Analysis of cross-population differentiation between Thoroughbred and Jeju horses

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Supplementary file

Table S1: Summary of sequencing data

Sample ID	DNA Sequenced (bp)	Total Reads	Alignment Rate (%)	Read Depth	Genome Coverage (%)
Thoroughbred1	37,246,295,613	382,315,321	93.73	15.05	97.73
Thoroughbred2	30,888,431,883	325,731,309	91.24	12.48	97.64
Thoroughbred3	31,450,675,227	328,079,041	92.32	12.72	97.62
Thoroughbred4	35,963,836,413	372,542,460	92.89	14.54	97.72
Thoroughbred5	33,694,868,912	347,933,273	93.24	13.63	97.69
Thoroughbred6	35,377,479,583	366,035,305	93	14.3	97.69
Thoroughbred7	34,425,811,410	359,701,273	92.11	12.13	97.68
Thoroughbred8	31,609,589,758	328,493,910	92.63	12.78	97.6
Thoroughbred9	30,000,054,254	309,864,749	93.15	12.13	97.59
Thoroughbred10	37,775,043,083	375,306,333	96.94	15.29	97.72
Thoroughbred11	33,509,411,544	350,176,922	92.08	13.54	97.72
Thoroughbred12	41,399,035,283	420,765,583	94.66	16.73	97.72
Thoroughbred13	44,528,923,038	428,687,902	96.24	18.01	97.73
Thoroughbred14	46,311,892,576	458,855,646	97.1	18.72	97.77
Jeju Horse1	35,538,209,275	369,702,396	92.5	14.36	97.72
Jeju Horse2	33,926,243,752	349,622,049	93.38	13.71	97.66
Jeju Horse3	52,145,917,996	535,283,964	98.7	21.13	97.57
Jeju Horse4	54,694,350,831	562,662,095	98.49	22.16	97.53
Jeju Horse5	54,931,054,131	564,955,386	98.51	22.26	97.55
Jeju Horse6	53,495,854,448	548,708,850	98.76	21.68	97.57

Table S2: Chromosomal distribution of number of SNPs

Chromosome	Chromosome length	# SNPs
1	185,838,109	1,024,647
2	120,857,687	694,422
3	119,479,920	686,421
4	108,569,075	585,817
5	99,680,356	538,705
6	84,719,076	470,973
7	98,542,428	528,174
8	94,057,673	546,168
9	83,561,422	446,716
10	83,980,604	481,410
11	61,308,211	305,227
12	33,091,231	258,469
13	42,578,167	259,775
14	93,904,894	476,310
15	91,571,448	516,562
16	87,365,405	490,134
17	80,757,907	492,980
18	82,527,541	478,720
19	59,975,221	343,076
20	64,166,202	456,092
21	57,723,302	343,924
22	49,946,797	275,284
23	55,726,280	314,323
24	46,749,900	269,511
25	39,536,964	212,433
26	41,866,177	278,974
27	39,960,074	258,628
28	46,177,339	258,577
29	33,672,925	203,291
30	30,062,385	202,551
31	24,984,650	156,904

Table S3: Genes overlapped with selective regions in Thoroughbreds compared to Jeju horses (XP-EHH)

Chr	Position	XP-EHH score	Gene Symbol	Gene Start	Gene End
1	13700000-13750000	5.86158	PRLHR	13735786	13736973
1	15550000-15600000	5.69065	PNLIP	15534773	15551621
1	15600000-15650000	5.31381	PNLIPRP3	15603161	15636794
1	16450000-16500000	5.4833	ATRNL1	16113986	16849098
1	16500000-16550000	5.2465	ATRNL1	16113986	16849098
1	25350000-25400000	5.27234	SORCS3	25204207	25768630
1	32900000-32950000	5.39809	BLNK	32920430	32978785
1	33200000-33250000	5.22926	C10orf131	33190582	33200629
1	33250000-33300000	5.90838	ENTPD1	33272430	33319727
1	33400000-33450000	5.80411	ALDH18A1	33436203	33476492
1	33400000-33450000	5.80411	TCTN3	33396225	33418740
1	42700000-42750000	5.06026	PRKG1	42400353	42839102
1	43200000-43250000	5.87416	MBL2	43245495	43249033
1	46400000-46450000	6.49695	ZWINT	46418493	46421253
1	64400000-64450000	5.05381	KCNMA1	64178413	64684808
1	64450000-64500000	5.07086	KCNMA1	64178413	64684808
1	77100000-77150000	5.18054	SLC35F3	76905154	77273031
1	84300000-84350000	5.27587	GRID1	84021400	84686687
1	84550000-84600000	5.62312	GRID1	84021400	84686687
1	84600000-84650000	5.13165	GRID1	84021400	84686687
1	121550000-121600000	5.11129	THSD4	121514028	121697263
1	139900000-139950000	5.55544	SLC27A2	139944322	139990189
1	139900000-139950000	5.55544	HDC	139917440	139938572
1	180500000-180550000	5.7126	U6	180536708	180536810
2	62650000-62700000	6.20426	GALNTL6	62489262	62681183
3	25650000-25700000	5.45974	SYCE1L	25675996	25681658
3	25650000-25700000	5.45974	MON1B	25666657	25671458
3	39600000-39650000	5.15622	LAMTOR3	39617734	39628537
3	39600000-39650000	5.15622	DNAJB14	39578196	39607247
3	39600000-39650000	5.15622	DAPP1	39644056	39690466
3	44900000-44950000	5.30024	GRID2	44794591	45895007
3	44950000-45000000	5.59438	GRID2	44794591	45895007
3	45050000-45100000	5.68747	GRID2	44794591	45895007
3	45100000-45150000	5.63662	GRID2	44794591	45895007
3	45150000-45200000	5.26046	GRID2	44794591	45895007
3	45200000-45250000	5.89623	GRID2	44794591	45895007
3	45850000-45900000	5.09328	GRID2	44794591	45895007
3	50100000-50150000	5.17407	DMP1	50146395	50152805
3	89350000-89400000	5.92846	C4orf19	89397506	89402420
3	89350000-89400000	5.92846	RELL1	89324004	89367130
4	6150000-6200000	5.17238	CDHR3	6186918	6234732
5	30350000-30400000	6.26976	eca-mir-29c-2	30369007	30369094
5	44150000-44200000	5.04912	S100A12	44157872	44159412
5	98200000-98250000	5.20441	INADL	97978035	98261790
6	3850000-3900000	5.46432	U6	3883149	3883255
6	3850000-3900000	5.46432	SPAG16	3796222	4460726
6	74000000-74050000	5.67948	TIMELESS	74016170	74027809
6	74000000-74050000	5.67948	MIP	74039621	74043018
6	84150000-84200000	5.59724	CPSF6	84181612	84194476
7	69100000-69150000	5.2344	XRRA1	69105591	69159184
7	69100000-69150000	5.2344	SPCS2	69080473	69100266

7	89150000--89200000	5.75848	NELL1	88433704	89174004
8	34550000-34600000	5.41974	TXNDC2	34571990	34691966
8	34550000-34600000	5.41974	RAB31	34550671	34667158
8	34600000-34650000	5.17978	TXNDC2	34571990	34691966
8	34600000-34650000	5.17978	RAB31	34550671	34667158
8	80300000-80350000	5.73443	SERPINB8	80320350	80329754
8	90500000-90550000	5.30671	ZNF516	90542842	90611367
9	6150000-6200000	6.4953	SNX16	6171006	6205303
9	6300000-6350000	5.46072	IMPA1	6292748	6306961
9	6800000-6850000	5.37018	PAG1	6824382	6837911
9	16200000-16250000	5.2304	SULF1	16074405	16224037
9	66400000-66450000	5.54417	FER1L6	66308735	66423491
9	79800000-79850000	5.20337	PTK2	79818506	80002758
10	7250000-7300000	5.25597	COX7A1	7269471	7271181
10	7250000-7300000	5.25597	CAPNS1	7262426	7268651
10	7300000-7350000	5.2253	ZNF565	7307788	7339451
10	61400000-61450000	5.40652	LAMA4	61402132	61536414
10	61450000-61500000	5.1339	LAMA4	61402132	61536414
10	69850000-69900000	5.71679	SERINC1	69859908	69897651
10	69850000-69900000	5.71679	HSF2	69834195	69853354
10	73200000-73250000	5.99878	CENPW	73213328	73221110
14	39100000-39150000	5.34111	7SK	39120973	39121303
14	39100000-39150000	5.34111	SPOCK1	39058444	39358820
14	39850000-39900000	5.21437	TRPC7	39766718	39890007
14	41700000-41750000	5.07947	C5orf15	41739245	41752621
14	41700000-41750000	5.07947	VDAC1	41721444	41735701
14	47500000-47550000	5.26567	C5orf63	47506713	47511322
14	47650000-47700000	5.53935	LMNB1	47692226	47739561
14	47650000-47700000	5.53935	MARCH3	47635117	47670086
14	47700000-47750000	5.33336	LMNB1	47692226	47739561
14	84600000-84650000	5.09522	SSBP2	84400526	84608573
15	36450000-36500000	5.15836	SPRED2	36492830	36523750
15	75100000-75150000	5.2719	LAPTM4A	75114020	75130250
15	85900000-85950000	5.19836	RNF144A	85914791	85956240
16	12700000-12750000	5.96111	CRBN	12725357	12749878
16	12700000-12750000	5.96111	TRNT1	12724876	12768252
16	12750000-12800000	5.18303	TRNT1	12724876	12768252
16	12750000-12800000	5.18303	IL5RA	12787710	12817071
16	12800000-12850000	5.43263	CNTN4	12829317	13266006
16	12800000-12850000	5.43263	IL5RA	12787710	12817071
16	12850000-12900000	6.51972	CNTN4	12829317	13266006
16	13000000-13050000	5.2077	CNTN4	12829317	13266006
16	13050000-13100000	5.18385	CNTN4	12829317	13266006
16	13100000-13150000	6.66298	CNTN4	12829317	13266006
16	13150000-13200000	5.65654	CNTN4	12829317	13266006
16	14500000-14550000	6.09174	CNTN6	14278424	14573446
16	15150000-15200000	5.48224	CHL1	15165246	15247062
16	15200000-15250000	5.36809	CHL1	15165246	15247062
16	18900000-18950000	5.08297	FOXP1	18770909	19256184
17	21550000-21600000	5.2091	PHF11	21587654	21608810
17	21550000-21600000	5.2091	RCBTB1	21554166	21582916
17	21700000-21750000	5.25187	CAB39L	21719935	21817311
17	21800000-21850000	6.38355	CAB39L	21719935	21817311
17	21800000-21850000	6.38355	CDADC1	21840188	21887601
17	21850000-21900000	5.142	FNDC3A	21894149	21987908
17	21850000-21900000	5.142	CDADC1	21840188	21887601
17	22900000-22950000	5.81028	NUDT15	22928322	22937604

17	22900000-22950000	5.81028	MED4	22898988	22917936
17	24800000-24850000	5.29218	SIAH3	24802461	24871435
17	63950000-64000000	5.6257	U3	63966017	63966106
18	42500000-42550000	5.17347	GCG	42514001	42519890
18	42500000-42550000	5.17347	FAP	42541300	42613886
18	42600000-42650000	5.41773	FAP	42541300	42613886
18	42600000-42650000	5.41773	IFIH1	42641015	42693091
18	42700000-42750000	5.63498	GCA	42711787	42724685
18	42700000-42750000	5.63498	KCNH7	42736751	42903512
18	42750000-42800000	5.70166	KCNH7	42736751	42903512
18	42800000-42850000	5.88412	KCNH7	42736751	42903512
18	42850000-42900000	6.84833	KCNH7	42736751	42903512
18	55950000-56000000	5.07136	PDE11A	55879303	56265586
18	56650000-56700000	5.10757	PLEKHA3	56647504	56665871
18	56650000-56700000	5.10757	TTN	56684352	56950669
18	68200000-68250000	5.07252	TMEFF2	68182723	68408125
19	9600000-9650000	5.20187	MECOM	9611359	9672717
19	30200000-30250000	5.25779	HRASLS	30202826	30213052
19	30200000-30250000	5.25779	ATP13A5	30217310	30320365
19	30250000-30300000	5.06828	ATP13A5	30217310	30320365
19	36800000-36850000	6.14349	PARP15	36820276	36860670
21	4800000-4850000	5.15386	CCDC125	4800230	4835583
21	4800000-4850000	5.15386	CDK7	4823527	4862725
21	46200000-46250000	5.24347	DNAH5	45963018	46358179
21	46300000-46350000	5.38774	DNAH5	45963018	46358179
21	53900000-53950000	5.78185	DNAJA1	53922754	53924220
22	16600000-16650000	5.07233	BMP2	16421811	16700617
24	41900000-41950000	5.38119	EML1	41841755	41914666
26	39300000-39350000	5.15975	TRAPPC10	39295705	39369686
29	5700000-5750000	5.69076	EPC1	5698985	5730185
30	2850000-2900000	6.89461	EXO1	2830467	2869501
30	24950000-25000000	5.59626	ZBTB41	24919687	24956608
30	24950000-25000000	5.59626	CRB1	24999325	25195424
30	25000000-25050000	5.24008	CRB1	24999325	25195424
30	25100000-25150000	5.19162	CRB1	24999325	25195424
30	25150000-25200000	5.18014	CRB1	24999325	25195424
30	25550000-25600000	5.15655	LHX9	25548666	25565340
30	26250000-26300000	5.16313	PTPRC	26241146	26299185

Table S4: Genes overlapped with selective regions in Thoroughbreds compared to Jeju horses (XP-CLR)

Chr	Position	XP-CLR score	Gene Symbol	Gene Start	Gene End
1	126725612-126775612	20.676	DENND4A	126,684,369	126,758,683
			SLC24A1	126,764,822	126,790,389
1	136425612-136475612	17.440	UNC13C	136,245,628	136,766,038
1	15425612-15475612	20.051	HSPA12A	15,427,489	15,460,863
			C10orf82	15,467,311	15,472,418
1	15675612-15725612	21.056	CCDC172	15,685,508	15,747,853
1	157825612-157875612	18.287	METTL17	157,867,776	157,874,131
			SLC39A2	157,875,487	157,877,348
1	23525612-23575612	32.388	7SK	23,561,099	23,561,429
1	28325612-28375612	23.433	FBXW4	28,317,811	28,394,997
1	29725612-29775612	24.623	DNMBP	29,761,898	29,828,213
1	30725612-30775612	17.742	HPSE2	30,713,590	30,967,094
1	33225612-33275612	22.710	ENTPD1	33,272,430	33,319,727
1	42425612-42475612	18.250	PRKG1	42,400,353	42,839,102
1	46375612-46425612	17.195	ZWINT	46,418,493	46,421,253
1	50275612-50325612	21.304	RHOBTB1	50,306,440	50,343,205
1	58725612-58775612	17.403	ADAMTS14	58,710,202	58,792,012
1	76875612-76925612	19.575	SLC35F3	76,905,154	77,273,031
1	8525612-8575612	16.082	OAT	8,548,828	8,560,937
1	93425612-93475612	16.845	AP3S2	93,469,167	93,515,923
1	93675612-93725612	16.115	WDR93	93,656,285	93,697,469
			PEX11A	93,708,555	93,713,201
			PLIN1	93,717,373	93,726,793
2	34475100-34525100	24.222	MINOS1	34,444,953	34,475,724
2	46625100-46675100	18.185	PRDM16	46,652,454	46,701,985
2	75125100-75175100	22.628	RAPGEF2	75,147,690	75,312,625
2	75175100-75225100	19.246	RAPGEF2	75,147,690	75,312,625
2	75475100-75525100	23.743	C4orf45	75,480,525	75,527,216
3	114978116-115028116	18.841	SORCS2	114,992,496	115,473,178
3	2778116-2828116	21.565	ZNF423	2,577,934	2,838,642
3	69028116-69078116	16.749	EPHA5	68,911,940	69,237,154
4	100225018-100275018	19.843	CNTNAP2	99,376,000	100,675,021
4	16075018-16125018	16.251	ADCY1	16,102,379	16,243,343
4	16275018-16325018	16.490	IGFBP3	16,295,112	16,300,689
			IGFBP1	16,280,516	16,284,828
4	19725018-19775018	22.948	VWC2	19,717,223	19,825,574
4	24375018-24425018	22.024	SEC61G	24,372,218	24,380,086
4	26725018-26775018	18.858	CACNA2D1	26,623,297	27,110,715
			U6	26,758,240	26,758,346
4	36275018-36325018	21.925	FAM133B	36,291,522	36,312,750
4	37025018-37075018	17.461	CALCR	37,068,659	37,131,493
4	37375018-37425018	16.560	GNGT1	37,417,410	37,515,636
4	48075018-48125018	16.894	AGMO	47,940,706	48,126,316
4	69225018-69275018	21.775	LRRN3	69,069,584	69,264,494
4	74025018-74075018	16.820	ST7	74,038,076	74,295,387
5	14975139-15025139	18.237	IQCJ-SCHIP1	14,688,233	15,215,414
5	15175139-15225139	18.360	IQCJ-SCHIP1	14,688,233	15,215,414
5	51725139-51775139	15.823	MAN1A2	51,589,486	51,773,010
5	54975139-55025139	19.384	MAGI3	55,015,010	55,232,268
			PHTF1	54,958,358	55,004,256
5	56875139-56925139	15.720	ATP5F1	56,905,428	56,918,714
			C1orf162	56,885,158	56,885,977

			ADORA3	56,865,300	56,880,853
			WDR77	56,918,930	56,926,645
5	56925139-56975139	18.277	OVGP1	56,934,870	56,943,943
			PIFO	56,973,316	56,978,156
			WDR77	56,918,930	56,926,645
5	64325139-64375139	19.519	OLFM3	64,324,886	64,506,868
6	20925133-20975133	16.086	SNORD112	20,943,206	20,943,277
6	22075133-22125133	16.149	AGAP1	22,070,624	22,434,439
6	22325133-22375133	20.050	AGAP1	22,070,624	22,434,439
6	23575133-23625133	16.497	MLPH	23,607,273	23,652,480
			RAB17	23,613,902	23,685,934
6	31075133-31125133	28.473	TSPAN9	31,002,891	31,197,638
6	31375133-31425133	18.916	PRMT8	31,381,202	31,469,652
6	40525133-40575133	21.520	APOLD1	40,567,019	40,567,849
6	66425133-66475133	20.350	LALBA	66,475,022	66,477,097
6	69675133-69725133	19.995	KRT72	69,680,384	69,692,566
			KRT73	69,698,559	69,708,600
7	77575058-77625058	20.456	RIC3	77,606,947	77,665,883
			TUB	77,570,067	77,631,674
7	80325058-80375058	16.181	GALNT18	80,256,649	80,597,024
7	88525058-88575058	20.734	NELL1	88,433,704	89,174,004
8	10378197-10428197	21.297	MYO18B	10,181,087	10,411,809
8	18728197-18778197	20.721	RBM19	18,745,890	18,873,916
8	53428197-53478197	19.598	KLHL14	53,418,094	53,510,049
8	55078197-55128197	18.861	DTNA	55,074,654	55,330,726
8	70928197-70978197	24.395	DCC	70,765,480	71,472,757
8	85128197-85178197	20.633	DOK6	84,877,188	85,288,608
9	15975414-16025414	20.736	SLCO5A1	15,938,273	16,062,069
9	2025414-2075414	17.598	CNBD1	1,831,922	2,142,743
9	65725414-65775414	19.060	ZHX1	65,748,399	65,762,668
9	7075414-7125414	17.128	ZNF704	7,080,227	7,114,212
10	12225448-12275448	16.784	C19orf69	11,969,029	12,305,319
10	13825448-13875448	18.901	CD79A	13,823,300	13,826,489
			LYPD4	13,850,603	13,854,810
			DMRTC2	13,844,388	13,848,201
			RPS19	13,830,074	13,837,793
10	15875448-15925448	16.494	MARK4	15,852,069	15,876,746
			KLC3	15,900,600	15,905,546
			DACT3	15,688,161	16,899,653
			CKM	15,881,172	15,890,008
10	16375448-16425448	17.935	NOVA2	16,384,190	16,393,862
			DACT3	15,688,161	16,899,653
10	16775448-16825448	16.186	DACT3	15,688,161	16,899,653
10	39775448-39825448	33.871	HTR1E	39,801,452	39,870,896
10	68925448-68975448	16.134	TBC1D32	68,764,771	68,950,109
			U2	68,967,924	68,968,118
10	72925448-72975448	17.050	TRMT11	72,921,154	72,971,638
10	74425448-74475448	17.740	THEMIS	74,465,373	74,641,267
10	80775448-80825448	15.987	HBS1L	80,764,958	80,842,492
10	81525448-81575448	16.061	PDE7B	81,476,052	81,765,672
10	81625448-81675448	17.651	PDE7B	81,476,052	81,765,672
11	24775090-24825090	16.196	TTLL6	24,774,459	24,812,864
			CALCOCO2	24,821,372	24,844,044
11	275090-325090	29.455	TBCD	297,524	482,406
			B3GNTL1	165,925	288,330
11	2775090-2825090	19.073	EIF4A3	2,814,986	2,828,951
			CARD14	2,772,943	2,798,639

11	3025090-3075090	20.446	CBX4	3,063,802	3,064,803
12	12675087-12725087	16.106	OR8K5	12,681,826	12,682,767
12	29575087-29625087	20.333	SHANK2	29,316,173	29,799,539
12	32125087-32175087	26.965	DUSP8	31,534,226	32,674,266
			MUC6	32,129,549	32,141,574
13	20826251-20876251	16.075	NSMCE1	20,871,434	20,899,516
13	23476251-23526251	17.501	PRKCB	23,368,966	23,672,898
13	25876251-25926251	25.804	UQCRC2	25,858,966	25,881,655
13	27026251-27076251	31.604	GP2	27,028,368	27,042,804
14	2275407-2325407	16.063	GFPT2	2,252,113	2,280,346
14	2275407-2325407	16.063	MAPK9	2,303,318	2,346,926
14	42475407-42525407	16.087	FSTL4	42,281,900	42,481,829
14	71825407-71875407	16.276	LNPEP	71,808,888	71,895,463
15	10425122-10475122	19.674	KIAA1211L	10,460,246	10,516,120
15	17625122-17675122	16.689	FABP1	17,645,656	17,655,539
			SMYD1	17,668,603	17,708,719
15	28075122-28125122	16.953	TACR1	27,972,112	28,122,537
15	4025122-4075122	16.142	NCK2	4,066,301	4,112,284
15	68275122-68325122	15.731	BRE	68,075,291	68,495,845
16	11025589-11075589	18.938	ARL8B	11,046,061	11,087,247
			EDEM1	11,011,208	11,035,979
16	39325589-39375589	17.635	ELP6	39,370,138	39,380,115
16	6675589-6725589	18.943	SEC13	6,667,915	6,693,504
			GHRL	6,704,413	6,709,418
16	67675589-67725589	17.425	CPNE4	67,434,752	67,979,351
16	87275589-87325589	16.377	GMPS	87,269,128	87,305,934
17	21475591-21525591	25.682	EBPL	21,469,751	21,476,860
			ARL11	21,504,968	21,505,495
17	35075591-35125591	16.605	DIAPH3	35,062,159	35,497,994
17	35325591-35375591	22.145	DIAPH3	35,062,159	35,497,994
17	69425591-69475591	17.470	PCCA	69,097,619	69,492,947
18	31275498-31325498	15.964	EPC2	31,175,313	31,305,229
18	3175498-3225498	19.919	MYO7B	3,154,614	3,221,832
18	41675498-41725498	19.863	TANK	41,680,821	41,756,857
18	42275498-42325498	19.221	SLC4A10	42,072,060	42,346,581
18	48325498-48375498	17.284	CERS6	48,176,453	48,465,399
18	51175498-51225498	17.457	METAP1D	51,182,790	51,253,663
18	53025498-53075498	18.063	OLA1	52,895,533	53,062,128
18	68375498-68425498	19.964	TMEFF2	68,182,723	68,408,125
18	74625498-74675498	15.843	FTCDNL1	74,664,313	74,697,642
19	10275538-10325538	16.171	LRRC31	10,281,706	10,310,009
			LRRIQ4	10,269,951	10,279,498
19	26425538-26475538	18.994	LPP	26,156,935	26,575,534
19	27175538-27225538	18.109	TP63	27,207,319	27,428,546
19	36775538-36825538	17.779	PARP14	36,754,148	36,795,593
			PARP15	36,820,276	36,860,670
19	38025538-38075538	16.656	STXBP5L	37,827,844	38,176,937
19	45275538-45325538	16.449	EEF1A1	45,277,340	45,278,728
20	16425065-16475065	16.720	CAP2	16,381,199	16,511,216
20	23725065-23775065	17.512	SLC17A1	23,713,124	23,741,030
			SLC17A3	23,767,516	23,814,310
20	24675065-24725065	38.572	ABT1	24,705,444	24,707,109
20	28875065-28925065	18.226	TRIM10	28,904,045	28,910,889
			TRIM40	28,886,521	28,897,617
			TRIM15	28,913,189	28,919,167
20	32575065-32625065	16.463	BTNL2	32,624,134	32,635,273
20	36225065-36275065	20.169	PNPLA1	36,247,031	36,284,176

20	40675065-40725065	17.008	NCR2	40,702,448	40,718,695
20	55275065-55325065	19.748	KHDRBS2	55,166,761	55,674,261
20	60525065-60575065	26.040	BAI3	60,514,643	61,156,448
21	2325625-2375625	19.455	MVB12A	2,374,359	2,377,643
			BST2	2,362,120	2,362,368
			PLVAP	2,339,197	2,346,592
21	44325625-44375625	21.672	MARCH11	44,250,022	44,356,382
21	46125625-46175625	18.588	DNAH5	45,963,018	46,358,179
22	17875778-17925778	19.311	PROKR2	17,891,663	17,897,674
22	19275778-19325778	16.789	ATRN	19,279,380	19,328,716
22	20325778-20375778	49.233	TGM3	20,308,216	20,347,901
22	29225778-29275778	16.142	DHX35	29,084,472	29,249,586
23	5178476-5228476	16.068	NTRK2	5,103,223	5,441,937
23	54328476-54378476	26.961	BARX1	54,329,182	54,329,843
23	678476-728476	15.982	ZNF510	678,829	683,407
24	11575650-11625650	20.921	SPTB	11,524,261	11,583,792
24	13675650-13725650	16.752	EIF2S1	13,678,234	13,692,660
			PLEK2	13,695,923	13,714,379
24	32525650-32575650	17.201	7SK	32,564,588	32,564,827
24	35575650-35625650	22.517	RIN3	35,536,972	35,801,389
25	21425066-21475066	23.462	ASTN2	20,887,845	21,589,955
25	28825066-28875066	16.623	GOLGA1	28,825,836	28,868,824
25	34575066-34625066	20.731	NTNG2	34,590,566	34,664,747
26	30886161-30936161	16.939	KCNE2	30,892,092	30,898,292
			C21orf140	30,924,353	30,925,084
			SMIM11	30,910,646	30,910,822
27	38475354-38525354	16.883	ARHGEF10	38,491,515	38,576,907
28	14275118-14325118	20.069	C12orf50	14,271,518	14,306,876
			C12orf29	14,310,367	14,321,768
			CEP290	14,322,732	14,409,061
28	24625118-24675118	17.134	GAS2L3	24,616,666	24,642,118
29	10575088-10625088	19.078	MYO3A	10,537,654	10,735,234
29	14525088-14575088	17.817	MLLT10	14,171,706	14,672,770
29	18125088-18175088	19.009	ST8SIA6	18,027,487	18,145,292
29	21825088-21875088	23.268	7SK	21,845,014	21,845,301
29	21825088-21875088	23.268	CCDC3	21,769,233	21,847,581
29	28325088-28375088	19.942	CALML3	28,371,632	28,372,081
30	16277987-16327987	21.691	USH2A	15,772,313	16,515,816
30	20977987-21027987	22.942	RGS21	21,002,828	21,020,497
30	27527987-27577987	33.585	SCARNA4	27,527,953	27,528,082
30	4027987-4077987	17.060	FMN2	4,027,214	4,369,602
30	4627987-4677987	23.725	KIF26B	4,577,169	5,068,285
31	175501-225501	22.875	ZDHHC14	93,019	371,433
31	4375501-4425501	15.743	PACRG	4,229,872	4,689,096

Table S5: Gene ontology terms (72) of genes related to selective regions in Thoroughbreds

Category	Gene Ontology Term	p-value(FDR)	# Genes	Genes
Neuron recognition	neuron recognition	4.9 E-2	3	*[CNTN4, CNTNAP2, NELL1]*
Central nervous system neuron development	response to auditory stimulus	2.8 E-2	3	*[CNTNAP2, NTRK2, TACR1]*
	learning	3.7 E-2	7	*[CNTNAP2, EIF4A3, NTRK2, SHANK2, SORCS3, TACR1, VDAC1]*
	cellular response to nerve growth factor stimulus	4.9 E-2	3	*[EIF4A3, NTRK2, RAPGEF2]*
	long-term memory	4.2 E-2	3	*[ADCY1, NTRK2, TACR1]*
	cellular response to brain-derived neurotrophic factor stimulus	2.3 E-2	2	*[EIF4A3, NTRK2]*
	central nervous system neuron development	1.9 E-2	6	*[DCC, NELL1, NTRK2, PTK2, RAPGEF2, SLC4A10]*
	brain-derived neurotrophic factor receptor signaling pathway	2.3 E-2	2	*[NTRK2, RAPGEF2]*
Regulation of synapse assembly	regulation of synapse organization	3.1 E-2	6	*[ADGRB3, GHRL, LRRN3, NTRK2, PTK2, RAB17]*
	synapse assembly	2.9 E-2	7	*[ADGRB3, GHRL, LRRN3, NTRK2, PTK2, RAB17, SHANK2]*
	regulation of synapse assembly	1.9 E-2	6	*[ADGRB3, GHRL, LRRN3, NTRK2, PTK2, RAB17]*
	positive regulation of synapse assembly	4.4 E-2	4	*[ADGRB3, GHRL, LRRN3, NTRK2]*
	neuron migration	2.2 E-2	8	*[CHL1, DCC, NELL1, NTRK2, PRKG1, PTK2, RAPGEF2, SPOCK1]*
	dendrite development	2.7 E-2	9	*[ADGRB3, DCC, GHRL, NCK2, NELL1, NTRK2, PRKG1, RAB17, RAPGEF2]*
	central nervous system neuron development	1.9 E-2	6	*[DCC, NELL1, NTRK2, PTK2, RAPGEF2, SLC4A10]*
Neuron migration	cellular response to nerve growth factor stimulus	4.9 E-2	3	*[EIF4A3, NTRK2, RAPGEF2]*

	neuron migration	2.2 E-2	8	*[CHL1, DCC, NELL 1, NTRK2, PRKG1, PTK2, RAPGEF2, SP OCK1]*
	negative regulation of cell morphogene sis involved in diff erentiation	4.4 E-2	6	*[DACT3, DCC, MBL 2, NELL1, PTK2, RA PGEF2]*
	central nervous sys tem neuron differe ntiation	2.4 E-2	9	*[ABT1, DCC, GRID 2, NELL1, NTRK2, P TK2, RAPGEF2, SLC 4A10, SPOCK1]*
	dendrite developme nt	2.7 E-2	9	*[ADGRB3, DCC, GH RL, NCK2, NELL1, NTRK2, PRKG1, RA B17, RAPGEF2]*
	central nervous sys tem neuron develo pment	1.9 E-2	6	*[DCC, NELL1, NTRK 2, PTK2, RAPGEF2, SLC4A10]*
	brain-derived neuro trophic factor receptor sign aling pathway	2.3 E-2	2	*[NTRK2, RAPGEF2]*
Exploration behavior	exploration behavio r	1.7 E-2	4	*[CHL1, EIF4A3, SHA NK2, SLC4A10]*
PERK-mediated unfold ed protein response	response to unfold ed protein	4.5 E-2	7	*[DNAJA1, EDEM1, E IF2S1, IGFBP1, NCK 2, PACRG, SEC61G]*
	cellular response to unfolded protein	4.6 E-2	6	*[EDEM1, EIF2S1, IG FBP1, NCK2, PACR G, SEC61G]*
	PERK-mediated un folded protein response	2.2 E-2	3	*[EIF2S1, IGFBP1, N CK2]*
Protein demannosylatio n	oligosaccharide met abolic process	4.6 E-2	4	*[EDEM1, LALBA, M AN1A2, ST8SIA6]*
	protein demannosyl ation	2.7 E-2	2	*[EDEM1, MAN1A2]*
	protein alpha-1,2-demannos ylation	2.7 E-2	2	*[EDEM1, MAN1A2]*
Endothelial cell activati on	endothelial cell act ivation	3.6 E-2	2	*[APOLD1, FOXP1]*
Sodium-dependent phos phate transport	phosphate ion trans membrane transport	4.6 E-2	2	*[SLC17A1, SLC17A3]*
	sodium-dependent phosphate transport	3.6 E-2	2	*[SLC17A1, SLC17A3]*
Photoreceptor cell deve lopment	photoreceptor cell development	1.3 E-2	5	*[CEP290, CRB1, GN GT1, NTRK2, OLFM 3]*
	photoreceptor cell differentiation	2.4 E-2	5	*[CEP290, CRB1, GN GT1, NTRK2, OLFM 3]*
	eye photoreceptor cell	1.7 E-2	5	*[CEP290, CRB1, GN GT1, NTRK2, OLFM*

	differentiation			*3]*
	eye photoreceptor cell development	1.7 E-2	5	*[CEP290, CRB1, GNGT1, NTRK2, OLFM3]*
Regulation of insulin-like growth factorreceptor signaling pathway	regulation of insulin-like growth factor receptor signaling pathway	2.8 E-2	3	*[BMP2, IGFBP1, IGFBP3]*
	insulin-like growth factor receptor signaling pathway	4.9 E-2	3	*[BMP2, IGFBP1, IGFBP3]*
cAMP metabolic process	activation of adenylate cyclase activity	2.3 E-2	4	*[CALCR, CAP2, NTRK2, SERPINB8]*
	positive regulation of cyclase activity	4.4 E-2	4	*[CALCR, CAP2, NTRK2, SERPINB8]*
	positive regulation of lyase activity	4.4 E-2	4	*[CALCR, CAP2, NTRK2, SERPINB8]*
	cyclic nucleotide metabolic process	2.6 E-2	9	*[ADCY1, CALCR, CAP2, CEP290, HTR1E, NTRK2, PDE11A, PDE7B, SERPINB8]*
	cAMP metabolic process	1.8 E-2	9	*[ADCY1, CALCR, CAP2, CEP290, HTR1E, NTRK2, PDE11A, PDE7B, SERPINB8]*
	regulation of cAMP metabolic process	4.9 E-2	6	*[CALCR, CAP2, CEP290, HTR1E, NTRK2, SERPINB8]*
	positive regulation of adenylate cyclase activity	2.7 E-2	4	*[CALCR, CAP2, NTRK2, SERPINB8]*
Signal complex assembly	signal complex assembly	3.1 E-2	2	*[NCK2, PTK2]*
L-proline biosynthetic process	proline metabolic process	4.1 E-2	2	*[ALDH18A1, OAT]*
	proline biosynthetic process	2.7 E-2	2	*[ALDH18A1, OAT]*
	L-proline biosynthetic process	2.3 E-2	2	*[ALDH18A1, OAT]*
Smooth muscle contraction involved in micturition	digestive system process	2.7 E-2	6	*[FABP1, GHRL, KCNMA1, MUC6, PNLIP, TACR1]*
	micturition	3.6 E-2	2	*[KCNMA1, TACR1]*
	mineralocorticoid metabolic process	4.6 E-2	2	*[BMP2, KCNMA1]*
	relaxation of smooth muscle	3.6 E-2	2	*[KCNMA1, PRKG1]*
	aldosterone metabolic process	3.6 E-2	2	*[BMP2, KCNMA1]*
	saliva secretion	4.6 E-2	2	*[KCNMA1, TACR1]*
	urinary tract smooth muscle contraction	3.1 E-2	2	*[KCNMA1, TACR1]*
	regulation of aldost	2.7 E-2	2	*[BMP2, KCNMA1]*

	erone metabolic process			
	smooth muscle contraction involved in micturition	2.3 E-2	2	*[KCNMA1, TACR1]*
	urinary bladder smooth muscle contraction	3.1 E-2	2	*[KCNMA1, TACR1]*
	relaxation of vascular smooth muscle	2.9 E-2	2	*[KCNMA1, PRKG1]*
Prostatic bud formation	prostate glandular acinus development	4.4 E-2	2	*[TP63, WDR77]*
	lateral sprouting from an epithelium	4.4 E-2	2	*[SULF1, TP63]*
	prostatic bud formation	3.1 E-2	2	*[SULF1, TP63]*
Otic vesicle formation	otic vesicle formation	4.1 E-2	2	*[CEP290, NELL1]*
	otic vesicle morphogenesis	4.9 E-2	2	*[CEP290, NELL1]*
Positive regulation of protein binding	positive regulation of protein binding	2.8 E-2	5	*[BMP2, CRBN, NELL1, RAPGEF2, TANK]*
	positive regulation of protein homodimerization activity	3.6 E-2	2	*[CRBN, TANK]*
Brown fat cell differentiation	brown fat cell differentiation	1.5 E-2	5	*[LAMA4, MECOM, PEX11A, PRDM16, ZNF516]*
	regulation of brown fat cell differentiation	4.4 E-2	2	*[MECOM, PRDM16]*
	positive regulation of brown fat cell differentiation	2.7 E-2	2	*[MECOM, PRDM16]*
Regulation of intracellular transport of viral material	regulation of intracellular transport of viral material	1.2 E-2	2	*[BST2, TRIM15]*
	negative regulation of intracellular transport of viral material	1.2 E-2	2	*[BST2, TRIM15]*

Table S6: KEGG pathway analysis of genes related to selective regions in Thoroughbreds

Term	Genes	P-Value	Fold Enrichment
GnRH signaling pathway	ADCY1, CALML3, MAPK9, PRKCB	0.0581	4.416
Vascular smooth muscle contraction	ADCY1, CALML3, PRKG1, PRKCB	0.0798	3.864
MAPK signaling pathway	CACNA2D1, NTRK2, MAPK9, RAPGEF2, DUSP8, PRKCB	0.0914	2.431

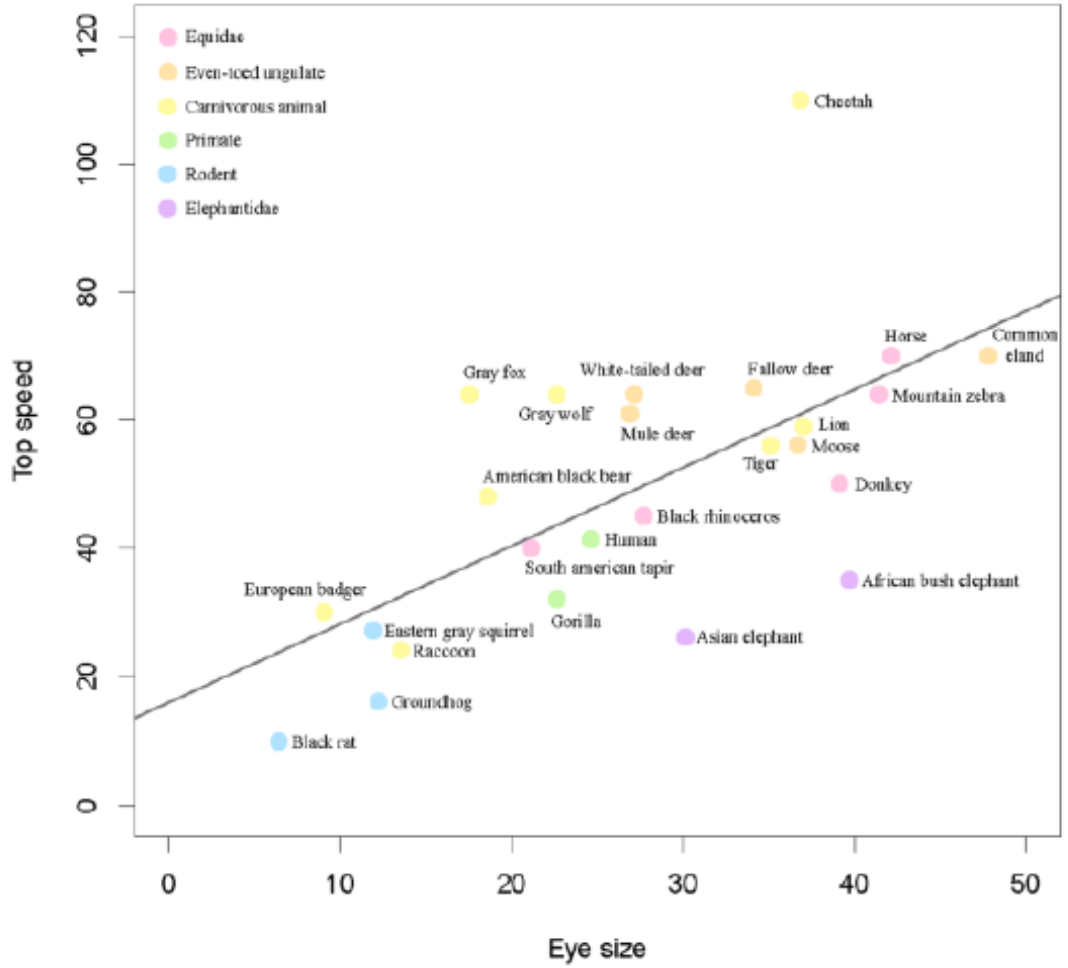

Figure S1. Relationship between eye size and maximum speed in diverse mammals

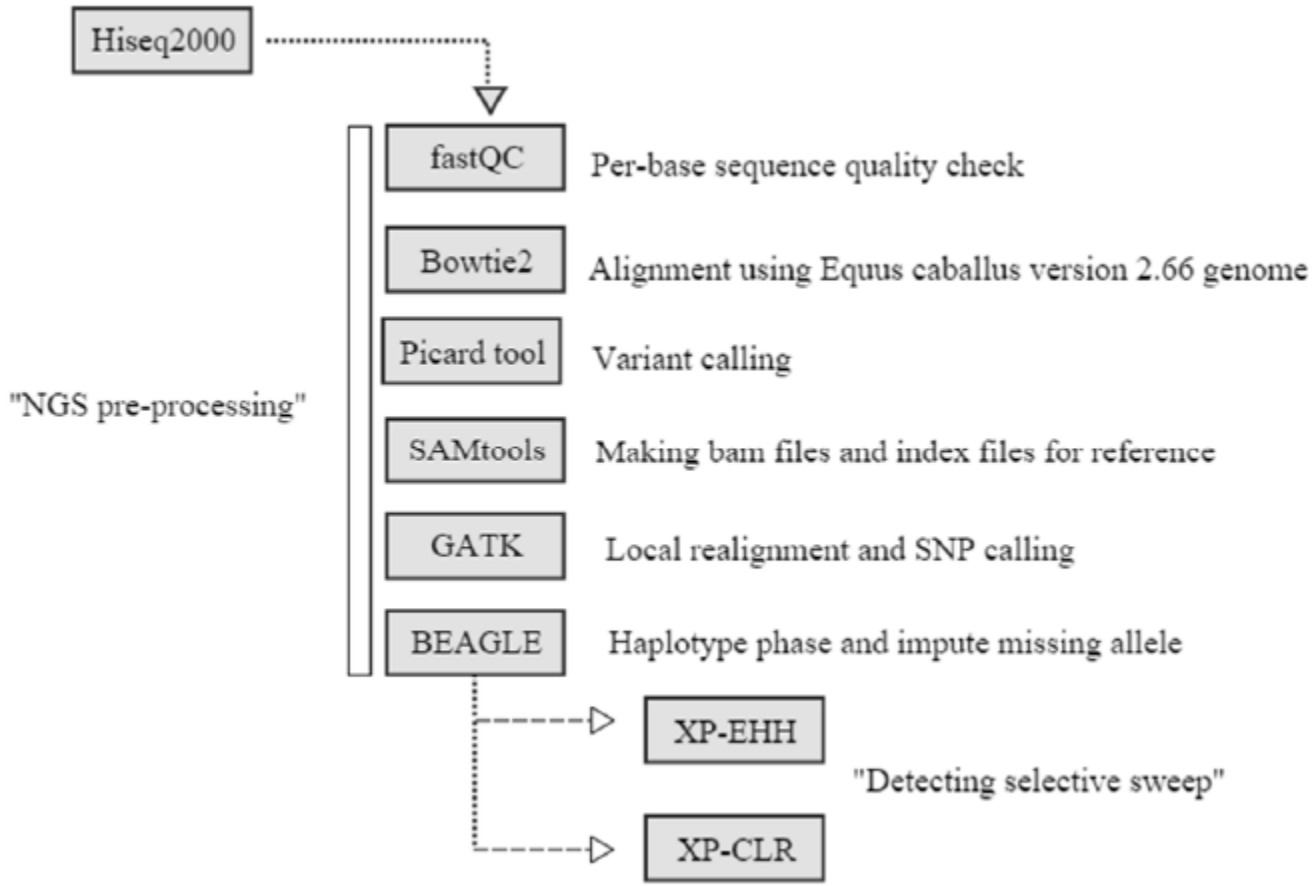

Figure S2. The scheme of analysis

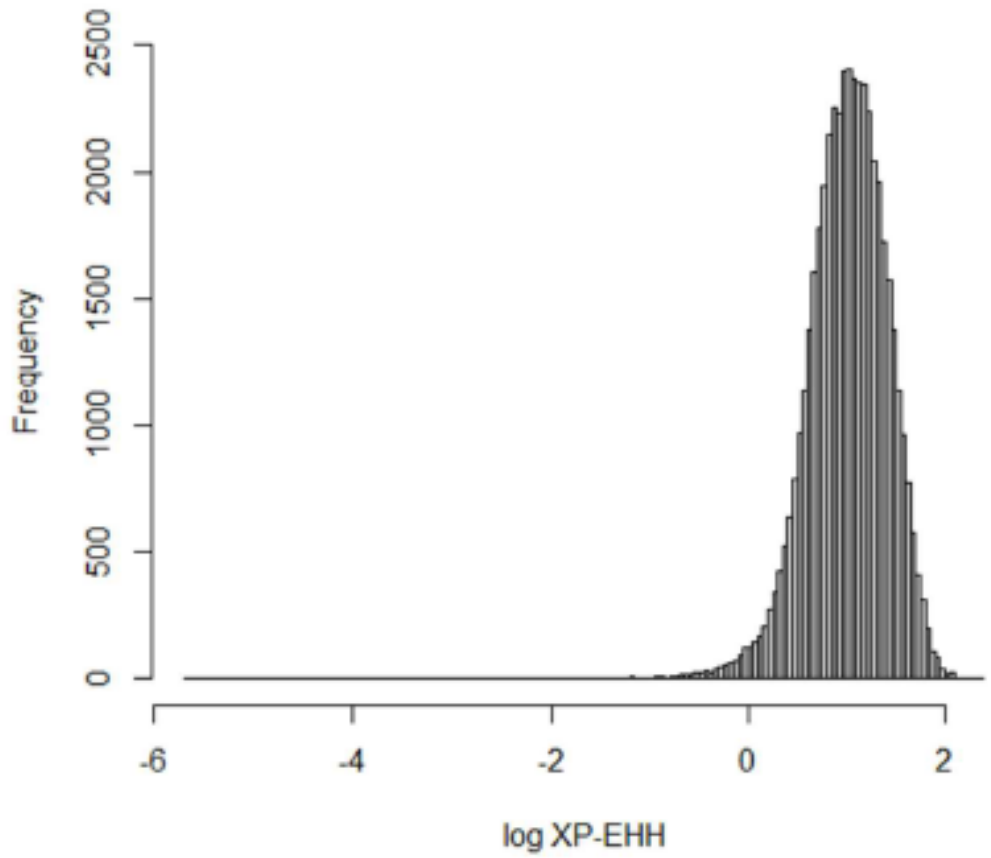

Figure S3. XP-EHH score distribution in Thoroughbreds compared to Jeju horses

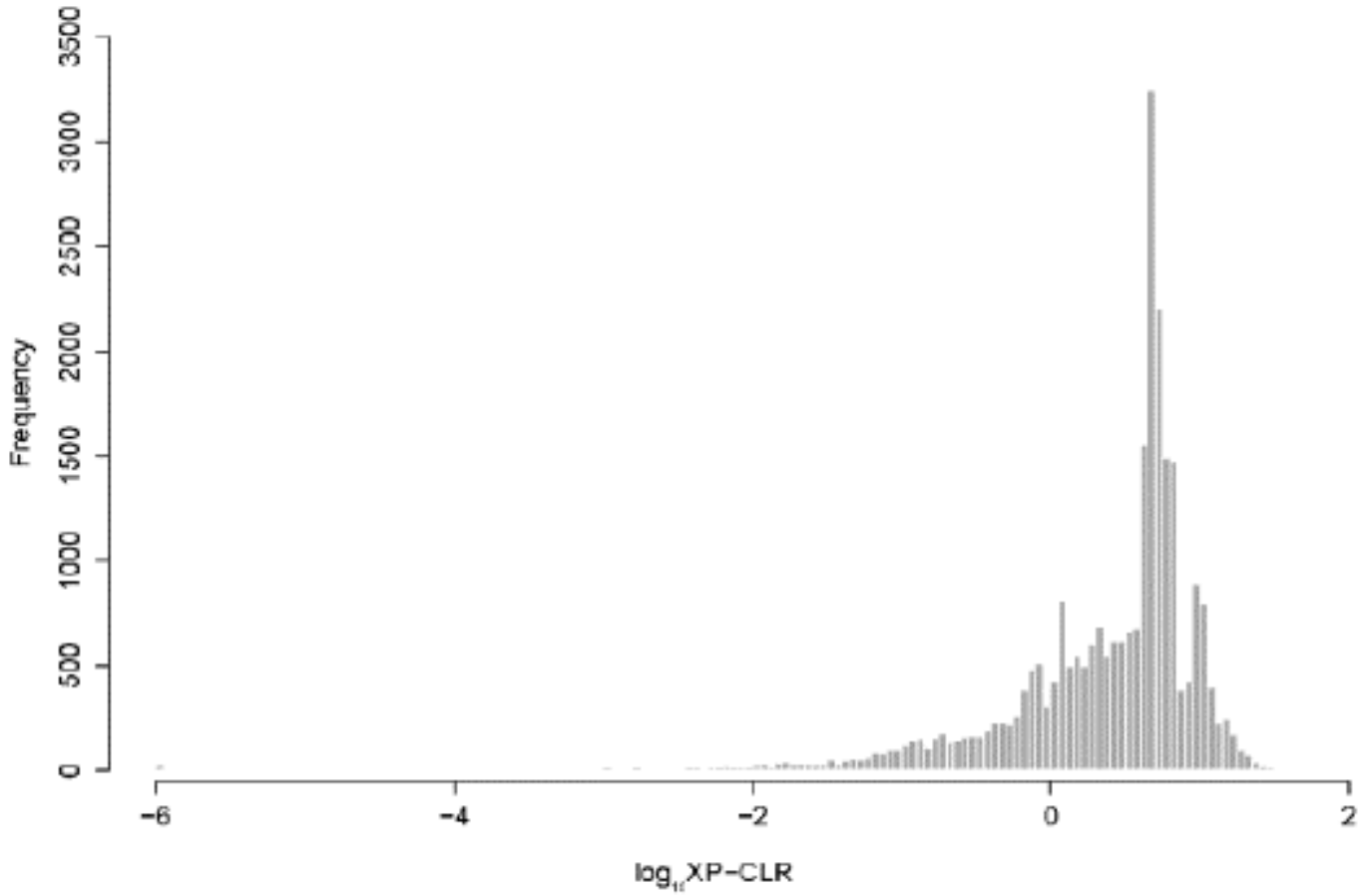

Figure S4. XP-CLR score distribution in Thoroughbreds compared to Jeju horses