB-91: G145R	16
19–28	Th	Class II	CHB-34: R24K CHB-67: F20S CHB-86: R24S CHB92: R24K	4
28–51	CTL	Class I HLA-A2	CHB-4: Q30K CHB18: L49R CHB-34: Q30K CHB-36: L49R CHB-57: Q30K CHB-70: T45N CHB-74: Q51R CHB-86: Q30K CHB-87: G44E CHB-90: Q30K CHB-92: Q30K	11
80–98	Th	Class II	CHB-72: I92T	1
171–179	CTL	Class I		0
175–184	CTL	Class I HLA-A2		0
186–197	Th	Class II	CHB-15: I195M CHB-36: S193L CHB-70: T189I / S193L CHB-72: S193L CHB-86: I195M CHB-88: W196L	7
206–215	CTL	Class I	CHB-1: Y206C / L213I CHB-6: Y206C / I208T CHB-14: S207R CHB-15: S210R / L213I CHB-34: S207N / I208T CHB-35: L209S / S210R CHB54: Y206CM / L213I CHB-67: L213S	14
215–223	Th	Class II	CHB-26: I218F / F219S CHB-57: P217L CHB-74: F220C CHB-80: W223R	5