

# R1b TMRCA Calculations, Mutation Rates, and Allele Distributions

Generations to TMRCA	Calculated on McGee using the following average mutation rates based on Marko Heinila.				
	FTDNA - 37 Markers				0.36%
	DNAH - 43 Markers				0.25%
	Common - 32/34 Markers				0.24%
Probability of number of generations to MRCA	5%	16%	50%	84%	95%
Genetic Distance	DNAH (43 markers) mutation rate 0.25%				
0	0	1	3	9	14
1	2	3	8	16	23
2	4	7	13	22	30
3	7	10	18	28	37
4	10	14	23	35	45
5	13	18	28	41	52
6	16	22	33	48	59
7	20	27	39	55	67
	FTDNA (37 markers) mutation rate 0.36%				
0	0	1	3	7	11
1	1	3	6	13	19
2	3	5	10	18	24
3	5	8	14	23	30
4	9	11	19	28	36
5	10	15	23	34	42
6	13	18	27	39	49
7	17	22	32	45	55
8	20	26	37	51	61
	Common (32 markers) mutation rate 0.24%				
0	0	1	5	12	19
1	2	5	11	22	32
2	5	9	18	31	42
3	9	14	25	40	53
4	14	20	32	50	64
5	18	26	40	59	74
6	24	32	48	69	85

## R1b TMRCA Calculations, Mutation Rates, and Allele Distributions

No of Mutations vs probability	Probability of x mutations in 20 generations, i.e. since circa 1250, using Ann Taylor's calculator:		
	37 markers @ average mutation rate of 0.36%		
	Mutations	Probability	Cumulative probability
	0	7.0%	7.0%
	1	18.6%	25.6%
	2	24.9%	50.5%
	3	22.0%	72.5%
	4	14.6%	87.1%
	5	7.8%	94.9%
	Mean = 2.7 mutations		
	43 markers @ average mutation rate of 0.26%		
	Mutations	Probability	Cumulative probability
	0	10.7%	10.7%
	1	23.9%	34.6%
	2	26.7%	61.3%
	3	19.2%	80.5%
	4	11.1%	91.6%
	5	5.0%	96.6%
	Mean = 2.2 mutations		

## R1b TMRCA Calculations, Mutation Rates, and Allele Distributions

Source	Marker	FTDNA 1	Wikipedia 2	RogersDNA 3	Hawgood DNA 4	R1b Allele Frequency 5	Cheshire Clan Experience	Lancashire Clan	Other R1b Experience
	23 of 30 test results to date are haplogroup R1b (mostly R1b1a2).						7 x DNAH, 4 x FTDNA = 11 = most common allele unless noted	2 x DNAH, 6 x FTDNA = 8 = most common allele unless noted	8 x DNAH, 7 x FTDNA = 15 = most common allele unless noted
<b>Panel 1 (1-12)</b>		0.250%	0.185%		0.211%				
	DYS393		0.076%	as Wikipedia	0.150%	13 = 92%, 12 = 2%, 14 = 5%	One mutation at 14	5 x 13, 3 x 14	1 x 12, 2 x 14
	DYS390		0.311%	do	0.340%	23 = 58%, 24 = 31%, 25 = 7%, 22 = 3%	All at 24		4 x 25, 9 x 24, 1 x 22, 1 x 23
	DYS19		0.151%	do	0.230%	14 = 91%, 15 = 7%			4 x 15
	DYS391		0.265%	do	0.270%	11 = 67%, 10 = 28%, 12 = 5%	One mutation at 10	Three mutations at 10	4 x 10, 1 x 12
	DYS385		0.226%	do	0.320%	11-14=70% 11-15=14% 12-14 = 6%			2 x 12-14, 3 x 11-15, 3 x others
	DYS426		0.009%	do	0.030%	12 = 98%			
	DYS388		0.222%	do	0.050%	12 = 98%			
	DYS439		0.477%	do		12 = 62%, 11 = 24%, 13 = 12%	One mutation at 111, one at 13	7 x 11, 1 x 12	6 x 11, 4 x 13
	DYS389i		0.186%	do	0.250%	13 = 83%, 14 = 12%, 12 = 4%		1 x 12, 1 x 14	2 x 12, 1 x 14
	DYS392		0.052%	do	0.140%	13 = 94%, 14 = 4%		7 x 14, 1 x 13	1 x 15
	DYS389ii		0.242%	do	0.280%	29 = 65%, 30 = 19%, 28 = 11%		1 x 28, 1 x 30	3 x 30., 2 x 28

## R1b TMRCA Calculations, Mutation Rates, and Allele Distributions

Source	Marker	FTDNA 1	Wikipedia 2	RogersDNA 3	Hawgood DNA 4	R1b Allele Frequency 5	Cheshire Clan Experience	Lancashire Clan	Other R1b Experience
	23 of 30 test results to date are haplogroup R1b (mostly R1b1a2).						7 x DNAH, 4 x FTDNA = 11 = most common allele unless noted	2 x DNAH, 6 x FTDNA = 8 = most common allele unless noted	8 x DNAH, 7 x FTDNA = 15 = most common allele unless noted
<b>Panel 2 (13-25)</b>		0.300%	0.352%			0.363%			
	DYS458		0.814%	do	0.730%	17 = 51%, 16 = 20%, 18 = 20%, 19 = 6%	One mutation at 16, one at 18		2 x 16, 2 x 18, 1 x 19
	DYS459		0.132%	do	0.210%	9-10=82%, 9-9=16%	One mutation at 9-9		
	DYS455		0.016%	do	0.070%	11 = 98%			
	DYS454		0.016%	do	0.070%	11 = 98%			
	DYS447		0.264%	do	0.300%	25 = 54%, 24 = 31%, 26 = 11%		all 24	2 x 24
	DYS437		0.099%	do	0.170%	15 = 85%, 14 = 12%	All = 14		2 x 14
	DYS448		0.135%	do	0.170%	19 = 90%, 18 = 5%, 20 = 5%			1 x 20
	DYS449		0.838%	do	0.880%	29 = 44%, 30 = 28%, 28 = 13%, 31 = 10%	All = 30	3 x 29, 4 x 30	7 x 29, 1 x 30, 2 x 28
	DYS464a		0.566%	do		15 = 83%, 14 = 12%, 16 = 3%		15-16-17-19 x 5, = 2% probability	2 x 14, 1 x 16
	DYS464b		0.566%	do	0.500%	15 = 70%, 16 = 26%		1 x 15, 6 x 16	4 x 16
	DYS464c		0.566%	do	0.500%	17 = 53%, 16 = 33%, 15 = 9%	9 x 16, 2 x 15	6 x 17, 1 x 16	5 x 15, 3 x 16, 5 x 17
	DYS464d		0.566%	do	0.550%	17 = 49%, 18 = 37%, 16 = 8%, 15 = 1%, 19 = 4%	All = 16	all 19	1 x 15, 2 x 16, 5 x 17, 3 x 18, 1 x 19

## R1b TMRCA Calculations, Mutation Rates, and Allele Distributions

Source	Marker	FTDNA 1	Wikipedia 2	RogersDNA 3	Hawgood DNA 4	R1b Allele Frequency 5	Cheshire Clan Experience	Lancashire Clan	Other R1b Experience
	23 of 30 test results to date are haplogroup R1b (mostly R1b1a2).						7 x DNAH, 4 x FTDNA = 11 = most common allele unless noted	2 x DNAH, 6 x FTDNA = 8 = most common allele unless noted	8 x DNAH, 7 x FTDNA = 15 = most common allele unless noted
<b>Panel 3 (26-37)</b>		0.710%	0.936%		0.930%				
	DNAH present		0.279%		0.300%				
	FTDNA Specific		1.857%		1.812%				
	DYS460		0.402%	do	0.340%	11 = 74%, 10 = 21%			3 x 10,
	Y-GATA-H4		0.208%	do	0.320%	11 = 68%, 10 = 26%, 12 = 5%			1 x 12
	YCAIIa		0.123%	do	0.160%	19 = 95%, 20 = 1%			2 x 20
	YCAIIb		0.123%	do	0.160%	23 = 81%, 22 = 9%, 24 = 6%			2 x 22, 1 x 24
	DYS456		0.735%	do	0.540%	16 = 41%, 15 = 33%, 17 = 21%	8 x 16, 3 x 15	1 x 17	6 x 15, 1 x 17
	DYS607*		0.411%	do	0.390%	15 = 70%, 14 = 21%, 16 = 7%			1 x 14, 1 x 16
	DYS576*		1.022%	do	0.860%	17 = 41%, 18 = 29%, 19 = 10%, 16 = 16%	1 x 17, 4 x 18	2 x 17, 2 x 18, 1 x 19	1 x 18, 1 x 20, 1 x 21
	DYS570*		0.790%	do	0.750%	17 = 56%, 18 = 23%, 16 = 12%, 19 = 7%		1 x 17, 1 x 18	1 x 16, 2 x 20
	CDYa*		3.531%	do		36 = 30%, 35 = 14%, 34 = 4%, 37 = 29%, 38 = 16%	1 x 34, 3 x 35, 1 x 36	3 x 37, 2 x 38	1 x 34, 2 x 38
	CDYb*		3.531%	do		38 = 31%, 39 = 32%, 36 = 7%		2 x 38, 3 x 39	2 x 36, 1 x 37
	DYS442		0.324%	do	0.500%	12 = 70%, 13 = 15%, 11 = 12%	One mutation at 11	all 13	3 x 11, 2 x 13
	DYS438		0.035%	do	0.080%	12 = 93%, 10 = <1%	1 x 10		

## R1b TMRCA Calculations, Mutation Rates, and Allele Distributions

Source	Marker	FTDNA 1	Wikipedia 2	RogersDNA 3	Hawgood DNA 4	R1b Allele Frequency 5	Cheshire Clan Experience	Lancashire Clan	Other R1b Experience
	23 of 30 test results to date are haplogroup R1b (mostly R1b1a2).						7 x DNAH, 4 x FTDNA = 11 = most common allele unless noted	2 x DNAH, 6 x FTDNA = 8 = most common allele unless noted	8 x DNAH, 7 x FTDNA = 15 = most common allele unless noted
		* = FTDNA specific							
<b>DNAH Specific</b>				0.237%	0.271%				
	DYS441			0.132%			all 13	2 x 13	all 13
	DYS444			0.321%	0.290%	12 = 78%, 11 = 8%, 13 = 13%	3 x 11, 3 x 12, 2 x 13	2 x 12	8 x 12, 1 x 11, 1 x 13
	DYS445			0.296%	0.260%		all 12	2 x 12	all 12
	DYS446			0.095%	0.310%	13 = 79%, 12 = 8%, 14 = 11%	12, 1 mutation at 13	2 x 14	7 x 13, 1 x 14
	DYS452			0.314%	0.330%		all 30	2 x 30	7 x 30, 1 x 31
	DYS461			0.233%	0.230%		all 12	2 x 12	7 x 12 1 x 13
	DYS462			0.053%	0.150%		all 11	2 x 11	7 x 11, 1 x 12
	DYS463			0.162%	0.190%		all 24	2 x 24	all 24
	DYS635			0.492%	0.340%		all 22	2 x 23	6 x 23, 1 x 24, 1 x 25
	GATA A10			0.379%	0.340%		all 13	2 x 13	6 x 13, 1 x 14, 1 x 12
	GATA 1B			0.130%			all 10	2 x 10	7 x 10, 1 x 11
<b>Overall</b>		<b>My Rates</b>	<b>FTDNA + R</b>	<b>Wiki + R</b>	<b>RogersDNA</b>	<b>Hawgood DNA</b>	<b>Heinila</b>	<b>Burgarella + Heilina infill</b>	<b>Iain McD</b>
	FTDNA - 37 Markers	0.36%	0.417%	0.487%	0.487%	0.498%	0.358%	0.352%	0.428%
	DNAH - 43 Markers	0.25%	0.222%	0.220%	0.220%	0.238%	0.247%	0.255%	0.300%
	Common - 32/34 Markers	0.24%	0.277%	0.273%	0.273%	0.292%	0.241%	0.235%	0.322%
	FTDNA 25	0.25%					0.242%	0.252%	0.315%
	FTDNA 67	0.26%					0.258%	0.258%	0.326%
	FTDNA 111	0.26%					0.259%	0.272%	0.308%
	FTDNA + is FTDNA panels 1 and 2 plus RogersDNA values								
	Hawgood DNA uses values from RogersDNA where missing from Hawgood DNA								
<b>Sources</b>	1	<a href="http://www.kerchner.com/cgi-bin/ystrmutationrate.cgi">http://www.kerchner.com/cgi-bin/ystrmutationrate.cgi</a>							
	2	<a href="http://en.wikipedia.org/wiki/List_of_Y-STR_markers">http://en.wikipedia.org/wiki/List_of_Y-STR_markers</a>							
	3	<a href="http://www.rogersdna.com/geddna/mutate.php">http://www.rogersdna.com/geddna/mutate.php</a>							
	4	<a href="http://www.hawgoodfamily.co.uk/str%20data.html">http://www.hawgoodfamily.co.uk/str%20data.html</a>							
	5	U106 Project at FTDNA and Yahoo							