

Figure S1. The condensed identity states. The 15 detailed identity states grouped into the nine condensed identity states. Each dot represents an allele and a line connecting dots indicates those alleles are IBD.

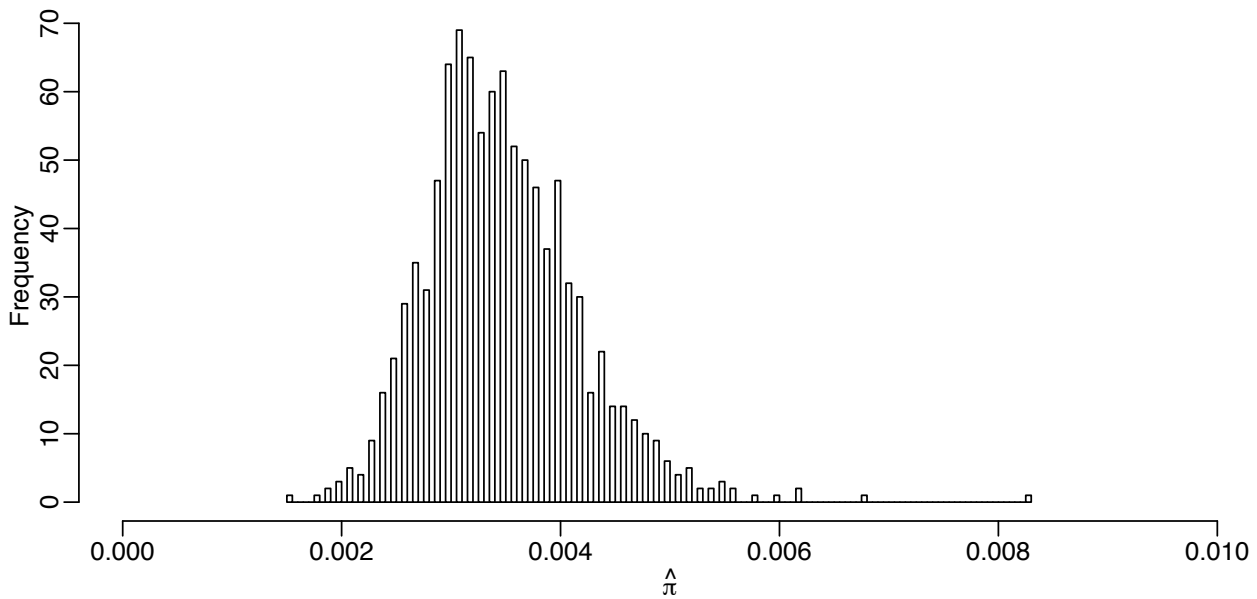


Figure S2. Distribution of $\hat{\pi}$ in simulated unrelated YRI pairs.

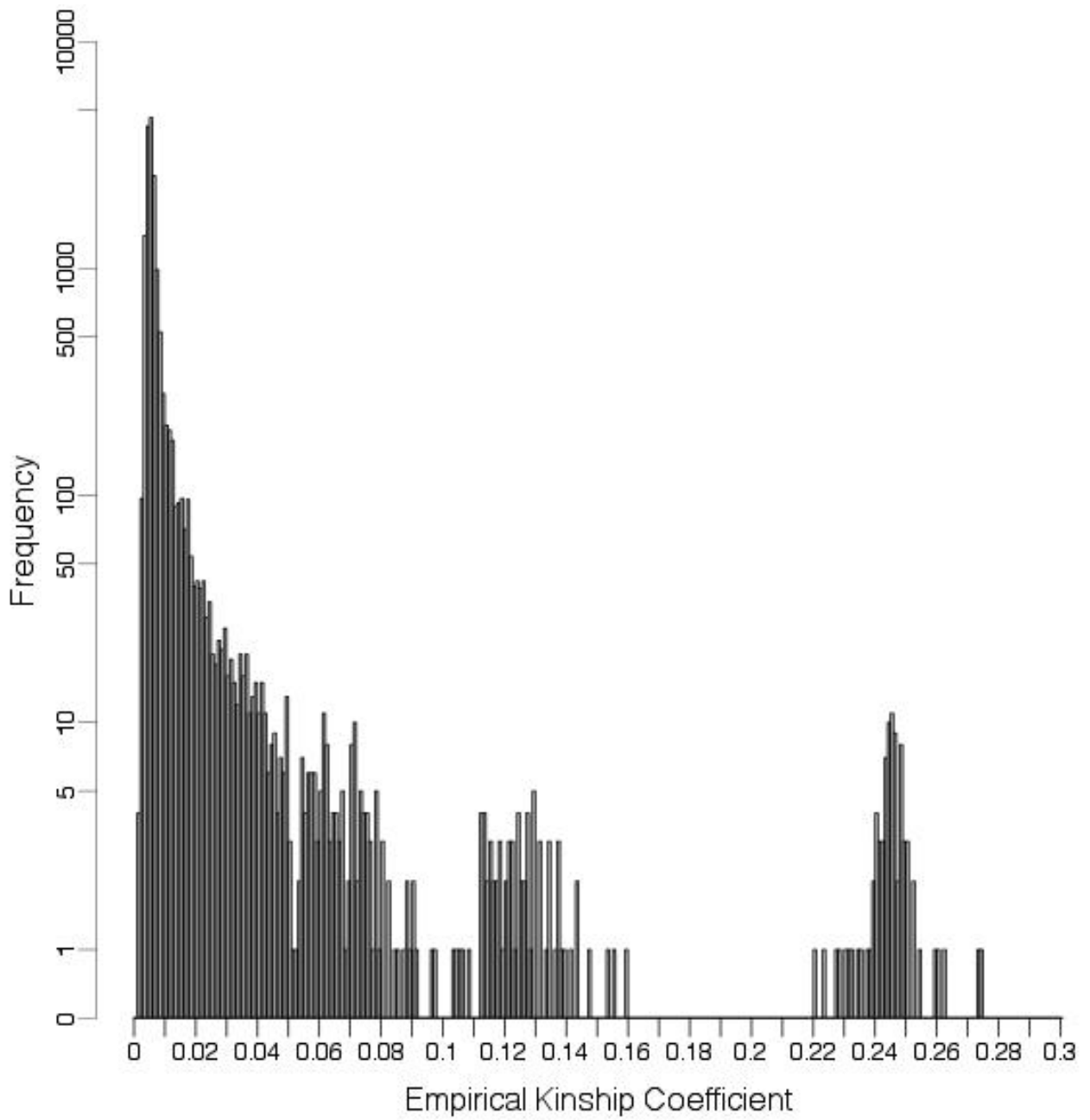


Figure S3. Distribution of $\hat{\pi}$ across all MKK pairs.

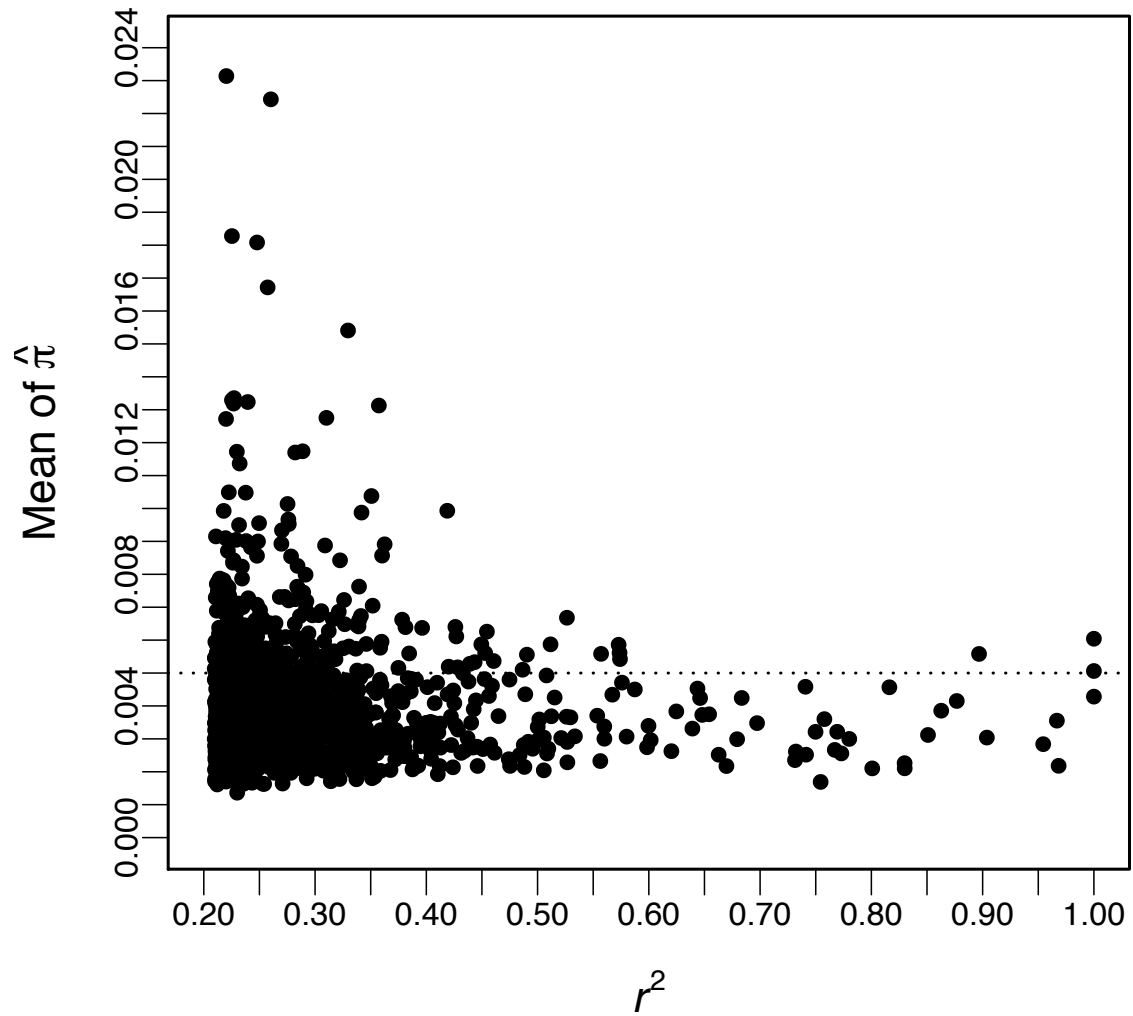


Figure S4. The mean, across all unrelated pairs, of $\hat{\pi}_i$ for a SNP in genomic regions with high LD (measured by r^2). The dotted line is the genomewide average of $\hat{\pi}_i$ across all unrelated pairs.

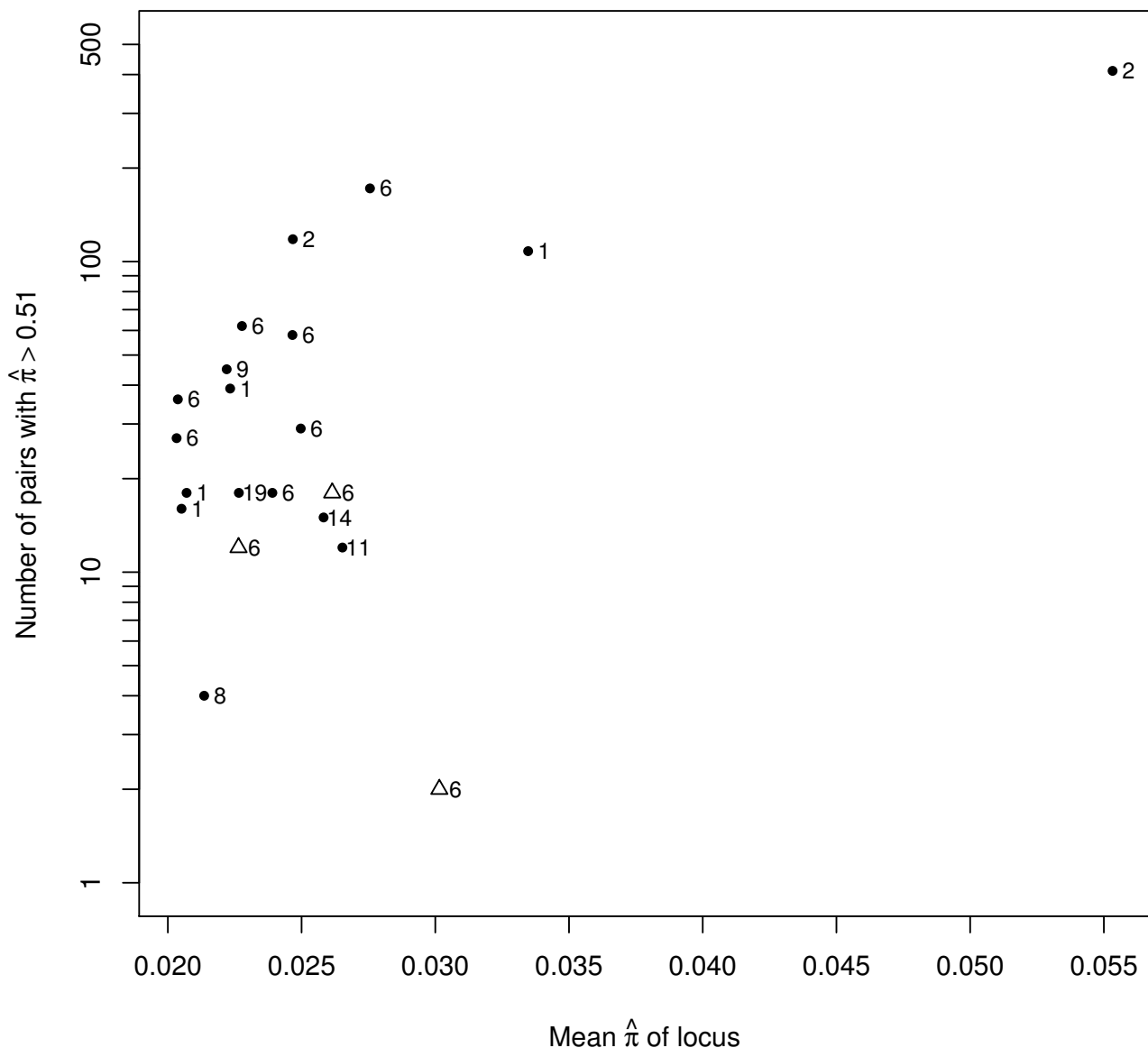


Figure S5. Number of pairs with $\hat{\pi}_i > 0.51$. For each locus with mean $\hat{\pi}_i > 0.02$, the number of pairs for which $\hat{\pi}_i$ was estimated as > 0.51 . Next to each point is the chromosome on which that locus is located. The open triangles represent loci in the HLA region. Note that the vertical axis is on the log scale.

Table S_1 . The Individuals in different MKK panels. The panels are labeled with the letter “M” followed by a count of the number of individuals in the panel. All pairs within a panel have $\hat{\pi} < \Pi_p$ where Π_p is a threshold for that panel. We define panels as all MKK individuals minus excluded individuals. Excluded individuals for a panel are those listed in the table for that panel as well as excluded individuals for panels on previous rows.

Panel	Π_p	Excluded Individuals					
M183	0.50	NA21737					
M136	0.22	NA21475	NA21384	NA21522	NA21402	NA21314	NA21718
		NA21648	NA21636	NA21608	NA21601	NA21527	NA21525
		NA21514	NA21493	NA21490	NA21487	NA21480	NA21455
		NA21442	NA21439	NA21425	NA21401	NA21389	NA21383
		NA21366	NA21361	NA21317	NA21313	NA21309	NA21302
		NA21683	NA21678	NA21613	NA21596	NA21587	NA21577
		NA21575	NA21523	NA21509	NA21477	NA21434	NA21415
		NA21405	NA21404	NA21386	NA21344	NA21318	
M107	0.10	NA21617	NA21494	NA21453	NA21320	NA21634	NA21520
		NA21488	NA21421	NA21414	NA21370	NA21308	NA21825
		NA21741	NA21733	NA21719	NA21685	NA21635	NA21616
		NA21615	NA21599	NA21583	NA21519	NA21450	NA21448
		NA21447	NA21438	NA21387	NA21312	NA21304	
M87	0.05	NA21351	NA21614	NA21513	NA21420	NA21357	NA21740
		NA21650	NA21528	NA21473	NA21435	NA21367	NA21300
		NA21723	NA21631	NA21597	NA21526	NA21521	NA21485
		NA21423	NA21352				
M36 ^a	0.01	NA21717	NA21424	NA21365	NA21486	NA21390	NA21722
		NA21576	NA21303	NA21512	NA21339	NA21784	NA21391
		NA21316	NA21457	NA21409	NA21382	NA21619	NA21578
		NA21524	NA21515	NA21378	NA21400	NA21362	NA21716
		NA21647	NA21620	NA21479	NA21417	NA21408	NA21388
		NA21517	NA21489	NA21359	NA21297	NA21682	NA21580
		NA21454	NA21371	NA21364	NA21686	NA21622	NA21611
		NA21582	NA21529	NA21510	NA21491	NA21451	NA21440
		NA21418	NA21381	NA21356			

^a The individuals included in M36 are: NA21826, NA21776, NA21770, NA21769, NA21768, NA21739, NA21738, NA21693, NA21689, NA21632, NA21600, NA21584, NA21574, NA21573, NA21478, NA21476, NA21441, NA21436, NA21410, NA21403, NA21399, NA21385, NA21379, NA21368, NA21363, NA21360, NA21355, NA21353, NA21341, NA21336, NA21333, NA21311, NA21307, NA21301, NA21298, NA21295.

Table S_2 . Unrelated pairs with IBD segments ≥ 30 cM

Individual 1	Individual 2	Chr	Length (cM)	Length (Mb)	# of SNPs	$\hat{\pi}$
NA21360	NA21379	chr1	37.16	19.900	8890	0.0064
NA21601	NA21423	chr2	30.08	24.750	12215	0.0093
NA21309	NA21435	chr2	35.78	33.960	17436	0.0091
NA21769	NA21577	chr3	55.27	65.000	24595	0.0066
NA21420	NA21424	chr4	35.62	27.850	11803	0.0091
NA21361	NA21717	chr5	36.42	19.020	9364	0.009
NA21351	NA21339	chr5	33.50	27.780	12084	0.0083
NA21784	NA21480	chr6	31.09	22.900	11412	0.0094
NA21619	NA21682	chr6	34.56	16.690	10228	0.0088
NA21316	NA21366	chr7	30.33	17.350	9013	0.0078
NA21601	NA21408	chr8	31.24	14.960	11239	0.008
NA21410	NA21441	chr9	34.25	24.750	13250	0.0089
NA21359	NA21383	chr10	34.92	15.260	10216	0.0069
NA21361	NA21382	chr10	35.98	15.250	10337	0.009
NA21487	NA21417	chr10	33.94	32.470	15374	0.0094
NA21509	NA21716	chr11	38.04	47.770	17949	0.0087
NA21529	NA21522	chr12	40.39	17.700	9762	0.0088
NA21298	NA21425	chr13	30.73	34.020	14991	0.0083
NA21383	NA21453	chr15	30.14	10.110	6222	0.0076
NA21718	NA21390	chr17	34.08	22.170	9555	0.0081
NA21488	NA21386	chr19	31.86	18.820	6990	0.0096
NA21529	NA21717	chr19	32.72	15.290	5865	0.0074

Table S_3 . Pairs with ≥ 16 segments of size ≥ 2 cM

Individual 1 ID	Individual 2 ID	No. Seg.	Total (Mean) Length(cM)	Genetic Length(cM)	Number of SNPs	Physical Length(Mb)	$\hat{\pi}$
NA21300	NA21741	16	85.32(5.33)	2.33–21.78	1.331–7.531	559–3915	0.0092
NA21320	NA21368	18	78.21(4.35)	2.28–8.76	0.990–7.739	554–2676	0.0083
NA21648	NA21448	17	99.51(5.85)	2.01–13.39	0.728–9.627	308–4190	0.0092
NA21361	NA21311	16	62.66(3.92)	2.00–8.28	1.047–28.48	528–3353	0.0098
NA21514	NA21825	17	94.20(5.54)	2.02–13.82	0.908–10.95	308–4377	0.0093
NA21366	NA21513	16	87.10(5.44)	2.02–16.56	1.153–9.469	380–4182	0.0099
NA21344	NA21615	16	78.43(4.90)	2.13–11.15	0.877–14.37	478–4972	0.0096
NA21365	NA21599	17	86.64(5.10)	2.11–14.29	1.079–8.224	698–4693	0.0093
NA21363	NA21312	16	69.08(4.32)	2.06–7.27	0.648–6.841	342–2774	0.0091
NA21631	NA21510	17	82.78(4.87)	2.24–11.17	0.629–13.53	457–5360	0.0096
NA21485	NA21313	16	68.29(4.27)	2.13–9.30	0.711–8.313	517–3584	0.0099
NA21457	NA21523	16	88.22(5.51)	2.05–18.50	0.750–10.74	470–6437	0.0098
NA21370	NA21718	16	107.85(6.74)	2.08–16.84	0.596–16.36	357–6924	0.0098
NA21370	NA21693	16	99.38(6.21)	2.04–17.43	0.886–31.77	580–5986	0.0095
NA21370	NA21442	16	71.56(4.47)	2.33–9.34	0.890–6.254	274–3229	0.0099
NA21475	NA21313	16	106.62(6.66)	2.25–14.83	1.011–10.99	626–5293	0.0097
NA21304	NA21301	16	102.03(6.38)	2.13–22.93	0.808–23.75	389–7626	0.0092
NA21584	NA21608	18	61.10(3.40)	2.17–6.18	0.875–6.698	419–2617	0.0087
NA21584	NA21519	21	76.36(3.64)	2.01–8.55	0.439–4.465	163–1659	0.0075
NA21584	NA21317	18	73.08(4.06)	2.01–13.14	0.699–5.39	254–2608	0.0097
NA21584	NA21309	17	68.14(4.01)	2.05–7.18	0.514–5.703	369–2472	0.0085

Table S_4 . Individuals with autozygous segments ≥ 10 cM

Individual ID	Chr	Genetic Length(cM)	Number of SNPs	Physical Length (Mb)	Inbreeding Coefficient
NA21615	chr1	16.00	5749	12.330	0.005
NA21423	chr3	10.01	4515	9.983	0.006
NA21333	chr3	38.61	17759	50.830	0.023
NA21311	chr6	23.72	10330	24.440	0.008
NA21370	chr7	25.40	11962	32.530	0.013
NA21436	chr8	16.54	7112	16.720	0.017
NA21489	chr14	11.45	2236	7.326	0.004
NA21425	chr16	10.70	4907	12.710	0.011
NA21436	chr17	32.10	6144	13.010	0.017
NA21333	chr18	11.46	6481	14.520	0.023

Table S_5 . Individuals with ≥ 3 autozygous segments of length ≥ 2 cM

Individual ID	Number of Segments	Total (Average) Length(cM)	Genetic Length(cM)	Number of SNPs	Physical Length(Mb)	Inbreeding Coefficient
NA21634	3	15.378(5.126)	2.466–8.701	1.598–18.85	1149–5594	0.006
NA21513	3	8.409(2.803)	2.196–3.444	1.204–3.778	613–1626	0.005
NA21357	3	9.945(3.315)	2.856–3.58	0.9669–1.587	677–1059	0.002
NA21405	3	9.202(3.067)	2.678–3.382	1.201–2.63	772–1445	0.004
NA21401	3	16.348(5.449)	4.524–7.042	2.786–5.046	1167–2026	0.005
NA21723	3	7.082(2.361)	2.208–2.516	1.179–3.021	512–1288	0.003
NA21489	3	18.932(6.311)	3.246–11.449	1.619–7.326	869–2236	0.004
NA21303	3	7.267(2.422)	2.174–2.839	0.5251–2.28	386–983	0.005
NA21399	3	9.610(3.203)	2.681–3.63	1.572–2.629	933–1443	0.004
NA21388	3	8.595(2.865)	2.227–3.299	1.56–3.92	465–1430	0.004
NA21415	3	7.432(2.477)	2.056–2.725	0.8056–2.838	485–1414	0.004
NA21363	3	8.075(2.692)	2.268–3.007	0.5346–1.454	419–747	0.004
NA21439	3	7.292(2.431)	2.036–2.887	1.6–2.83	704–1505	0.005
NA21425	6	29.077(4.846)	2.018–10.702	1.142–12.71	580–4907	0.011
NA21333	3	58.791(19.597)	8.724–38.612	8.84–50.83	3790–17759	0.023
NA21391	4	12.675(3.169)	2.054–4.186	0.8406–3.51	490–1634	0.003
NA21490	4	13.387(3.347)	2.15–4.386	1.59–5.419	684–3884	0.008
NA21417	4	12.1(3.025)	2.253–4.893	1.062–4.108	399–1942	0.004
NA21436	5	61.415(12.283)	2.747–32.098	1.376–16.72	994–7112	0.017

Table S₆. The 50 loci showing the greatest excess of IBD sharing

Chromosome	Start(bp)	End (bp)	Size(cM)	References	# of Genes	Candidate Genes
1	39324208	39704126	0.036	-	13	RRAGC, GJA9, MACF1
1	49064047	50364152	0.077	5, 7	8	ELAVL4, DMRTA2
1	50641271	51214549	0.044	5, 7	11	EPS15, CDKN2C, DMRTA2
1	75963278	76233802	0.041	1, 7	8	ACADM, RABGGTB, MSH4
1	113877319	114222836	0.021	-	3	PHTF1, RSNB1, C1orf178
1	160004862	160164421	0.014	-	8	KCNJ10, ATP1A2, CASQ1
1	167360386	167703170	0.049	4, 5	9	NME7, BLZF1, C1orf114
1	171808391	173261413	0.068	7	22	GPR52, TNFR
1	189062244	189329011	0.048	-	1	RGS1
1	225240160	225664792	0.089	4	5	CDC42BPA
2	134735206	136759336	1.383	1, 2, 4, 7	27	LCT, ZRANB3, R3HDM1
2	136771874	137484018	0.577	1, 7, 9	9	CXR4
3	50399186	51743949	0.067	1	20	C3orf18, HEMK1, CISH
6	26252770	26855017	0.266	1, 6, 8	29	BTN2A3
6	27796348	31041773	1.139	1, 5, 6, 7, 9	213	HLA-Class I
6	31189817	31536148	0.419	-	33	HLA-Class I
6	31593333	31787286	0.135	-	31	LSM2, MSH5, DDAH2
6	32317005	32819554	0.361	-	26	HLA-Class II
6	33190718	33235735	0.058	-	3	HLA-Class II
6	44790294	45463587	0.065	-	6	SUPT3H
6	54532896	54575592	0.052	-	0	-
6	57436566	63102769	0.309	-	20	GUSBL2, LOC727798, KHDRBS2
6	76986401	77315837	0.050	-	3	U6, RP11-35J1.1
6	86546633	86595437	0.002	-	1	RP11-207F8.1
6	87931591	88103096	0.013	7	6	ZNF292, GJB7, C6orf162
6	109758929	110203589	0.064	-	10	FLJ25791, FLJ42177, C6orf199
6	115691168	116073998	0.050	-	1	RP11-282C5.1
6	119676688	119793015	0.022	-	0	-
6	130553253	130813845	0.106	1, 4	2	KIAA1913, SAMD3
6	131177407	131413441	0.061	-	2	DKFZP781H1755, EPB41L2
6	145885559	146412767	0.044	-	5	EPM2A, FBXO30, LOC729411
6	162953482	163042726	0.010	-	2	PARK2
6	169637185	169864628	0.045	-	6	DKFZP686G02190, THBS2, WDR27
8	99536382	100917656	0.085	5	26	COH1, VPS13B, COX6C
9	11364073	11609839	0.075	-	0	-
9	93979436	94620197	0.105	-	5	LOC375748, C9orf102, ZNF367
11	48011370	56273685	0.344	1, 3, 6, 8	182	OR5T1, OR5W1P, OR8H3
12	21295588	21380972	0.039	-	2	SLCO1B1
12	37003945	37274117	0.029	7	1	CPNE8
12	110346958	111509176	0.064	1, 5, 9	29	FLJ34154, SCA2, ALDH2
14	65695432	66942881	0.097	1, 5, 7	17	PLEK2, ATP6V1D, EIF2S1
15	74264378	75049544	0.070	1	20	LOC388139, ZNF291, RCN2
16	34782230	46539787	0.157	3, 6	30	LOC91807, LOC388272, PHKB
16	65806332	66247253	0.063	3, 6	1	FLJ40162, FLJ11004
17	36539706	36869020	0.073	-	6	MRPL45
17	43451275	43891457	0.045	-	11	GFAP, LOC146909, NMT1
17	48154902	48300753	0.039	-	12	SLC35B1
19	15642246	15770516	0.051	-	5	OR10H2, OR10H3, LOC388514
19	23571954	23901490	0.028	-	4	ZNF681, LOC388524, LOC390909
19	42362309	43166926	0.132	1, 7	30	ZNF571, FLJ37549, LOC401915

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