Most Recent Common Ancestor (MRCA)

Y chromosome haplotypes of two distantly related male individuals can be used to estimate when their most recent common paternal ancestor lived with reasonable accuracy.

DNA Mutations

The resolving power of the MRCA calculation lies in understanding the naturally occurring mutation rate of each DNA marker. While the rate varies from marker to marker and within populations, on average, mutations occur at a frequency of 0.2%, or approximately once every 500 generations for any individual marker.

Average Time to MRCA

There are several statistical models for calculating MRCA, both yielding comparable results. For illustration, the average time to MRCA (50% probability of relationship) has been calculated using the Infinite Alleles Model with an average mutation rate of 0.002. One generation is defined as 25 years.

Average Generations to MRCA			
	No. of Mismatches		
No. Markers tested	0	1	2
9	19	50	85
10	18	44	75
11	16	40	67
12	15	37	61
13	14	34	56
14	13	31	52
15	12	29	48
16	11	27	45
17	10	26	42

Average Years to MRCA			
	No. of Mismatches		
No. Markers tested	0	1	2
9	475	1,250	2,125
10	450	1,100	1,875
11	400	1,000	1,675
12	375	925	1,525
13	350	850	1,400
14	325	775	1,300
15	300	725	1,200
16	275	675	1,125
17	250	650	1,050

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