

NOTES:

Haplogroup T was formerly called K2 and was first called T in the Karafet et al (2008) paper.

Identical SNPs that were discovered separately are listed in alphabetical order, not necessarily in the order of discovery.

and separated by ", Examples M184/USP9Y+3178

Mutations previously on tree but found so far only in one man or in closely related men:

M320 is downstream of M70. It was reported in a single Druze sample in Shen et al (2004).

Its placement relative to other SNPs under M70 is unknown. Listed 8 August 2012.

P330 is downstream of L162. It was reported in a single Assyrian sample in Mendez et al (2011).

P327 is downstream of P322. It was reported in four closely related Palestinian samples in Mendez et al (2011). Listed 8 August 2012.

L1254 is downstream of L1253 and found in one branch of a Kuwaiti family. Listed 7 October 2012.

L447 is downstream of L446 and found in a single Armenian sample. Listed 11 January 2013.

Y-DNA haplogroup T is found at low frequencies throughout Europe and in parts of the Middle East, North Africa, and East Africa. A famous person in Haplogroup T was Thomas Jefferson (1743-1826), the third President of the United States from 1801 to 1809.

References:

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Shen et al. Reconstruction of Patrilineages and Matrilineages of Samaritans and other Israeli Populations from Y-Chromosome and Mitochondrial DNA Sequence Variation. (pdf) Human Mutation. 30:248-260, 2004.

Su et al. Y-chromosome Evidence for a Northward Migration of Modern Humans into Eastern Asia during the Last Ice Age. (pdf) American Journal of Human Genetics. 65:1718-1724, 1999.

Thangaraj et al. Genetic Affinities of the Andaman Islanders, a Vanishing Human Population. (pdf) Current Biology. 13:86-93, 2003.

Additional Resources:

[ISOGG Wiki](#) What you need to know about Genetic Genealogy.

[The Y-DNA Haplogroup T \(former K2\) Project](#) Gareth Henson, Peter Hrechdakian.

Corrections/Additions made since 1 January 2019:

None

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MUTATION INFORMATION -->

If copying this section just below, choose Paste Special, then Values, otherwise the haplogroup contents will not copy

Name	Haplogroup	Tree	Other Names in	rs #	Build 37 #	Build 38 #	Mutation Info
MUTATION INFORMATION -->							
M184	T	Page34; USP9Y+rs20320		14898163	12786229	G->A	
Page34	T	M184; USP9Y+31 rs20320		14898163	12786229	G->A	
USP9Y+3178	T	M184; Page34; rs20320		14898163	12786229	G->A	
CTS150	T		rs758149605	2765271	2897230	A->G	
CTS482	T	PF5596	rs3880033	6781398	6911357	C->T	
PF5596	T	CTS482	rs3880033	6781398	6911357	C->T	
CTS493	T	PF5597	rs771391278	6794129	6926088	G->A	
PF5597	T	CTS493	rs771391278	6794129	6926088	G->A	
CTS549	T	L1322; PF5598	rs745767788	6835512	6967471	G->A	
L1322	T	CTS549; PF5598	rs745767788	6835512	6967471	G->A	
PF5598	T	CTS549; L1322	rs745767788	6835512	6967471	G->A	
CTS573	T		rs753345811	6854139	6986098	C->T	
CTS3855	T	PF5618	rs752003914	15046891	12934981	G->T	
PF5618	T	CTS3855	rs752003914	15046891	12934981	G->T	
CTS3837	T		rs103793299	15219813	13107899	T->A	
CTS404	T		rs75239985	15335205	13223323	A->G	
CTS4201	T	PF5621	rs762664954	15473615	13361735	C->T	
PF5621	T	CTS4201	rs762664954	15473615	13361735	C->T	
CTS4652	T	PF5547	rs746003593	15752377	13640497	A->G	
PF5547	T	CTS4652	rs746003593	15752377	13640497	A->G	
CTS5035	T		rs775267175	15973879	13862099	C->A	
CTS5268	T	PF7471	rs775534358	16174116	14062236	C->T	
PF7471	T	CTS5268	rs775534358	16174116	14062236	C->T	
CTS5336	T	PF5626	rs750077348	16213628	14101748	C->T	
PF5626	T	CTS5336	rs750077348	16213628	14101748	C->T	
CTS6045	T	PF5629	rs769285513	16633204	14521324	A->T	
PF5629	T	CTS6045	rs769285513	16633204	14521324	A->T	
CTS6275	T	PF7447	rs775871726	16789029	14678040	A->G	
PF7447	T	CTS6275	rs775871726	16789029	14678040	A->G	
CTS6887	T	PF5637	rs746985345	17172942	15061062	T->C	
PF5637	T	CTS6887	rs746985345	17172942	15061062	T->C	
CTS7164	T		rs745759243	1731255	15219375	T->C	
CTS7263	T		rs777229743	17384624	15272744	T->C	
CTS7426	T		rs762828986	17473499	15361619	A->T	
CTS7749	T	L810; PF5640	rs753404231	17644174	15532294	C->T	
L810	T	CTS7749; PF5640; rs753404231	rs753404231	17644174	15532294	C->T	
PF5640	T	CTS7749; L810	rs753404231	17644174	15532294	C->T	
CTS8247	T		rs751402361	17897990	15786110	C->T	
CTS8994	T		rs772494730	18605721	16493841	C->T	
CTS10416	T	PF5655	rs778604738	19443432	17331562	C->T	
PF5655	T	CTS10416	rs778604738	19443432	17331562	C->T	
CTS10700	T		rs780715848	22721606	205057020	G->A	
CTS10879	T		rs752472586	22915955	20654069	C->A	
CTS11569	T		rs912483262	23163364	21001478	C->A	
CTS12657	T		rs793331510	28659338	26513189	A->G	
L445	T			3436384	3568343	G->T	
L452	T		rs775471717	14423799	12303074	G->A	
L455	T	PF5670	rs749749781	23249407	21087521	G->T	
PF5670	T	L455	rs749749781	23249407	21087521	G->T	
L692	T		rs772201605	24376919	22230772	G->A	
M193	T			15014505	12902593	del=AAAC	
M272	T	PF5667	rs9341308	22738775	20578889	A->G	
PF5667	T	M272	rs9341308	22738775	20578889	A->G	
Page129	T		rs72625385	15472563	13360683	C->T	
PF5529	T		rs768262266	8269171	8401130	T->C	
PF5537	T			13231889	11076213	A->C	
PF5568	T		rs755480273	21532604	19370718	G->A	
PF5587	T		rs866943518	23889272	21427386	C->T	
PF5589	T		rs774461039	28667230	26521063	C->T	
PF5590	T			4169261	4301220	T->A	
PF5603	T		rs758144873	7697959	7829918	T->C	
PF5607	T		rs746427564	8459278	8591237	G->A	
PF5609	T		rs757188978	8886086	9018045	G->A	
PF5612	T		rs1170134696	13232973	11077297	G->A	
PF5613	T			13578398	11422722	G->A	
PF5657	T		rs751602139	21051456	18889570	G->A	
PF5661	T		rs761444321	21703373	19541487	C->A	
PF5674	T		rs756418236	23568001	21406115	G->A	
PF5678	T		rs746005466	24453331	22307164	G->A	

PF7460	T		5403274	5535233 T->C
PF7464	T	rs777284856	8581339	8713298 C->T
PF7466	T	rs762965719	13004842	11784136 A->T
PF7480	T	rs747111450	21481191	19319305 C->G
L206	T1		18162486..1916248 16050606..16050607	T->del
CTS5987	T1	rs769317579	1659426	14493846 A->G
CTS5276	T1	rs789917008	16790253	14678373 C->T
CTS5657	T1	rs767784232	16689942	14877762 A->G
CTS5805	T1	PF5636	rs749435175	17117713
CTS5638	T1	CTS805	rs749435175	17117713
CTS5804	T1	PF5641	rs758850544	17192858
PF5641	T1	CTS8004	rs758850544	17192858
CTS5397	T1	PF5646	rs61386840	17977306
PF5646	T1	CTS8397	rs61386840	17977306
CTS5938	T1		15865426 C->G	
CTS10278	T1		15005833 T-C	
L490	T1		16702634 C->A	
PF5602	T1		19368421 17256541 G->A	
PF5604	T1		14217831 G->A	
PF5659	T1		7567739 7699698 G->T	
PF5666	T1		8022420 C->T	
PF5673	T1		1790461 19074028 G->A	
PF7481	T1		1777306 15865426 C->G	
CTS2336	T1~		14493357 G->C	
CTS6004	T1~		16605237 14266253	
PF5666	T1		12145547 A->G	
CTS6214	T1~	PF5631	rs751398181	16733756
PF5631	T1~	CTS6214	rs751398181	16733756
PF5518	T1~		14621876 A->C	
PF5592	T1~		14621876 A->C	
PF5664	T1~		20377602 C->T	
M70	T1a	Page46; PF5662	rs2032672	21939881 19731995 A->C
Page46	T1a	M70; PF5662	rs2032672	21939881 19731995 A->C
PF5662	T1a	M70; Page46	rs2032672	21939881 19731995 A->C
CTS5332.1	T1a	PF7472.1	rs769562543	16212441 14100561 G->A
PF7472.1	T1a	CTS5332.1	rs769562543	16212441 14100561 G->A
CTS5363	T1a		16224726 14112846 G->A	
CTS6375	T1a		16862927 14751047 G->A	
CTS9265	T1a	PF5651	rs772941343	18788069 16676189 C->T
PF5651	T1a	CTS9268	rs772941343	18788069 16676189 C->T
CTS11054	T1a		22923054 20761168 G->A	
CTS11746	T1a		23248079 21086193 C->G	
Page79	T1a		1404941773 144948650	
PF5588	T1a		12367116 G->C	
PF6408	T1a		24360028 2223881 G->A	
PF5610	T1a		8823191 8955140 T->A	
PF5660	T1a		rs777833751 9124204	
PF5660	T1a		9286595 T->C	
PF7463	T1a		21504756 19342870 G->T	
L162	T1a1	Page21	rs753416454	8391078 8523037 A->G
Page21	T1a1	L162	rs34179999	16019072 13907192 G->C
L454	T1a1		16019072 13907192 G->C	
CTS484	T1a1		14577272 12465472 C->T	
CTS559	T1a1		6782888 6914827 A->G	
CTS3271	T1a1		rs76932237 6837888	
CTS5542	T1a1	PF5627	rs761819722	16550661 14238781 A->C
PF5627	T1a1	CTS5542	rs761819722	16550661 14238781 A->C
CTS5690	T1a1		16433905 14322025 C->G	
CTS8065	T1a1	PF5642	rs768005886	17819177 15707297 A->G
PF5642	T1a1	CTS8065	rs768005886	17819177 15707297 A->G
CTS11078	T1a1		22937229 20775343 C->T	
CTS11556	T1a1		23160461 20998575 A->T	
L299	T1a1	PF5675	rs755506380	23612472 21450586 G->C
PF5675	T1a1	L299	rs755506380	23612472 21450586 G->C
L453	T1a1	PF5617	rs759214048	14577209 12465409 C->G
PF5617	T1a1	L453	rs759214048	14577209 12465409 C->G
PF5567	T1a1		21472296 19310410 A->G	
PF5593	T1a1		6086853 6218812 A->C	
PF5594	T1a1		6667013 6798972 T->C	
PF5658	T1a1		rs770612758 21211777	
FGC3945.2	T1a1	Z526.2	rs762960884 19049891 G->T	
Z526.2	T1a1	FGC3945.2	rs369249246 8032311	
L208	T1a1a	Page2	rs35815655 8032311	
Page2	T1a1a	L208	rs35815655 8164270 G->A	
CTS931	T1a1a		6736443 8164270 G->A	
CTS1818	T1a1a		6736443 6868402 C->T	
CTS2611	T1a1a		6868402 C->T	
CTS4085	T1a1a	PF5620	rs759827413 14082729	
PF5620	T1a1a	CTS4085	rs759827413 14082729	
CTS4916	T1a1a		14082729 11962023 T->C	
CTS6000	T1a1a	PF7446	rs760408209 14492870 G->A	
PF7446	T1a1a	CTS6000	rs760408209 14492870 G->A	
CTS7169	T1a1a	PF7448	rs765178058 17332851	
PF7448	T1a1a	CTS7169	rs765178058 17332851	
CTS9163	T1a1a		17332851 15220971 C->G	
CTS11451	T1a1a1		1733193 12373193 T->G	
PF7455	T1a1a1		23115983 20954007 C->A	
Y12643	T1a1a1		22462031 2030145 G->C	
Y12641	T1a1a1a		8806164 8938573 G->T	
Y15422	T1a1a1a1		8433936 8565985 C->A	
PF7443	T1a1a1a1b		8928373 9024832 C->T	
PF7445	T1a1a1a1b1		9387846 9550307 G->C	
PF7444	T1a1a1a1b1a		16554745 14442865 G->A	
PF7443	T1a1a1a1b1a		15537442 13245661 G->A	
PF7447	T1a1a1a1b1a		19097234 17285354 G->A	
PF7448	T1a1a1a1b1a		22945511 20783625 A->G	
PF7458	T1a1a1a1b1a		23188462 21026576 A->G	
FGC3995	T1a1b1	Y1419	rs1042907593 16154871 A->G	
Y1419	T1a1b1	FGC3995	rs1042907593 16154871 A->G	
Y16244	T1a1b1		18266751 16154871 A->G	
FGC40894	T1a1b1a	Y18472	rs778150389 18941095	
Y18472	T1a1b1a	FGC40894	rs778150389 18941095	
Y14121	T1a1b1a1		6659212 6791171 A->C	
CTS2214	T1a1b1a1		23115983 20954007 C->A	
Y15127	T1a1b1a2		18266751 16154871 A->G	
Y15711	T1a1b1a2a1		21196384 19034498 A->C	
Y15709	T1a1b1a2a1a		15552197 13440317 G->C	
FGC41002	T1a1b1a2a1b	Y19196	211738526 19576640 G->A	
Y19196	T1a1b1a2a1b	FGC41002	211738526 19576640 G->A	
Y3781	T1a1b1a2a2		6918934 7050893 A->T	
Y3824	T1a1b1a2a2a		7695868 782827 G->A	
Y3782	T1a1b1a2a2a1		7215495 7347454 A->G	
Y3838	T1a1b1a2a2a1a		14003134 11882428 T->C	
Y9102	T1a1b1a2a2a2		8048236 8180195 A->T	
Y16247	T1a1b1a2a2a2a		18426471 16314591 G->T	
Y9103	T1a1b1a2a2a2b		8867069 8999028 C->A	
Y16241	T1a1b1a2a2a2b1		19194215 17082335 C->T	
Y16240	T1a1b1a2a2a2b1a		16928123 14816243 G->A	
FGC40425	T1a1b1a2a2a2b1Y19159		13804077 11683371 A->G	
Y19159	T1a1b1a2a2a2b1FGC40425		13804077 11683371 A->G	
FGC40529	T1a1b1a2a2a2b1Y19161		14705650 12593716 G->C	
Y19161	T1a1b1a2a2a2b1FGC40529		14705650 12593716 G->C	
Z709	T1a1b1b2b		rs763327841 6890722 7022681 T->C	
CTS6467	T1a1b1b2b		rs751410016 15748815 13636935 T->C	
Y9109	T1a1b1b2b1		rs913269816 21656805 19495019 G->A	

Y18004	T1a1a1b2b1a		8588851	8720810	T->A
Y18003	T1a1a1b2b1a1		7904756	7936715	G->A
FGC3988	T1a1a1b2b2	ZT10	rs774543323	8304456	8436415 G->A
ZT10	T1a1a1b2b2	FGC3988	rs774543323	8304456	8436415 G->A
CTS8512	T1a1a1b2b2		rs781377207	18061004	15949124 G->T
FGC3993	T1a1a1b2b2	ZT14	rs376336391	17553410	15441530 C->A
ZT14	T1a1a1b2b2	FGC3993	rs376336391	17553410	15441530 C->A
ZT13	T1a1a1b2b2		rs762609852	14243435	1222730 C->A
Y16409	T1a1a1b2b2a		rs993757508	6659977	6791936 T->G
CTS8660	T1a1a1b2b2b	L906	rs200332530	6931657	7063916 G->T
L906	T1a1a1b2b2b	CTS8660	rs200332530	6931657	7063916 G->T
CTS8663	T1a1a1b2b2b1		rs753537431	18103259	1599379 G->A
PT	T1a1a1b2b2b1a		rs794614269	14626202	12814937 G->A
CTS2860	T1a1a1b2b2b1a		rs768105380	14529342	12417543 C->A
CTS7225	T1a1a1b2b2b1a	L907	rs776102734	17564892	15253012 G->T
L907	T1a1a1b2b2b1a	CTS7225	rs776102734	17564892	15253012 G->T
CTS11968	T1a1a1b2b2b1a		rs761285211	23390048	21228162 C->T
CTS8174	T1a1a1b2b2b1a1		rs868804481	16710270	14589390 G->A
CTS8507	T1a1a1b2b2b1a1a		rs776665642	16949533	14837673 T->C
CTS8884	T1a1a1b2b2b1a1a1		rs764878716	19118773	17006893 G->A
Y15648	T1a1a1b2b2b1a1a1		7427236	7591915	G->A
FGC4067	T1a1a1b2b2b1a1Y19381		18979534	16867654 G->A	
Y19381	T1a1a1b2b2b1a1FGC4067		18979534	16867654 G->A	
FGC4018	T1a1a1b2b2b1a1Y4981		rs1048026330	13863804	11743098 G->A
Y4981	T1a1a1b2b2b1a1FGC4018		rs1048026330	13863804	11743098 G->A
Y16136	T1a1a1b2b2b1a1b1			15733397	13621517 T->C
FGC4040	T1a1a1b2b2b1a1Y5685		8484192	8616151	G->A
SK1718	T1a1a1b2b2b1a1FGC4040	Y5675	rs868575389	8484192	8616151 G->A
Y5675	T1a1a1b2b2b1a1FGC4040	SK1718	rs868575389	8484192	8616151 G->A
FGC4065	T1a1a1b2b2b1a1Y5685		rs868345558	23861496	21699610 G->T
Y5685	T1a1a1b2b2b1a1FGC4065		rs868345558	23861496	21699610 G->T
FGC4016	T1a1a1b2b2b1a1Y8852		rs762298393	2662351	2794310 G->A
Y8852	T1a1a1b2b2b1a1FGC4016		rs762298393	2662351	2794310 G->A
CTS6901	T1a1a1b2b2b1a1a1c		rs75918693	171179227	15067347 G->T
CTS6280	T1a1a1b2b2b1a1a2		rs778240450	16793730	14681850 G->A
Y16021	T1a1a1b2b2b1a1a3		8885073	9017032	C->T
Y11696	T1a1a1b2b2b1a1a4		15045583	12933673	T->C
P321	T1a1a1c-		16018726	13906846	C->T
P317	T1a1a1c-		16020373	13908493	C->T
Y16897	T1a1a2		rs959623004	6799492	6931451 A->G
Z19963	T1a1a2a		rs986358683	19118061	17006181 C->G
L131	T1a2		rs2215828	19372808	C->T
CTS2157	T1a2		rs765565656	14201429	12080723 G->A
CTS2201	T1a2a-		rs75315683	14216869	1209163 G->T
CTS2293	T1a2a-		rs751108699	14251124	12130418 G->T
CTS4809	T1a2a-			15834329	13722949 T->A
CTS7239	T1a2a-		rs759755507	17371481	15259601 T->G
CTS8300	T1a2a-		rs763411289	17928421	15816541 C->A
CTS4348	T1a2a-		rs763120510	18026935	15917755 A->T
CTS4929	T1a2a-		rs769950383	18889251	16777371 C->T
CTS9784	T1a2a-		rs748177031	19072194	1690314 G->A
CTS11227	T1a2a-		rs778016460	20322949	20891063 A->G
CTS12018	T1a2a-		rs768520172	23423886	21262000 T->C
CTS13009.1	T1a2a-			28779164	26633017 C->T
S11611	T1a2a-		rs755109146	8537272	8669231 C->A
S11668	T1a2a-		rs757158107	8570149	8702108 C->T
S12150	T1a2a-		rs780060669	9066475	9228866 C->T
S15560	T1a2a-		rs740890280	14169559	12048853 C->T
S16112	T1a2a-		rs760671714	14519754	12407955 A->C
S17330	T1a2a-		rs748481817	15592696	13480816 C->T
S22136	T1a2a-	SK1475	rs781451883	19335649	17223769 C->A
SK1475	T1a2a-	S22136	rs781451883	19335649	17223769 C->A
PH141	T1a2b	Y13244	rs752883829	6689226	6821185 A->G
Y13244	T1a2b	PH141	rs752883829	6689226	6821185 A->G
P322	T1a2a1		rs766660066	14000929	11880223 G->T
P328	T1a2a1		rs749120054	21844311	19682425 C->T
L446	T1a2b		rs765328997	16660785	14548905 C->T
CTS1482	T1a2b			7432519	7564478 A->G
CTS2161	T1a2b		rs747587829	14202697	12081991 A->G
CTS2880	T1a2b		rs773987640	14540560	1423761 T->G
CTS6786	T1a2b		rs769696882	17105081	14993201 C->T
CTS6930	T1a2b			17200010	15088130 T->C
CTS11660	T1a2b		rs1012975302	23205837	21049561 C->T
CTS11796	T1a2b		rs758655171	23280423	21118537 C->T
CTS12108	T1a2b		rs761392954	28481057	26334910 A->G
S16483	T1a2b		rs757237946	14863036	12748372 A->G
S23932	T1a2b		rs749441129	21403378	19241492 T->C
CTS933	T1a2b1		rs7746251564	7092630	7224589 C->T
CTS6071	T1a2b1		rs773981330	16649588	14537708 G->A
CTS10803	T1a2b1		rs779515027	22782038	2060152 T->C
CTS12204	T1a2b1		rs776222007	28520420	26374273 G->A
CTS3767	T1a2b1a		rs751517880	1516167	13022533 G->C
CTS11984	T1a2b1a		rs769323353	23403451	21241565 T->G
CTS54	T1a2b1a		rs746967056	2696928	288887 A->G
CTS1774	T1a2b1a		rs762527559	14061340	11940634 C->T
CTS6312	T1a2b1a		rs757429853	16816754	14704874 C->A
CTS5767	T1a2b1a		rs747956086	17099502	14987622 G->A
CTS7303	T1a2b1a		rs752006330	17412208	15300428 C->T
CTS8618	T1a2b1a		rs767807064	18113655	16001775 T->C
CTS9625	T1a2b1a		rs774530301	18116038	16004158 C->T
CTS8855	T1a2b1a		rs747012901	18244680	16132800 T->G
CTS9603	T1a2b1a		rs779117600	18895048	16873168 C->C
CTS11753	T1a2b1a		rs772396967	23251895	21090099 C->T
PH088	T1a2b1a		rs758832399	7014573	7146832 A->G
SK1478	T1a2b1a		rs774313522	17660321	15548441 C->C
CTS8862	T1a2b1a1		rs773515931	18246590	16134710 G->T
CTS8489	T1a2b1a1		rs746154125	18065035	15938655 G->A
CTS9984	T1a2b1a1		rs773175161	19185049	17073169 C->A
CTS10538	T1a2b1a1		rs753691755	19527799	17415919 T->C
Y17493	T1a2b1a1a			6837125	6969064 G->A
FGC23010	T1a2b2	Y7381		7150898	7282857 A->G
Y7381	T1a2b2	FGC23010		7150898	7282857 A->G
FGC23024	T1a2b2a	Y7438		14196904	12076198 T->C
Y7438	T1a2b2a	FGC23024		14196904	12076198 T->C
FGC1350	T1a3	Y11151	rs8686711742	7857464	7989423 C->G
Y11151	T1a3	FGC1350	rs8686711742	7857464	7989423 C->G
Y11675	T1a3a	Z9798	rs774531771	23385769	21223883 G->A
Z9798	T1a3a	Y11675	rs774531771	23385769	21223883 G->A
FGC1340	T1a3b	Y8614	rs867572589	7326752	7458711 G->T
Y8614	T1a3b	FGC1340	rs867572589	7326752	7458711 G->T
L1255	T1a3b1		rs866651514	21926143	19764257 G->A
FGC1408	T1a3b1a	Y9221		16828946	14717066 A->G
Y9221	T1a3b1a	FGC1408		16828946	14717066 A->G
Y13280	T1a3b2		rs867694229	2783141	2915100 G->A
Y13698	T1a3b2a		rs8686209329	14264556	12144250 A->G
SK1474	T1a3b2a1	Y13718	rs866117035	8461039	8592998 T->C
Y13718	T1a3b2a1	SK1474	rs866117035	8461039	8592998 T->C
FGC41095	T1a3b2a1a	Y19167	rs865836249	8486106	8618065 T->G
Y19167	T1a3b2a1a	FGC41095	rs865836249	8486106	8618065 T->G
Y13293	T1a3b2a1b			9465925	9628316 C->T
Y13279	T1a3b2a1b1			2776008	2907967 C->T
PH110	T2		rs792045732	291366	3045925 G->T
PH192	T2		rs746638338	6786263	6918222 G->T
PH478	T2		rs752166643	7168776	7300735 A->C
PH526	T2		rs775608481	7207571	7339530 G->C
PH550	T2		rs745648724	7232343	7384302 C->T

PH768	T2	rs767365717	13989484	11868778 G->C
PH933	T2	rs773296673	14137327	12016621 G->T
PH1092	T2	rs781041106	14285325	12164619 A->C
PH1106	T2	rs773330467	14296133	12175427 G->A
PH1172	T2	rs748510116	14343205	12222500 G->A
PH1268	T2	rs772698126	14484129	12383398 A->T
PH1294	T2	rs765225466	14522569	12410760 G->C
PH1343	T2	rs770524785	14677035	12466135 C->T
PH1378	T2	rs768813422	14627692	12515760 T->G
PH1434	T2	rs778889553	14722388	12610456 G->A
PH1457	T2	rs776657923	14604751	12692822 G->A
PH1546	T2	rs747303998	14971240	12859315 G->A
PH1579	T2	rs772365544	15081023	12916111 G->C
PH1583	T2	rs753936188	15033043	12921151 A->G
PH1633	T2	rs769231302	15263645	13151735 T->C
PH1691	T2	rs764970572	15418604	13306724 G->A
PH1841	T2	rs757379050	15832671	13720791 G->C
PH1867	T2	rs759885720	15877264	13765384 G->C
PH1883	T2	rs748086214	15900424	13788544 C->A
PH2017	T2	rs751190334	16061196	13949316 A->G
PH2156	T2	rs768950555	16290688	14178808 C->T
PH2279	T2	rs763867388	16443414	14331534 T->G
PH2292	T2	rs753325131	16450058	14338178 A->G
PH2328	T2	rs753071144	16513405	14401525 C->A
PH2655	T2	rs745867098	17140313	15028433 A->G
PH2861	T2	rs766509131	17144696	15032816 G->A
PH2900	T2	rs765166564	17233855	15121975 C->T
PH2933	T2	rs751996224	17289978	15178098 C->T
PH2990	T2	rs754651830	17339863	15227983 A->G
PH3010	T2	rs748413831	17354701	15242821 G->A
PH3131	T2	rs770557531	17496142	15384262 T->G
PH3150	T2	rs761120766	17527605	15415725 G->A
PH3341	T2	rs75674569	17748087	15636207 T->G
PH3399	T2	rs753042562	17905851	15693971 C->T
PH3422	T2	rs757053225	17933314	15721434 C->T
PH3474	T2	rs772025002	17889595	15777115 T->C
PH3561	T2	rs779654013	17970972	15859092 A->T
PH3721	T2	rs789141516	18148278	16036398 A->G
PH3842	T2	rs760779118	18576362	16464482 G->T
PH3862	T2	rs748926404	18607752	16495872 G->A
PH3868	T2	rs790468944	18613798	16501918 T->A
PH3822	T2	rs747789504	18696577	16584697 T->A
PH3943	T2	rs769404253	18712269	16600389 C->T
PH3996	T2	rs781592919	18779768	16667888 G->C
PH4121	T2	rs746358742	18695435	16853565 G->C
PH4216	T2	rs75273123	19095733	16983853 G->A
PH4431	T2	rs768571499	19319734	17207854 C->T
PH4491	T2	rs770787831	19663721	17451841 C->A
PH4676	T2	rs770706104	21156983	18994697 C->A
PH4746	T2	rs781116336	21281297	19094111 C->T
PH4802	T2	rs760102971	21401101	19232215 C->T
PH4834	T2	rs754653281	21616307	19456421 T->C
PH4842	T2	rs77976278	21622334	19460948 T->C
PH4892	T2	rs773920871	21703390	19541504 A->G
PH4935	T2	rs764128199	21758571	19596685 C->T
PH5136	T2	rs768648596	2288442	20422596 C->T
PH5171	T2	rs763795888	22675971	20514085 T->G
PH5181	T2	rs774811586	22687050	20525164 G->T
PH5212	T2	rs764898316	22753683	20591797 A->G
PH5256	T2	rs751003669	22912120	20750234 G->A
PH5433	T2	rs774487376	23481259	21319373 A->G