

HGD haplotypes associated with the AKU mutations

MUTATION	5'← HGD Polymorphisms * → 3'											Origin	Chromosome Code** (AKU_DB_)	Reference
	IVS2+ 35	IVS2- 218	IVS3- 112	H80Q c.240	IVS4+ 31	HGO-3	HGO-1	IVS5+ 25	IVS6+ 46	IVS11 +18	HGO-2			
ivs1-1G>A (c.16-1G>A) in1														
	A	A	T	T	A	201	161	T	C	A	181	Poland	22a	Beltrán et al., 1999a
	A	A	T	T	A	201	161	T	C	A	181	Algeria	43a,b	Zatkova et al., 2000b
	A	A	T	T	A	201	161	T	C	A	181	Slovakia	54a	Zatkova et al., 2000b
	A	A	T	T	A	201	161	T	C	A	181	Slovakia	53c	Zatkova et al., 2000b
	A	A	T/C	T	A	201/189	161	T	C	A	181/187	Slovakia	71a	Zatkova et al., 2000b
p.(Gly11IlefsX3) (c.31_32delGGinsATT) ex2														
	T	A	C	T	A	191	161	T	A	A	181	France	17a	Beltrán et al., 1998
missense ex3														
			C	T	A	191	161	T	C	A	181	Korea	100a	submitted
p.(Glu42Ala) (c.125A>C) ex3														
	A	T	T	A	A	193	161	T	C	A	187	England	8a,b	Beltrán et al., 1998
missense ex3														
			T/C	A/T	A				C/A	A		Algeria	108c	submitted
p.(Ser47Leu) (c.130C>T) ex3														
	A	T	T	A	A	197	161	T	C	A	197	Slovakia	57a	Zatkova et al., 2000b
p.(Arg53Trp) (c.157C>T) ex3														
	A	T	T	A/T	A	193	161	T	C	A	173/191	USA	45a	AKU database

p.(Ser59AlafsX52) (c.175delA) ex3

	A	A	T	T	A	193	161	T	C	A	181	India	49a	Zatkova et al., 2000b
	A	A	T	T	A	197	161	T	C	A	181	Finland	40a,b	Beltrán et al., 1999b
	A	A	T	T	A	197	161	T	C	A	181	Slovakia	66a	Zatkova et al., 2000b
			T	T	A	197	161	T	C	A	181	Turkey	89a,b	Uyguner et al. 2003
			T	T	A	197	161	T	C	A	181	Turkey	92a,b	Uyguner et al. 2003
			T	T	A	197	161	T	C	A	181/ 189	Turkey	90a	Uyguner et al. 2003
			T/C	T	A	197/ 195	161/ 163	T/C	C/A	A	181/ 187	Turkey	90b	Uyguner et al. 2003

p.(Trp60Gly) (c.178T>G) ex4

	T/A	A	C/T	T	A	195	161	T	A/C	A	179/ 181	USA	23b	Beltrán et al., 1999a
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stop ex4

			T	A	A	191	161	T	C	A	189	Italy	107a,b	submitted
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p.(Tyr62Cys) (c.185A>G) ex4

	T	A	C	T	A	191	161	T	A	A	179	France	20a,b	Beltrán et al., 1999a
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p.(Trp97Gly) (c.289T>G) ex5

	T	A	C	T	A	191	161	T	A	A	179	France	14a,b	Beltrán et al., 1998
	T/A	A	C	T	A	191/ 189	161	T	A/C	A	181	Switzerland	19a	AKU database

ivs5+1G>T (c.342+1G>T) in5

	T	A	C	T	A	191	161	T	C	A	183	The Netherlands	9a,b	Beltrán et al., 1998
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ivs5+1G>A (c.342+1G>A) in5

	A	T	T	A	A	193	161	T	C	A	187/ 191	Slovakia	41a	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	G	183	Slovakia	51a,b	Zatkova et al., 2000b

missense ex6														
			T	T	G	199	161	T	A	A	183	France (Indian origin)	112a,b	submitted
p.(Cys120Trp) (c.360T>G) ex6														
			T	A	A	191	161	T	A	A	195	Rep Dom	73a,b	Goicoechea de Jorge et al. 2002
			T	A	A	191	161	T	A	A	195	Rep Dom	74a,b	Goicoechea de Jorge et al. 2002
			T	A	A	191	161	T	A	A	195	Rep Dom	75a,b	Goicoechea de Jorge et al. 2002
			T	A	A	191	161	T	A	A	195	Rep Dom	76a,b	Goicoechea de Jorge et al. 2002
			T	A	A	191	161	T	A	A	195	Rep Dom	78a,b	Goicoechea de Jorge et al. 2002
			T	A	A	191	161	T	A	A	195	Rep Dom	79a,b	Goicoechea de Jorge et al. 2002
			T	A	A	191	161	T	A	A	195	Rep Dom	80a,b	Goicoechea de Jorge et al. 2002
p.(Ala122Asp) (c.365C>A) ex6														
	A	A/T	T	T/A	A	195	161	T	C	G	183	The Netherlands	25a	Beltrán et al., 1999a
p.(Ala122Val) (c.365C>T) ex6														
	A	A	T	T	A	193	161	T	C	A	185	India	49b	AKU database
			T	T	A	197	161	T	C	A	191	Canada (Indian origin)	99a,b	submitted
missense ex6														
			T	A	A			T	C	A		Algeria	113a,b	submitted
			T	A	A			T	C	A		Algeria	117a,b	submitted
			T	A	A			T	C	A		Algeria	118a,b	submitted
missense ex7														
			C	T	A	191	161	T	A	A	179	Korea	100b	submitted
p.(Asp153GlyfsX26) (c.457dupG) ex7														
	T	A	C	T	A	191	161	T	C	A	187	Italy	28a,b	Porfirio et al., 2000
	T	A	C	T	A	191	161	T	C	A	187	France	39a,b	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	A	187	Slovakia	50a	Zatkova et al., 2000b

	A	A	C	T	A	189	161	T	C	A	187	Slovakia	51c	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	A	187	Slovakia	55a,b	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	A	187	Slovakia	58a	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	A	187	Slovakia	60a,b	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	A	187	Slovakia	61a	Zatkova et al., 2000b
	A	A	C	T	A	189	161	T	C	A	187	Slovakia	70a,b	Zatkova et al., 2000b
	A	A	C/T	T	A	189/ 201	161	T	C	A	187/ 181	Slovakia	71b	Zatkova et al., 2000b
			C	T/A	A	193	161	T	C	A	187	Slovakia	101a	submitted
			C/T	T	A/G	199	161	T	C	A	187	Slovakia	103a	submitted
			C	T	A	191	161	T	C/A	A	187	France	97a	submitted

p.(Asp153Gly) (c.458A>G) ex7

	A	A	T/C	T	A	195	161	T	C/A	A	183/ 181	France	33b	AKU database
	A/T	A/T	T/C	T/A	A	195/ 191	161	T	C	A	183/ 187	France	13a	Beltrán et al., 1998

ivs7+2T>C (c.469+2T>C) in7

			T/C	T	A	189/ 195	163/ 161	C/T	C/A	A	189/ 183	France	96a	submitted
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ivs7+5G>A (c.469+5G>A) in7

	A	A	T	T	A	199	161	T	C	A	187	Italy	27a	Porfirio et al., 2000
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frameshift ex8

			C	T	A	191/ 193	163/ 161	C	A/C	A	187/ 191	France	110b	submitted
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p.(Pro158Leu) (c.473C>T) ex8

			C	T	A			T	A	A		Macedonia	116a	Gucev et al., 2011
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p.(Gly161Arg) (c.481G>A) ex8

	A	T	T	A/T	A	193	161	T	C	A	191/ 173	USA	45b	Zatkova et al., 2000b
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	A	T	T	A	A	193	161	T	C	A	191/187	Slovakia	41b	Zatkova et al., 2000b
	A	T	T	A	A	193	161	T	C	A	191	Slovakia	58b	Zatkova et al., 2000b
	A	T	T	A	A	193	161	T	C	A	191	Slovakia	62a,b	Zatkova et al., 2000b
	A	T	T	A	A	193	161	T	C	A	191	Slovakia	63a,b	Zatkova et al., 2000b
			T	A	A	193	161	T	C	A	191	Slovakia	94a	submitted
			T	A	A	193	161	T	C	A	191	Slovakia	104a,b,c,d	submitted
			T	A	A	193	161	T	C	A	191	Slovakia	106a,b	submitted
			T/C	A/T	A	193/189	161/163	T/C	C/A	A	191	Slovakia	93a	submitted
			T	A/T	A	193	161	T	C	A	191	Slovakia	101b	submitted
			T	A	A	193/191	161/163	T	C/A	A	191/187	Serbia	110a	submitted
	A		T	A	A	193	161	T	C	A	191	Poland	81a,b	submitted
	A	A	C	T	A	197	161	T	C	A	191	Slovakia	53d	Zatkova et al., 2000b
	A	A	C	T	A	197	161	T	C	A	191	Slovakia	57b	Zatkova et al., 2000b
	A	A	C	T	A	197	161	T	C	A	191	Slovakia	59a	Zatkova et al., 2000b
	A	A	C	T	A	197	161	T	C	A	191	Slovakia	61b	Zatkova et al., 2000b
	A	A	C	T	A	197	161	T	C	A	191	Slovakia	67a	Zatkova et al., 2000b
			C	T	A			T	C	A		Slovakia	115a	submitted
			C	T	A	197	161	T	C	A	191	Slovakia	105a,b	submitted
			C	T	A	197/189	161	T	C	A	191	Slovakia	102a	submitted

missense ex8

			T/C	T/A	A	189/193	163/161	T/C	C/A	A	185/191	Slovakia	93b	submitted
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p.(Val181Phe) (c.541G>T) ex8

	A	A	T	T	A	189	163	C	A	A	183	France	44a,b	AKU database
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p.(Ser189Ile) (c.566G>T) ex9

	A	A	C	T	A	189	163	C	A	A	185	Algeria	4a,b	Beltrán et al., 1998
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p.(Arg197GlyfsX32) (c.588delC) ex9

	A	T	T	A	A	193	161	T	A	A	177	Portugal	46a,b	AKU database
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p.(Ile216Thr) (c.647T>C) ex9

	A	T	C	A	A	193	161	T	C	A	187	Spain	12a	Beltrán et al., 1998
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ivs9-56G>A (c.650-56G>A) in9 ***

	A	A	T/C	T	A	195	161	T	C	A	181	Italy	10a	Beltrán et al., 1998
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	A	A	T	T	A/G	195/ 199	161	T	C	A	181	Italy	11a	Beltrán et al., 1998
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ivs9-17G>A (c.650-56G>A) in9 ***

	A	A	C/T	T	A	189	161	T	C	A	191	Italy	10b	Beltrán et al., 1998
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p.(Ala218ProfsX11) (c.652delG) ex10

	A		T	T	A	191	161	C	A	A	179	Algeria	83a	AKU database
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			C	T	A	191	161	T	C/A	A	181	Algeria	97b	submitted
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missense ex10

			C	T	A	191	161	T	A	A	187	Turkey	98a,b	submitted
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p.(Arg225His) (c.674G>A) ex10

	T	A	C	T	A	191	161	T	A	A	183	Spain	15a	Beltrán et al., 1998
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	T	A	C	T	A	191	161	T	A	A	179	Spain	15b	Beltrán et al., 1998
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			T	T	A	197	163	C	A	A	187	Turkey	86a,b	Uyguner et al. 2003
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			T	T	A	197	163	C	A	A	187	Turkey	87a,b	Uyguner et al. 2003
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			T	T	A	197	163	C	A	A	187	Turkey	88a,b	Uyguner et al. 2003
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p.(Phe227Ser) (c.680T>C) ex10

	A	A	T	T	A	197	161	T	A	A	181	Spain	16a,b	Beltrán et al., 1998
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p.(Pro230Ser) (c.688C>T) ex10

	T	A	C	T	A	191	163	C	A	A	185	Turkey	3a,b	Beltrán et al., 1998
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	A	A	T	A	A	191	163	C	A	A	185	Spain	2a	Beltrán et al., 1998
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	A	A	C	T	A	189	163	C	A	A	185	Spain	1a,b	Beltrán et al., 1998
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	A	A	C	T	A	189	163	C	A	A	185	Slovakia	64a,b	Zatkova et al., 2000b
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			C	T	A	189/ 199	163/ 161	C	C/A	A	185/ 183	Slovakia	95a	submitted
p.(Pro230Thr) (c.688C>A) ex10														
	A	A	T	T	A	199	161	T	C	A	181	Spain	18b	Beltrán et al., 1999a
p.(Lys248Arg) (c.743A>G) ex10														
	A	A	T	T	A	197	161	T	A	A	171	Italy	27b	Porfirio et al., 2000
p.(Gly270Arg) (c.808G>A) ex11														
	T	A	C	T	A	195	161	T	C	A	187	Italy	29a,b	Porfirio et al., 2000
			T/C	T	A	195/ 193	161	T	C	A	183/ 189	France/ Armenia	109a	submitted
			T	T	A				C	A		Slovakia	115b	submitted
	A	A	T	T	A	195	161	T	C	A	181	Slovakia	52a	Zatkova et al., 2000b
	A	A	T	T	A	195	161	T	C	A	181	Slovakia	53a	Zatkova et al., 2000b
	A	A	T	T	A	195	161	T	C	A	181	Slovakia	59b	Zatkova et al., 2000b
	A	A	T	T	A	195	161	T	C	A	181	Slovakia	61c	Zatkova et al., 2000b
	A	A	T	T	A	195	161	T	C	A	181	Slovakia	66b	Zatkova et al., 2000b
	A	A	T	T	A	195	161	T	C	A	181	Slovakia	67b	Zatkova et al., 2000b
	A		T	A	A	191	163	C	A	A	189	Dom. Rep	77a,b	Goicoechea de Jorge et al. 2002
			T	T	A	201	161	T	C	A	187	Turkey	91a,b	Uyguner et al. 2003
p.(Pro274Leu) (c.821C>T) ex11														
			T	T	A			C	A	A		Macedonia	116b	submitted
stop ex11														
			T	A	A	195	163	C	A	A	201	Algeria	108a,b	submitted
p.(Asp291Glu) (c.873C>A) ex11														
	A	A	C	T	A	193/ 189	161	T	C	A	175	Spain	21a	Beltrán et al., 1999a
	A	A	C	T	A	193	161	T	C	A	175	Portugal	72a,b	AKU database

p.(His292Arg) (c.875A>G) ex11

	A	A	T	T/A	A/G	199/ 193	161	T	C	A	187/ 181	France	33a	AKU database
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p.(Val300Gly) (c.899T>G) ex12

	A	A	C	T	A	189	163	C	A	A	187	France	5a	Beltrán et al., 1998
	A	A	C	T	A	189	163	C	A	A	187	Germany	6a,b	Beltrán et al., 1998
	A	A	C	T	A	189	163	C	A	A	187	Spain	2b	Beltrán et al., 1998
	T	A	C	T	A	191	161	T	A	A	187	Slovakia	50b	Zatkova et al., 2000b
			C	T	A	189/ 197	163	C	A	A	187	Slovakia	102b	submitted
	A		C	T	A	189	163	C	A	A	187	Portugal	84a,b	AKU database

p.(Arg321X) (c.961C>T) ex12

	A/T	A	C	T	A	189/ 191	161	T	C/A	A	181	Switzerland	19b	AKU database
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p.(Trp322Arg) (c.964T>C) ex12

	A	T	T	T	A	193	161	T	C	A	183	Spain	48a,b	AKU database
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p.(Arg330Ser) (c.990G>T) ex12

	A	A	C	T	A	191	161	T	A	A	177	Finland	37a,b	Beltrán et al., 1999b
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missense ex13

			C	T	A	193		T	C	A	197	France	111a,b	submitted
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p.(Gly360Arg) (c.1078G>C) ex13

	A	T	T	A	A	193	161	T	C	A	197	Italy	30a,b	Porfirio et al., 2000
	A			A/T	A	193	161/ 163	T/C	C/A	A	197/ 189	Italy	31a	Porfirio et al., 2000

p.(Met368Val) (c.1102A>G) ex13

	A	A	T	T	A	199	161	T	C	A	181	Spain	18a	Beltrán et al., 1999a
	A	A	T	T	A	195	161	T	C	A	183	Germany	7a,b	Beltrán et al., 1998

	A	A	T	T	A	195	161	T	C	A	183	Finland	38a,b	Beltrán et al., 1999b
	A	A	T	T	A	195	161	T	C	A	183	Finland	36a,b	Beltrán et al., 1999b
	T	A	T	T	A	195	161	T	C	A	181	France	5b	Beltrán et al., 1998
	A	A	T/C	T	A	195	161	T	C/A	A	181/ 183	France	33c	AKU database
	A	A	T	T	A	195	161	T	C	A	181	Portugal	47a,b	AKU database
	A/T	A	T/C	T	A	195	161	T	C/A	A	181/ 179	USA	23a	Beltrán et al., 1999a
	A	A/T	T	T/A	A	195	161	T	C	A	181	The Netherlands	25b	Beltrán et al., 1999a
	A	A	T	T	A	195	161	T	C	A	179	Spain	24a,b	Beltrán et al., 1999a
	A		T	T	A	193	161	T	A	A	179/ 181	France	82a	AKU database
	A		T	T	A	195	161	T	C	A	181	Portugal	85a,b	AKU database
			T	T	A	193/ 195	161	T	C	A	183/ 189	France/ Armenia	109b	submitted
			C/T	T	A	195/ 189	161/ 163	T/C	C/A	A	183/ 189	France	96b	submitted
			T	T	A	195	161	T	C	A	181	Slovakia	94b	submitted
			C	T	A	199/ 189	161/ 163	T	C/A	A	183/ 185	Slovakia	95b	submitted

p.(His371ProfsX4) (c.1111dupC) ex13

	A	A	T	T	G	199	161	T	C	A	179	Slovakia	52b	Zatkova et al., 2000b
	A	A	T	T	G	199	161	T	C	A	179	Slovakia	54b	Zatkova et al., 2000b
	A	A	T	T	G	199	161	T	C	A	179	Slovakia	69a,b	Zatkova et al., 2000b
			T/C	T	G/A	199	161	T	C	A	179	Slovakia	103b	submitted
	A	A	C	T	A	189	161	T	C	A	179	Slovakia	53b	Zatkova et al., 2000b

p.(His371Arg) (c.1112A>G) ex13

	A	A	T	T	A	199	161	T	C	A	189	Finland	35a,b	AKU database
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ivs13+1G>T (c.1188+1G>T) in13

	A	T	T	A	A	195	161	T	C	G	189	Poland	22b	AKU database
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p.(Ala407Ala) (c.1221G>A) ex14

	A/T	A	C	T	A	191/ 185	161	T	A/C	A	189/ 185	Algeria	42a	AKU database
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UNKNOWN

	A	A	T	T	A/G	199/ 195	161	T	C	A	181	Italy	11b	Beltrán et al., 1998
	A			A/T		193	163/ 161	C/T	A/C		189/ 197	Italy	31b	Porfirio et al., 2000
	T	A	T	T	A	193	161	T	C	A	181	Spain	12b	Beltrán et al., 1998
	A/T	A	T/C	T	A	197/ 191	161	T	C	A	189	Spain	26a	AKU database
	A	A	C	T	A	189	161	T	C	G	183	France	17b	Beltrán et al., 1998
	T			T	A	191	161	T	C/A	A	183	France	32a	AKU database
	A		T	A	A	193	161	C	A	A	179/ 181	France	82b	AKU database
	T		T	T	A	191	161	C	A	A	179	Algeria	83b	AKU database
	A/T	A	C	T	A	191/ 185	161	T	C/A	A	189/ 185	Algeria	42b	AKU database

Black thick bar= position of the mutation within the haplotype

Empty field= polymorphism was not analyzed

Two alleles in one field= it was not possible to establish the allele unambiguously

*** **BDGP and NatGen2 predictions** indicate that these variants in intron 9 do not affect splice sites (Vilboux et al. 2009)

** **Chromosome Code** corresponds to the last 3-4 letters of allele code in the variant database

* **Polymorphisms are organized in 5' to 3' direction.**

ivs2+35A/T	c.87+35A/T
ivs2-218A/T	c.88-218A/T
ivs3-112C/T	c.176-112C/T
H80Q	c.240C/A
ivs4+31A/G	c.282+31A/G
HGO-3/D3S4556	(CA)n
HGO-1/D3S4496	(CT)n
ivs5+25T/C	c.342+25T/C
ivs6+46C/A	c.434+46C/A
ivs11+18A/G	c.879+18A/G
HGO-2/D3S4497	(CA)n

3'