

Supplemental Data

FOXP2 Targets Show Evidence

of Positive Selection in European Populations

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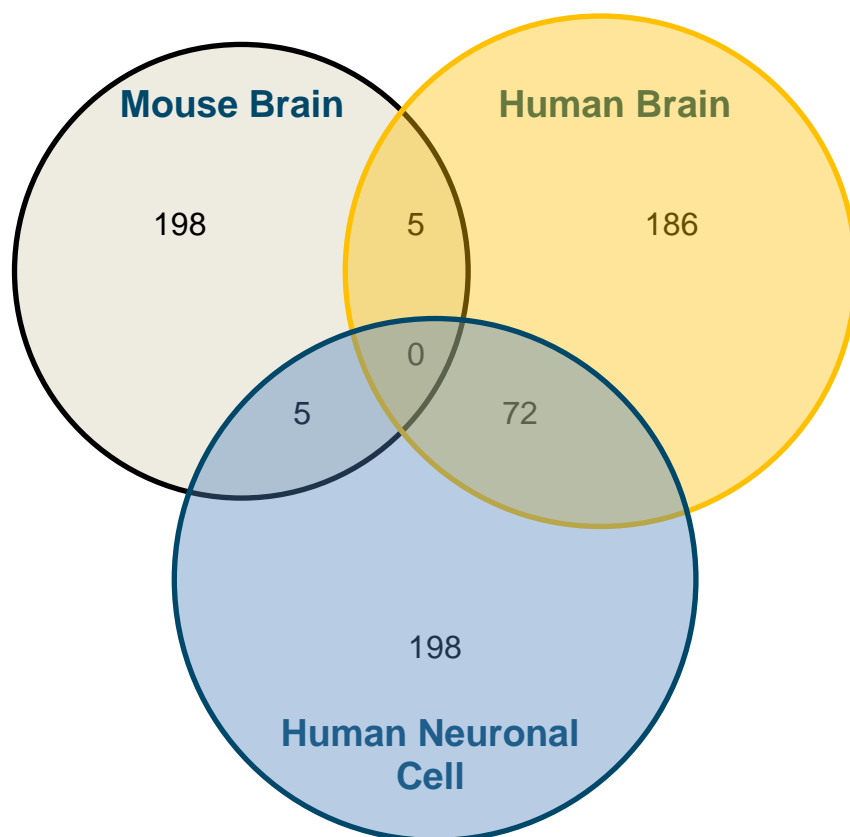
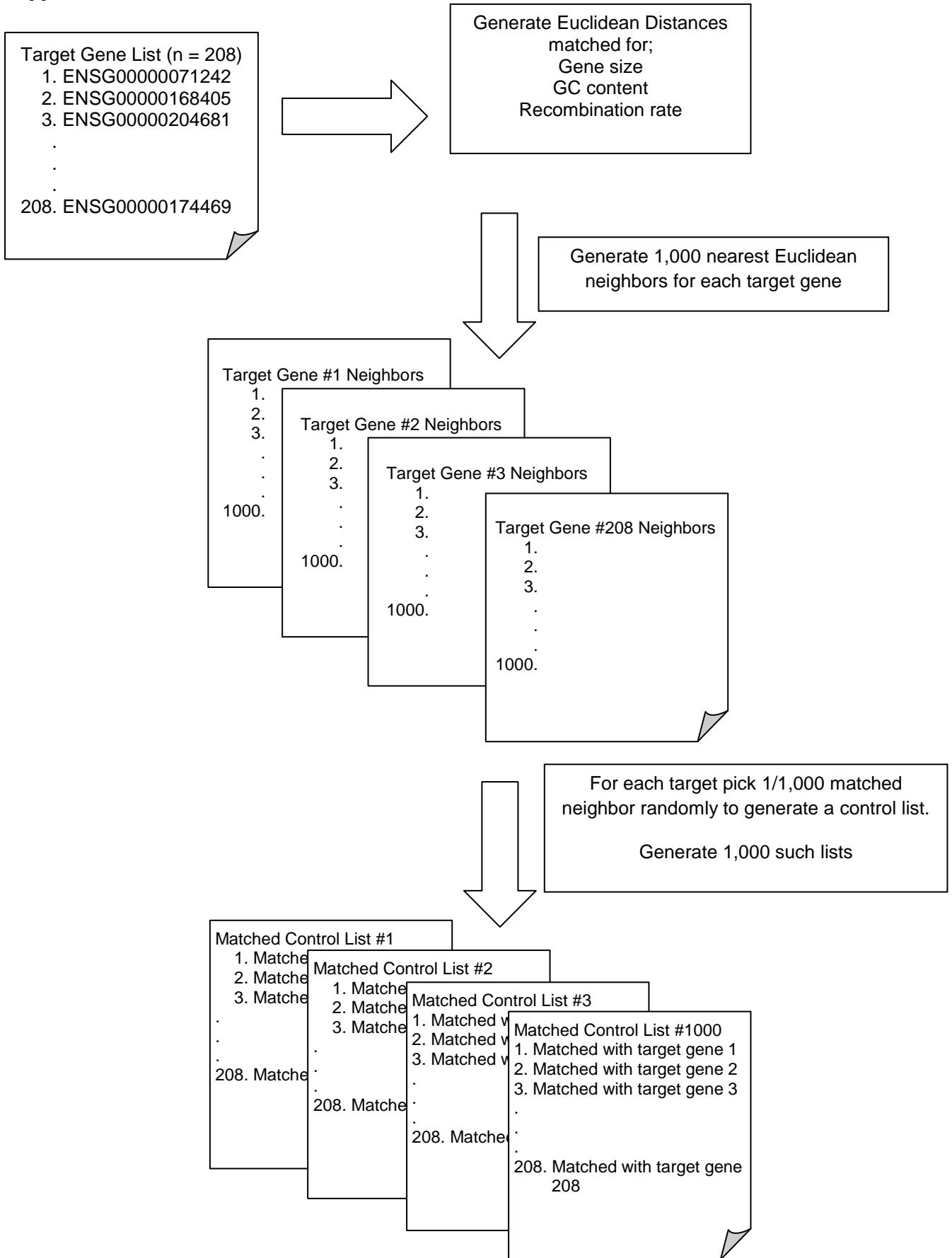


Figure S1. Overlap of FOXP2 Targets

FOXP2 targets were identified in three separate chromatin immunoprecipitation genomic screens.

A



B

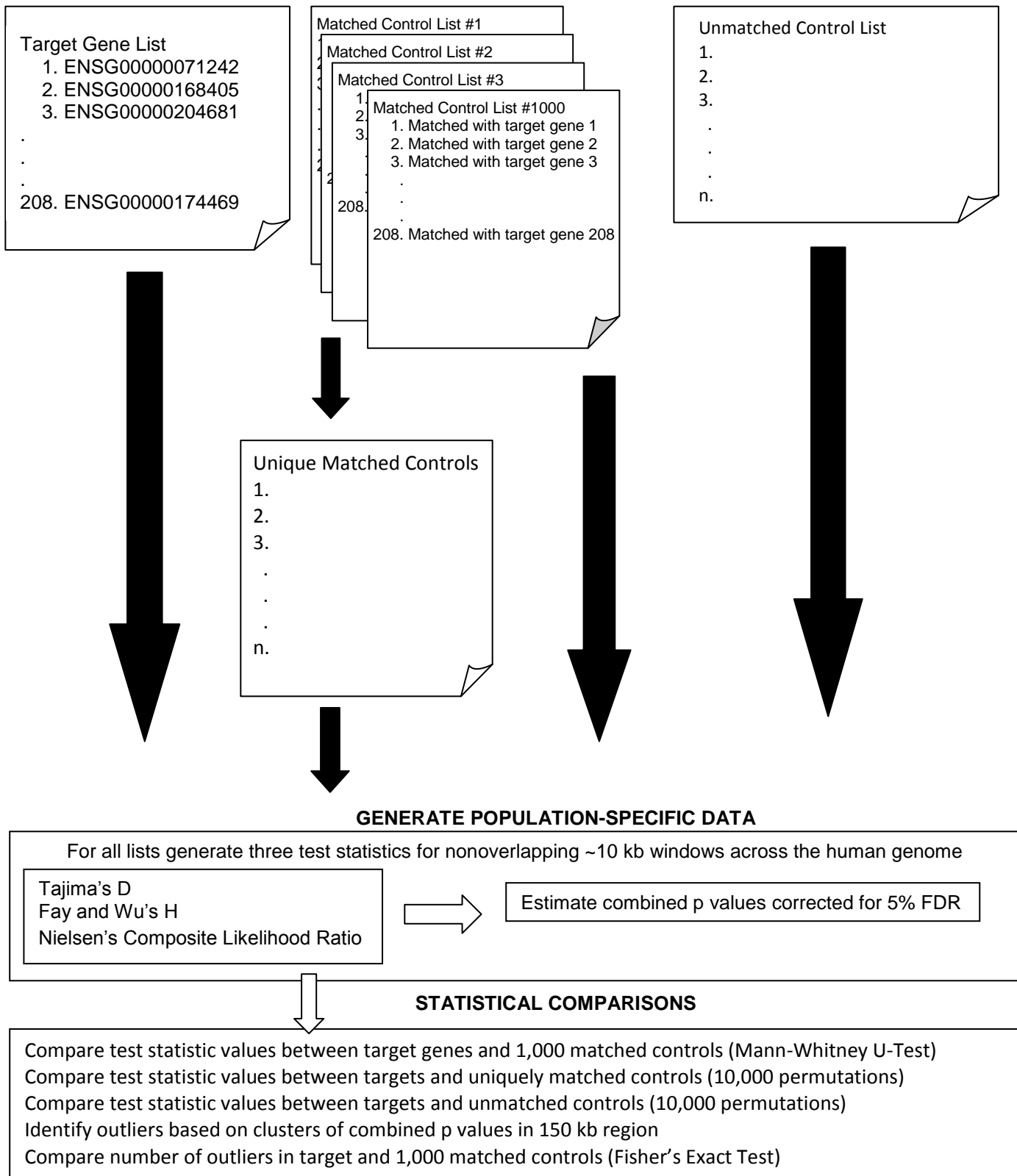
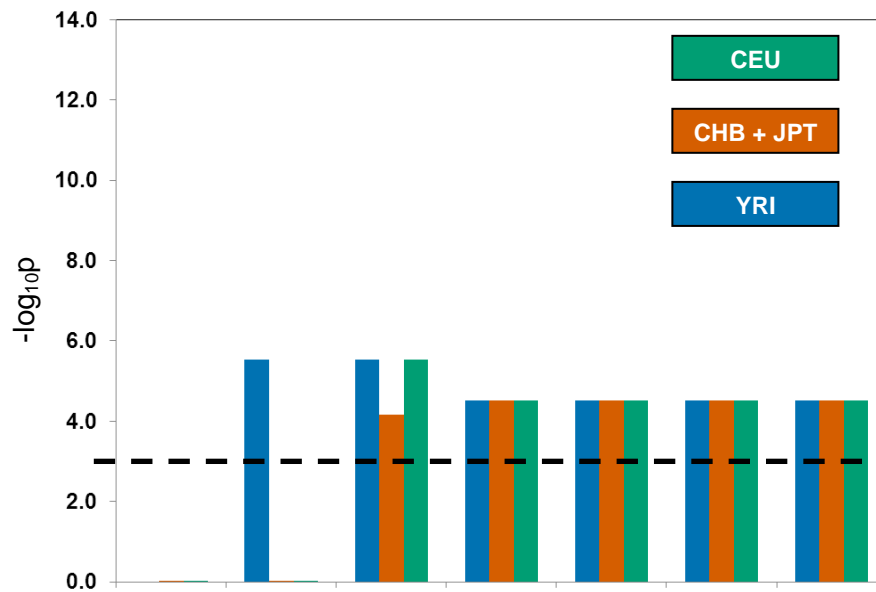
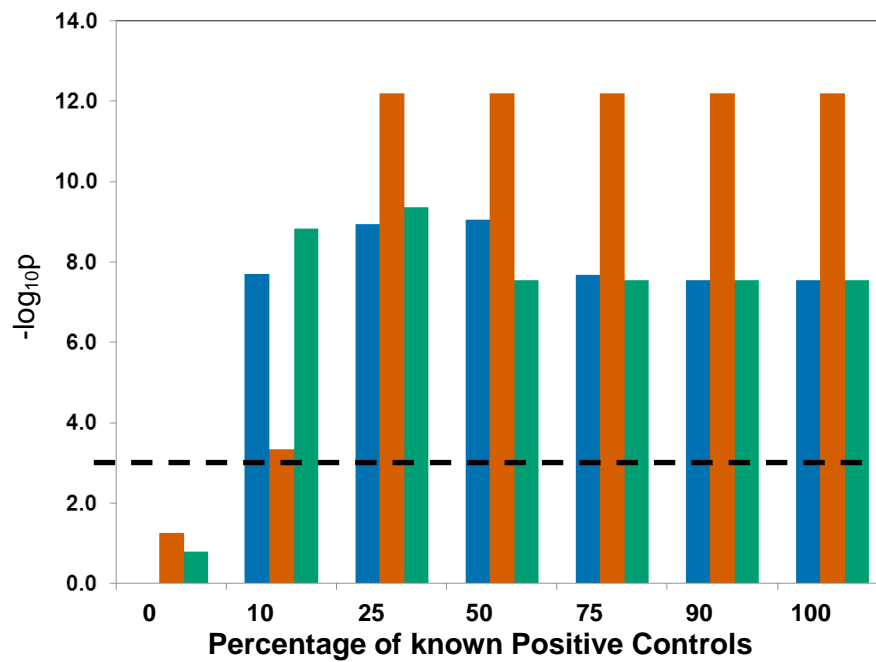


Figure 2. Schema of the Analyses Pipeline

(A) Generation of control lists for putative target list of 208 genes.

(B) Data generation and statistical analyses.

A**B****Figure S3. Sensitivity of the Pipeline**

Sensitivity was tested by varying proportion of known positively selected genes identified by frequency spectrum based tests in 1000 Genomes Project (A) Mann Whitney U and (B) Permutation test comparisons. The dashed horizontal line depicts the threshold of the $-\log_{10}p$ value for multiple comparisons.

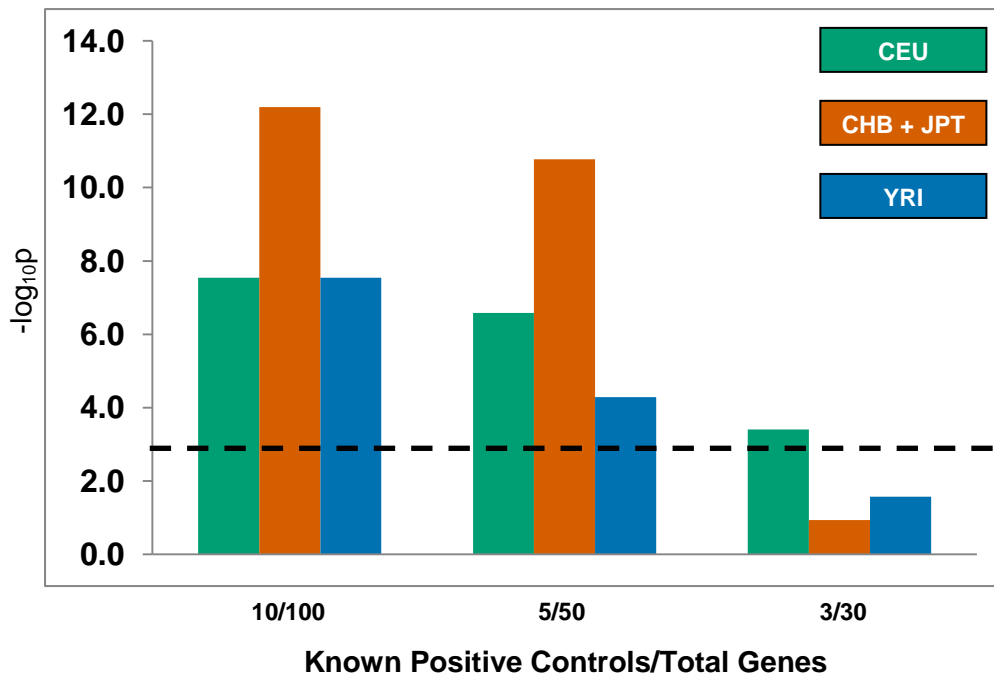


Figure S4. Detection of Signals in Lists Containing 100, 50, and 30 Genes

The method was able to detect a signal when at least 10% of the genes in a list under investigation are under selection. Gene lists containing 100, 50, and 30 genes with 10, 5, and 3 known positives were analysed. A selection signal was detected in all populations for the 100 and 50 gene sets but only in CEU for the 30 gene set. Permutation test comparisons are shown and the dashed horizontal line represents the threshold of the $-\log_{10}p$ value for multiple comparisons.

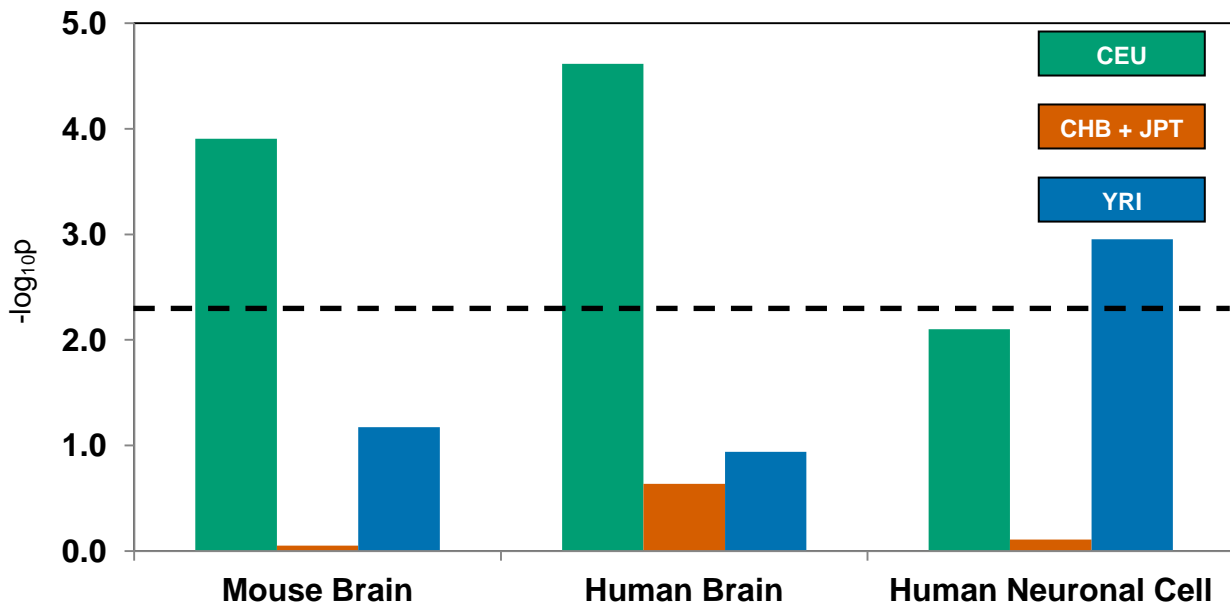


Figure S5. Evidence of Positive Selection in FOXP2 Targets from Three Separate Chromatin Immunoprecipitation Genomic Screens Using a Ranking Strategy

FOXP2 targets identified by ChIP in mouse and human brain are enriched with positive selection in CEU. The dashed horizontal line depicts the threshold of the $-\log_{10}p$ value for multiple comparisons after applying the Bonferroni correction.

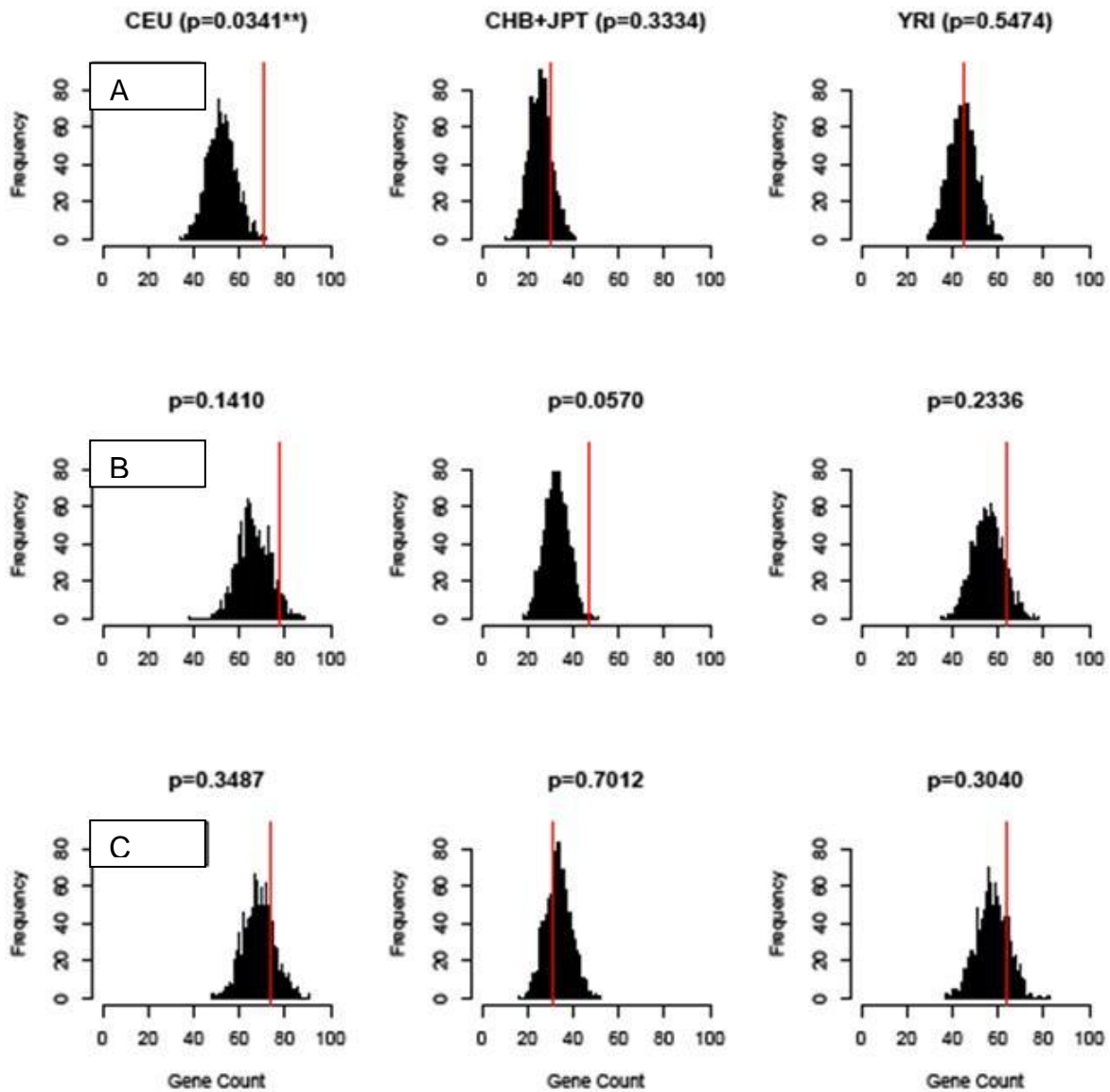


Figure S6. Number of FOXP2 Targets that Are Significant Outliers in the CEU, CHB + JPT, and YRI Populations

Mouse brain (A), human brain (B), and human neuronal cell (C). Comparison shows the number of 150 kb regions with at least two significant ~10 kb windows in FOXP2 targets (vertical red lines) with the distribution of such regions in 1,000 matched control lists.

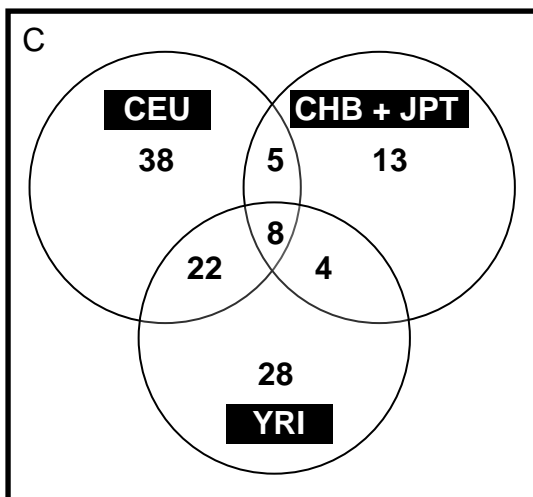
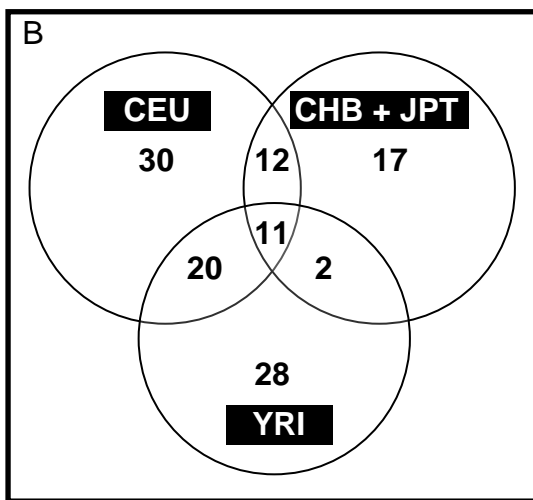
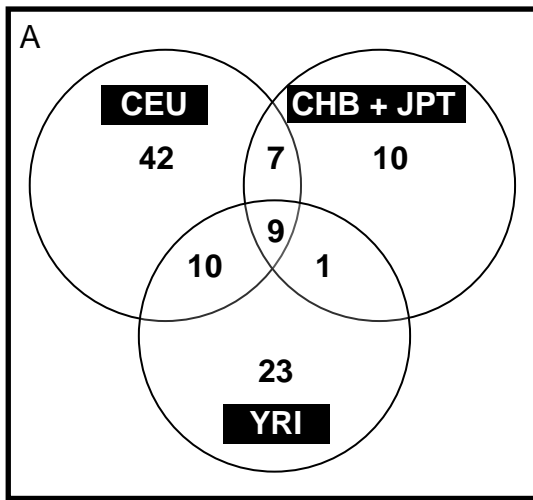
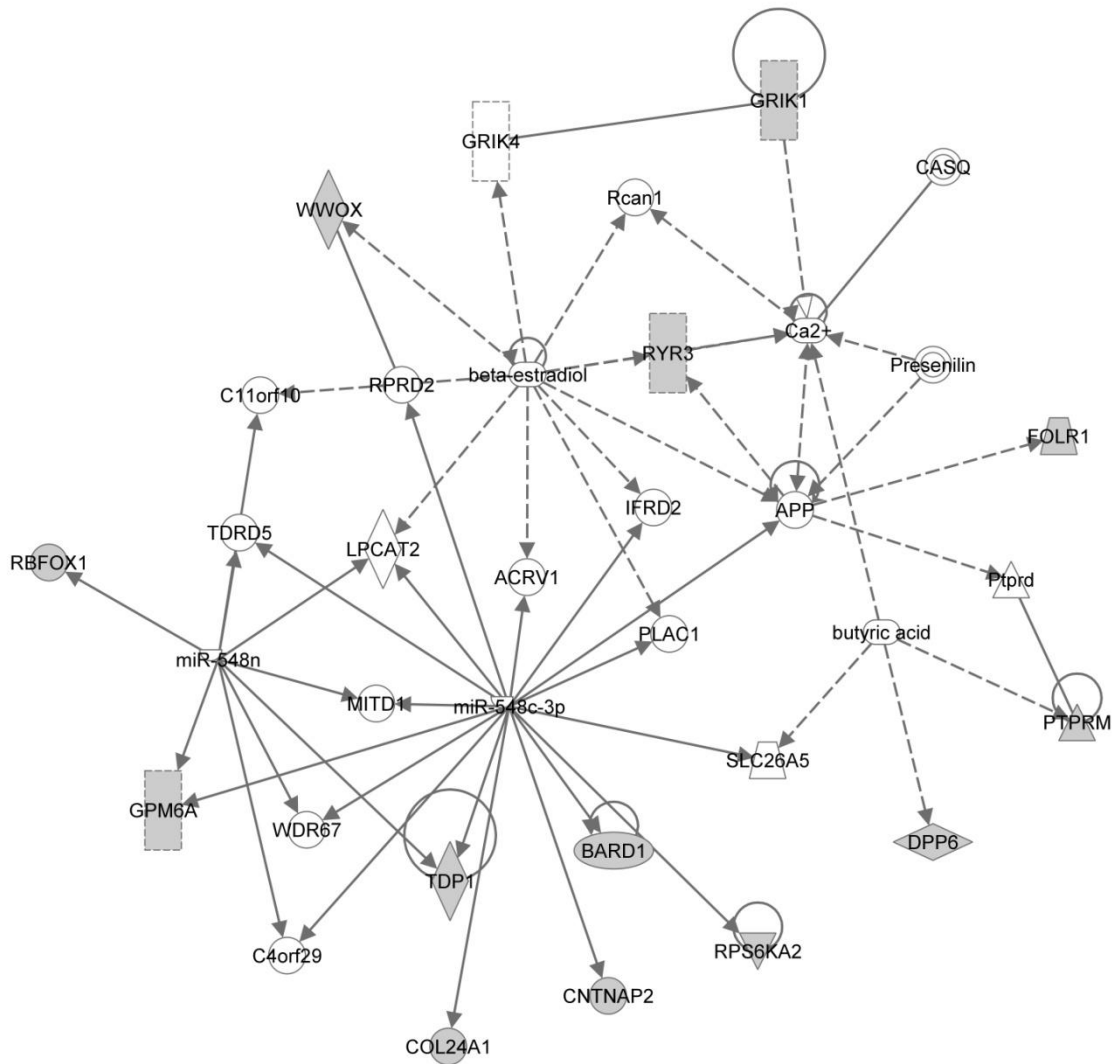


Figure S7. Venn Diagram Showing Distribution of FOXP2 Targets that Are Significant Outliers in the CEU, CHB + JPT, and YRI Populations

Mouse brain (A), human brain (B), and human neuronal cell (C).



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Figure S8. Ingenuity Pathway Analysis

Network shows FDXP2 targets (grey boxes) selected in CEU that are associated with cardiac arteriopathy.

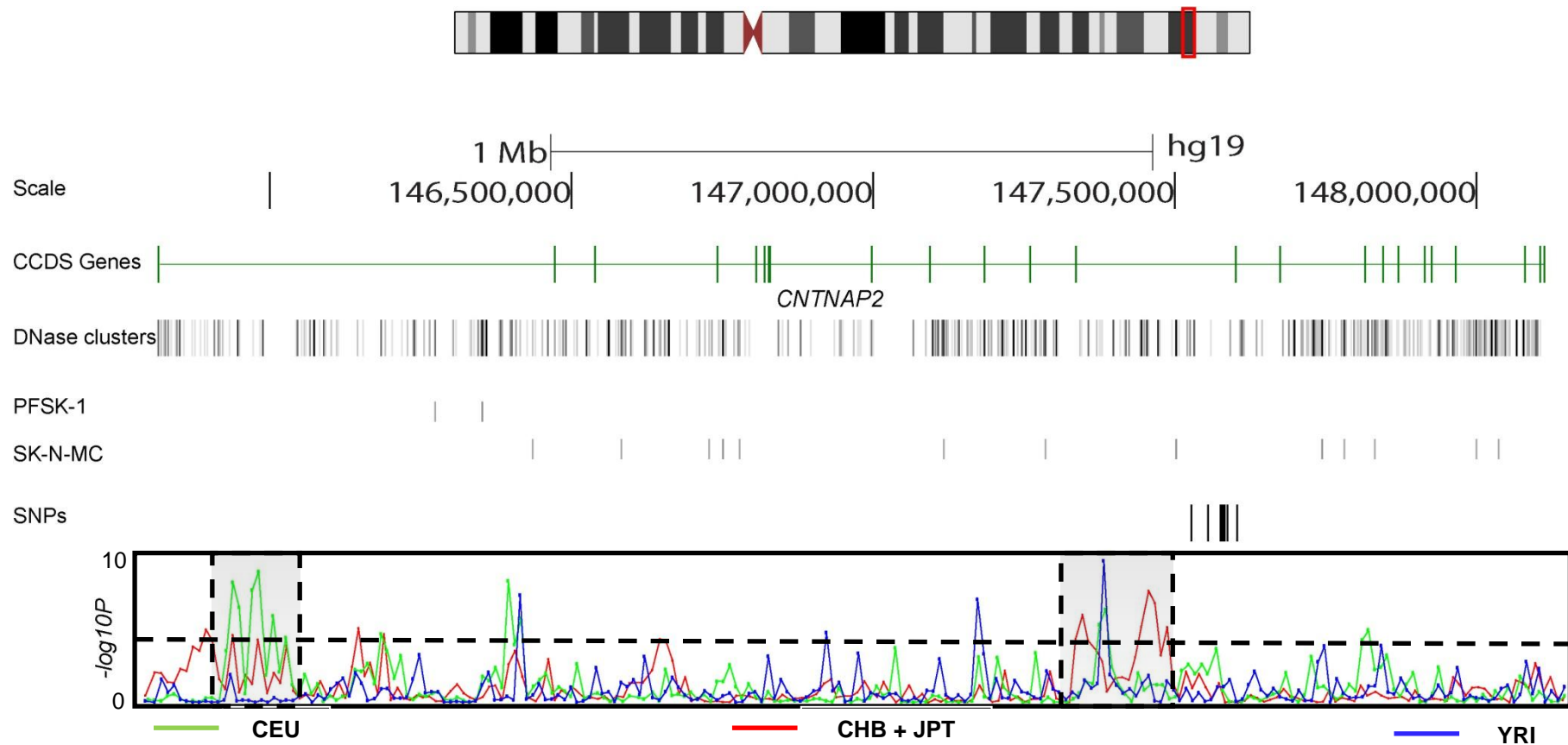


Figure S9. Selection Signals in a 2 Mb Region on Chromosome 7 that Harbors the *CNTNAP2* Gene

The first track shows the *CNTNAP2* gene with its exonic and intronic boundaries (CCDS). The next three tracks show region of open chromatin and FOXP2 binding sites based on ChIP-Seq in two neural cell lines; PFSK-1 and SK-N-MC. FOXP2 binding sites are represented by vertical lines in these two tracks. The SNPs track displays variants that form a risk haplotype associated with language deficits in SLI4 (Specific Language Impairment 4; OMIM# 612514). The combined p value track was generated from the separate probabilities of Tajima's D, Fay and Wu's H and CLR and the threshold represented by the dashed line, incorporates the 5% FDR for each population. Peaks above the threshold in the graph represent regions (shaded areas) that are enriched with positive selection. The window on left shows a selected region in CEU. The one on the right is selected in all populations. Variants associated with the risk haplotype lie to the right of the second window.

Table S1A. Comparison of Sequence Coverage (per Base/Gene/Individual) between FOXP2 Targets and Matched Controls in CEU, CHB + JPT, and YRI

	CEU	CHB + JPT	YRI
Mouse brain	0.1078	0.1528	0.9397
Human brain	0.2724	0.3506	0.3046
Human neuronal cell	0.0925	0.2412	0.1209

Sequence coverage across three sets of FOXP2 target genes and controls in each population were compared using the two-sample Kolmogorov-Smirnov test. Test p values for each population comparisons are shown.

Table S1B. Tajima's D and Y Estimates for Nonoverlapping 10 kb Windows on Chromosome 11 Are Positively Correlated

	CEU	CHB + JPT	YRI
Windows	12446	12224	12601
Y estimate mean (range)	0.4563 (-2.61 – +4.01)	0.8430 (-2.58 – +3.96)	0.4563 (-2.25 – +3.15)
Tajima's D mean (range)	0.7041 (-2.32 – +4.62)	1.3123 (-2.17 – +4.73)	0.4563 (-2.05 – +4.00)
Spearman's correlation	0.957*	0.976*	0.971*

*p value < 0.0001.

Table S2. Summary Statistics of Frequency-Spectrum-Based Neutrality Tests in Control Gene Sets

A

Number (n) of Genes	Pop	Permutation Test p Values (Unmatched Control List)			
		Combined p Value	CLR	Tajima's D	Fay and Wu's H
Positive controls 7 or more (n = 166)	CEU	1.4×10^{-10}	0.0001	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	CHB+JPT	1.7×10^{-11}	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	YRI	0.9311	0.9289	0.5150	0.9824
Positive controls 8 or more (n = 67)	CEU	10.0×10^{-8}	0.3777	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	CHB+JPT	1.7×10^{-11}	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	YRI	0.3842	0.7086	0.0875	0.6710
Positive controls 9 (n = 31)	CEU	6.8×10^{-5}	0.4752	8.0×10^{-4}	0.0015
	CHB+JPT	1.7×10^{-11}	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	YRI	0.5202	0.8738	0.0865	0.9894
Positive controls Common (n = 11)	CEU	2.6×10^{-9}	0.0071	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	CHB+JPT	1.7×10^{-11}	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$	$< 3.2 \times 10^{-5}$
	YRI	1.5×10^{-5}	0.0847	$< 3.2 \times 10^{-5}$	0.0376

B

Number (n) of Genes	Pop	Permutation Test p Values (Unmatched Control List)			
		Combined p Value	CLR	Tajima's D	Fay and Wu's H
Negative Controls (n = 166)	CEU	0.8374	0.0768	0.8158	0.9945
	CHB+JPT	0.2685	0.2172	0.2400	0.1190
	YRI	0.0540	0.3024	0.0107	0.3175
Negative Controls (n = 67)	CEU	0.7111	0.4016	0.9153	0.4181
	CHB+JPT	0.7237	0.4636	0.9888	0.3514
	YRI	0.8472	0.6859	1.0000	0.3808
Negative Controls (n = 31)	CEU	0.4312	0.3556	0.9959	0.1457
	CHB+JPT	0.0015	0.0716	0.9707	0.0003
	YRI	0.5460	0.3658	1.0000	0.2263
Negative Controls (n = 11)	CEU	0.0306	0.1733	0.9995	0.0055
	CHB+JPT	0.2749	0.8288	1.0000	0.0282
	YRI	0.0018	0.0048	0.9996	0.0055

Permutation test p values for the composite likelihood ratio (CLR), Tajima's D, and Fay and Wu's H test statistics and their combined p values. Significant differences below the threshold for multiple comparisons, using a Bonferroni correction, are highlighted in black.

(A) Positively selected genes lay in regions identified as being under selection in ≥ 7 , ≥ 8 , or 9 genome-wide scans² or a smaller dataset of 11 genes that were shared between studies.^{2,15,26}

(B) Negative control gene lists excluded 2,601 protein-coding genes reported to be under positive selection in the literature. Gene sets of equivalent size were compared with the remaining protein-coding genes using permutation tests.

Table S3. Summary Statistics of Frequency-Spectrum-Based Neutrality Tests for FOXP2 Target Gene Sets

Populations	Mouse Brain (Vernes et al. 2011)											
	Mann-Whitney U-Test (Matched)				Permutation Test (Unique Matched)				Permutation Test (Unmatched)			
	Combined p value	CLR	D	H	Combined p value	CLR	D	H	Combined p value	CLR	D	H
CEU	0.2756	1.0000	1.5×10^{-7}	0.3814	0.0001	0.0334	0.0387	0.0010	0.0054	0.0548	0.2260	0.0083
CHB+JPT	1.0000	1.0000	1.0000	1.0000	0.8643	0.7257	0.9498	0.4081	0.9928	0.7371	1.0000	0.9226
YRI	1.0000	1.0000	0.9998	1.0000	0.0728	0.0550	0.3864	0.1460	0.6752	0.3255	0.8667	0.4771
Populations	Human Foetal Forebrain (Spiteri et al. 2007)											
	Mann-Whitney U-Test (Matched)				Permutation Test (Unique Matched)				Permutation Test (Unmatched)			
	Combined p value	CLR	D	H	Combined p value	CLR	D	H	Combined p value	CLR	D	H
CEU	3.9×10^{-12}	0.9944	2.2×10^{-16}	2.2×10^{-16}	7.1×10^{-5}	0.0221	0.8440	3.2×10^{-5}	0.0007	0.0023	0.5109	0.0070
CHB+JPT	1.0000	1.0000	1.0000	0.0084	0.2162	0.2480	1.0000	0.0632	0.9476	0.5161	1.0000	0.8415
YRI	1.0000	2.2×10^{-16}	0.2444	1.0000	0.1214	0.0186	0.5558	0.6269	0.1027	0.0116	0.4762	0.9181
Populations	Human Neuronal Cell Line (Vernes et al. 2007)											
	Mann-Whitney U-Test (Matched)				Permutation Test (Unique Matched)				Permutation Test (Unmatched)			
	Combined p value	CLR	D	H	Combined p value	CLR	D	H	Combined p value	CLR	D	H
CEU	1.0000	0.9975	0.9990	1.0000	0.0076	0.0403	0.9592	0.0041	0.5756	0.1712	0.9640	0.5622
CHB+JPT	1.0000	1.0000	0.7358	1.0000	0.7728	0.5955	0.9992	0.3260	1.0000	0.9772	0.9933	0.9994
YRI	5.9×10^{-16}	2.2×10^{-16}	3.9×10^{-12}	1.0000	0.0015	0.0121	0.8782	0.0014	0.1669	0.0375	0.9135	0.3052

Nonparametric comparisons of the composite likelihood ratio (CLR), Tajima's D (D), and Fay and Wu's H (H) values between FOXP2 targets identified in three different studies and matched and un-matched control gene sets. For the Mann-Whitney U Test the number of comparisons (out of 1,000) in which the ranked test statistics were significantly different from expectation ($\alpha = 0.05$) were estimated by the Fisher's Exact Test. Significant p values below the cut-off for multiple comparisons are highlighted in black (i.e. < 0.0056 with the Bonferroni correction).

Table S4. FOXP2 Targets Enriched with Positive Selection

Ensembl Gene ID	MIM Number	Gene	Description	Study	Populations
ENSG00000078328	605104	<i>RBFOX1</i>	RNA binding protein, fox-1 homolog (C. elegans) 1	Spiteri et al. 2007; Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000105854	602447	<i>PON2</i>	paraoxonase 2	Spiteri et al. 2007; Vernes et al. 2011	CEU
ENSG00000047617	610109	<i>ANO2</i>	anoctamin 2	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000071242	601685	<i>RPS6KA2</i>	ribosomal protein S6 kinase, 90kDa, polypeptide 2	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000078668	610029	<i>VDAC3</i>	voltage-dependent anion channel 3	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000106397	603066	<i>PLOD3</i>	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000130226	126141	<i>DPP6</i>	dipeptidyl-peptidase 6	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000130382	159556	<i>MLLT1</i>	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 1	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000168405	Not available	<i>CMAH</i>	cytidine monophosphate-N-acetylneuraminic acid hydroxylase (CMP-N-acetylneuraminate monooxygenase) pseudogene	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000173482	176888	<i>PTPRM</i>	protein tyrosine phosphatase, receptor type, M	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000186153	605131	<i>WWOX</i>	WW domain containing oxidoreductase	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000204681	603540	<i>GABBR1</i>	gamma-aminobutyric acid (GABA) B receptor, 1	Spiteri et al. 2007	CEU, CHB+JPT, YRI
ENSG00000072840	604831	<i>EVC</i>	Ellis van Creveld syndrome	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000081870	Not available	<i>HSPB11</i>	heat shock protein family B (small), member 11	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000100360	Not available	<i>IFT27</i>	intraflagellar transport 27 homolog (Chlamydomonas)	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000101188	162651	<i>NTSR1</i>	neurotensin receptor 1 (high affinity)	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000120686	610553	<i>UFM1</i>	ubiquitin-fold modifier 1	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000127412	606679	<i>TRPV5</i>	transient receptor potential cation channel, subfamily V, member 5	Spiteri et al. 2007	CEU, CHB+JPT

ENSG00000131051	604739	<i>RBM39</i>	RNA binding motif protein 39	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000134716	601258	<i>CYP2J2</i>	cytochrome P450, family 2, subfamily J, polypeptide 2	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000151790	Not available	<i>TDO2</i>	tryptophan 2,3-dioxygenase	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000171033	606059	<i>PKIA</i>	protein kinase (cAMP-dependent, catalytic) inhibitor alpha	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000178913	600573	<i>TAF7</i>	TAF7 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 55kDa	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000198838	180903	<i>RYR3</i>	ryanodine receptor 3	Spiteri et al. 2007	CEU, CHB+JPT
ENSG00000008083	601594	<i>JARID2</i>	jumonji, AT rich interactive domain 2	Spiteri et al. 2007	CEU, YRI
ENSG00000034152	602315	<i>MAP2K3</i>	mitogen-activated protein kinase kinase 3	Spiteri et al. 2007	CEU, YRI
ENSG00000042980	606188	<i>ADAM28</i>	ADAM metallopeptidase domain 28	Spiteri et al. 2007	CEU, YRI
ENSG00000080493	603345	<i>SLC4A4</i>	solute carrier family 4, sodium bicarbonate cotransporter, member 4	Spiteri et al. 2007	CEU, YRI
ENSG00000081041	139110	<i>CXCL2</i>	chemokine (C-X-C motif) ligand 2	Spiteri et al. 2007	CEU, YRI
ENSG00000118762	173910	<i>PKD2</i>	polycystic kidney disease 2 (autosomal dominant)	Spiteri et al. 2007	CEU, YRI
ENSG00000120915	132811	<i>EPHX2</i>	epoxide hydrolase 2, cytoplasmic	Spiteri et al. 2007	CEU, YRI
ENSG00000126602	606219	<i>TRAP1</i>	TNF receptor-associated protein 1	Spiteri et al. 2007	CEU, YRI
ENSG00000131015	Not available	<i>ULBP2</i>	UL16 binding protein 2	Spiteri et al. 2007	CEU, YRI
ENSG00000134812	609342	<i>GIF</i>	gastric intrinsic factor (vitamin B synthesis)	Spiteri et al. 2007	CEU, YRI
ENSG00000136250	102593	<i>AOAH</i>	acyloxyacyl hydrolase (neutrophil)	Spiteri et al. 2007	CEU, YRI
ENSG00000138653	Not available	<i>NDST4</i>	N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 4	Spiteri et al. 2007	CEU, YRI
ENSG00000144791	604543	<i>LIMD1</i>	LIM domains containing 1	Spiteri et al. 2007	CEU, YRI
ENSG00000163394	Not available	<i>CCKAR</i>	cholecystokinin A receptor	Spiteri et al. 2007	CEU, YRI
ENSG00000163655	600358	<i>GMPS</i>	guanine monphosphate synthetase	Spiteri et al. 2007	CEU, YRI

ENSG00000171189	138245	<i>GRIK1</i>	glutamate receptor, ionotropic, kainate 1	Spiteri et al. 2007	CEU, YRI
ENSG00000173762	186820	<i>CD7</i>	CD7 molecule	Spiteri et al. 2007	CEU, YRI
ENSG00000182165	Not available	<i>TP53TG1</i>	TP53 target 1 (non-protein coding)	Spiteri et al. 2007	CEU, YRI
ENSG00000204628	176981	<i>GNB2L1</i>	guanine nucleotide binding protein (G protein), beta polypeptide 2-like 1	Spiteri et al. 2007	CEU, YRI
ENSG00000217555	Not available	<i>CKLF</i>	chemokine-like factor	Spiteri et al. 2007	CEU, YRI
ENSG00000000938	164940	<i>FGR</i>	Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog	Spiteri et al. 2007	CEU
ENSG00000023892	610094	<i>DEF6</i>	differentially expressed in FDCP 6 homolog (mouse)	Spiteri et al. 2007	CEU
ENSG00000073008	173850	<i>PVR</i>	poliovirus receptor	Spiteri et al. 2007	CEU
ENSG00000079308	600076	<i>TNS1</i>	tensin 1	Spiteri et al. 2007	CEU
ENSG00000092969	190220	<i>TGFB2</i>	transforming growth factor, beta 2	Spiteri et al. 2007	CEU
ENSG00000103326	603267	<i>SOLH</i>	small optic lobes homolog (Drosophila)	Spiteri et al. 2007	CEU
ENSG00000104321	604775	<i>TRPA1</i>	transient receptor potential cation channel, subfamily A, member 1	Spiteri et al. 2007	CEU
ENSG00000106105	600287	<i>GARS</i>	glycyl-tRNA synthetase	Spiteri et al. 2007	CEU
ENSG00000106245	603477	<i>BUD31</i>	BUD31 homolog (S. cerevisiae)	Spiteri et al. 2007	CEU
ENSG00000110195	136430	<i>FOLR1</i>	folate receptor 1 (adult)	Spiteri et al. 2007	CEU
ENSG00000111653	608524	<i>ING4</i>	inhibitor of growth family, member 4	Spiteri et al. 2007	CEU
ENSG00000114268	605320	<i>PFKFB4</i>	6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 4	Spiteri et al. 2007	CEU
ENSG00000115317	606441	<i>HTRA2</i>	HtrA serine peptidase 2	Spiteri et al. 2007	CEU
ENSG00000124469	114890	<i>CEACAM8</i>	carcinoembryonic antigen-related cell adhesion molecule 8	Spiteri et al. 2007	CEU
ENSG00000128283	606084	<i>CDC42EP1</i>	CDC42 effector protein (Rho GTPase binding) 1	Spiteri et al. 2007	CEU
ENSG00000128322	146770	<i>IGLL1</i>	immunoglobulin lambda-like polypeptide 1	Spiteri et al. 2007	CEU

ENSG00000134061	602226	<i>CD180</i>	CD180 molecule	Spiteri et al. 2007	CEU
ENSG00000137713	603113	<i>PPP2R1B</i>	protein phosphatase 2, regulatory subunit A, beta	Spiteri et al. 2007	CEU
ENSG00000147571	122560	<i>CRH</i>	corticotropin releasing hormone	Spiteri et al. 2007	CEU
ENSG00000149591	600818	<i>TAGLN</i>	transgelin	Spiteri et al. 2007	CEU
ENSG00000151615	113725	<i>POU4F2</i>	POU class 4 homeobox 2	Spiteri et al. 2007	CEU
ENSG00000164106	603163	<i>SCRG1</i>	stimulator of chondrogenesis 1	Spiteri et al. 2007	CEU
ENSG00000165474	121011	<i>GJB2</i>	gap junction protein, beta 2, 26kDa	Spiteri et al. 2007	CEU
ENSG00000167196	609096	<i>FBXO22</i>	F-box protein 22	Spiteri et al. 2007	CEU
ENSG00000172660	601574	<i>TAF15</i>	TAF15 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 68kDa	Spiteri et al. 2007	CEU
ENSG00000187266	133171	<i>EPOR</i>	erythropoietin receptor	Spiteri et al. 2007	CEU
ENSG00000197702	608120	<i>PARVA</i>	parvin, alpha	Spiteri et al. 2007	CEU
ENSG00000198959	190196	<i>TGM2</i>	transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase)	Spiteri et al. 2007	CEU
ENSG00000213096	604768	<i>ZNF254</i>	zinc finger protein 254	Spiteri et al. 2007	CEU
ENSG00000174469	604569	<i>CNTNAP2</i>	contactin associated protein-like 2	Vernes et al. 2008; Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000042088	607198	<i>TDP1</i>	tyrosyl-DNA phosphodiesterase 1	Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000134769	601239	<i>DTNA</i>	dystrobrevin, alpha	Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000165525	608378	<i>NEMF</i>	nuclear export mediator factor	Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000166446	Not available	<i>CDYL2</i>	chromodomain protein, Y-like 2	Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000181690	603026	<i>PLAG1</i>	pleiomorphic adenoma gene 1	Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000187908	601969	<i>DMBT1</i>	deleted in malignant brain tumors 1	Vernes et al. 2011	CEU, CHB+JPT, YRI
ENSG00000214376	Not available	<i>C11orf90</i>	chromosome 11 open reading frame 90	Vernes et al. 2011	CEU, CHB+JPT, YRI

ENSG00000074621	603617	<i>SLC24A1</i>	solute carrier family 24 (sodium/potassium/calcium exchanger), member 1	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000147316	607117	<i>MCPH1</i>	microcephalin 1	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000149575	601327	<i>SCN2B</i>	sodium channel, voltage-gated, type II, beta	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000168824	607645	<i>AC110814.1</i>	Neuron-specific protein family member 1	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000171502	610025	<i>COL24A1</i>	collagen, type XXIV, alpha 1	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000197993	613883	<i>KEL</i>	Kell blood group, metallo-endopeptidase	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000212916	Not available	<i>KIAA1383</i>	KIAA1383	Vernes et al. 2011	CEU, CHB+JPT
ENSG00000006468	600541	<i>ETV1</i>	ets variant 1	Vernes et al. 2011	CEU, YRI
ENSG00000092051	Not available	<i>JPH4</i>	junctophilin 4	Vernes et al. 2011	CEU, YRI
ENSG00000111716	150100	<i>LDHB</i>	lactate dehydrogenase B	Vernes et al. 2011	CEU, YRI
ENSG00000150625	601275	<i>GPM6A</i>	glycoprotein M6A	Vernes et al. 2011	CEU, YRI
ENSG00000168062	Not available	<i>BATF2</i>	basic leucine zipper transcription factor, ATF-like 2	Vernes et al. 2011	CEU, YRI
ENSG00000171368	608773	<i>TPPP</i>	tubulin polymerization promoting protein	Vernes et al. 2011	CEU, YRI
ENSG00000172179	176760	<i>PRL</i>	prolactin	Vernes et al. 2011	CEU, YRI
ENSG00000176907	607702	<i>C8orf4</i>	chromosome 8 open reading frame 4	Vernes et al. 2011	CEU, YRI
ENSG00000179168	609966	<i>GGN</i>	gametogenetin	Vernes et al. 2011	CEU, YRI
ENSG00000196800	Not available	<i>SPINK14</i>	serine peptidase inhibitor, Kazal type 14 (putative)	Vernes et al. 2011	CEU, YRI
ENSG00000008197	610161	<i>TFAP2D</i>	transcription factor AP-2 delta (activating enhancer binding protein 2 delta)	Vernes et al. 2011	CEU
ENSG00000009790	608255	<i>TRAF3IP3</i>	TRAF3 interacting protein 3	Vernes et al. 2011	CEU
ENSG00000067533	611193	<i>RRP15</i>	ribosomal RNA processing 15 homolog (S. cerevisiae)	Vernes et al. 2011	CEU
ENSG00000083782	601657	<i>EPYC</i>	epiphycan	Vernes et al. 2011	CEU
ENSG00000084444	Not available	<i>KIAA1467</i>	KIAA1467	Vernes et al. 2011	CEU

ENSG00000085274	606042	<i>MYNN</i>	myoneurin	Vernes et al. 2011	CEU
ENSG00000091986	608298	<i>CCDC80</i>	coiled-coil domain containing 80	Vernes et al. 2011	CEU
ENSG00000100083	606004	<i>GGA1</i>	golgi-associated, gamma adaptin ear containing, ARF binding protein 1	Vernes et al. 2011	CEU
ENSG00000105829	605456	<i>BET1</i>	blocked early in transport 1 homolog (<i>S. cerevisiae</i>)	Vernes et al. 2011	CEU
ENSG00000106399	179837	<i>RPA3</i>	replication protein A3, 14kDa	Vernes et al. 2011	CEU
ENSG00000112234	605654	<i>FBXL4</i>	F-box and leucine-rich repeat protein 4	Vernes et al. 2011	CEU
ENSG00000112290	605035	<i>WASF1</i>	WAS protein family, member 1	Vernes et al. 2011	CEU
ENSG00000113578	131220	<i>FGF1</i>	fibroblast growth factor 1 (acidic)	Vernes et al. 2011	CEU
ENSG00000114120	Not available	<i>SLC25A36</i>	solute carrier family 25, member 36	Vernes et al. 2011	CEU
ENSG00000114491	613891	<i>UMPS</i>	uridine monophosphate synthetase	Vernes et al. 2011	CEU
ENSG00000122390	Not available	<i>NAT15</i>	N-acetyltransferase 15 (GCN5-related, putative)	Vernes et al. 2011	CEU
ENSG00000126785	607653	<i>RHOJ</i>	ras homolog gene family, member J	Vernes et al. 2011	CEU
ENSG00000130943	604670	<i>PKDREJ</i>	polycystic kidney disease (polycystin) and REJ homolog (sperm receptor for egg jelly homolog, sea urchin)	Vernes et al. 2011	CEU
ENSG00000132964	Not available	<i>CDK8</i>	cyclin-dependent kinase 8	Vernes et al. 2011	CEU
ENSG00000135569	607405	<i>TAAR5</i>	trace amine associated receptor 5	Vernes et al. 2011	CEU
ENSG00000135622	603706	<i>SEMA4F</i>	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4F	Vernes et al. 2011	CEU
ENSG00000137819	607781	<i>PAQR5</i>	progesterin and adipoQ receptor family member V	Vernes et al. 2011	CEU
ENSG00000137942	608848	<i>FNBP1L</i>	formin binding protein 1-like	Vernes et al. 2011	CEU
ENSG00000138376	601593	<i>BARD1</i>	BRCA1 associated RING domain 1	Vernes et al. 2011	CEU
ENSG00000138629	609748	<i>UBL7</i>	ubiquitin-like 7 (bone marrow stromal cell-derived)	Vernes et al. 2011	CEU

ENSG00000141668	600433	<i>CBLN2</i>	cerebellin 2 precursor	Vernes et al. 2011	CEU
ENSG00000143190	164175	<i>POU2F1</i>	POU class 2 homeobox 1	Vernes et al. 2011	CEU
ENSG00000152705	609120	<i>CATSPER3</i>	cation channel, sperm associated 3	Vernes et al. 2011	CEU
ENSG00000155111	614720	<i>CDK19</i>	cyclin-dependent kinase 19	Vernes et al. 2011	CEU
ENSG00000158296	606411	<i>SLC13A3</i>	solute carrier family 13 (sodium-dependent dicarboxylate transporter), member 3	Vernes et al. 2011	CEU
ENSG00000162374	168360	<i>ELAVL4</i>	ELAV (embryonic lethal, abnormal vision, <i>Drosophila</i>)-like 4 (Hu antigen D)	Vernes et al. 2011	CEU
ENSG00000163636	Not available	<i>PSMD6</i>	proteasome (prosome, macropain) 26S subunit, non-ATPase, 6	Vernes et al. 2011	CEU
ENSG00000165714	Not available	<i>LOH12CR1</i>	loss of heterozygosity, 12, chromosomal region 1	Vernes et al. 2011	CEU
ENSG00000166035	151670	<i>LIPC</i>	lipase, hepatic	Vernes et al. 2011	CEU
ENSG00000168066	601516	<i>SF1</i>	splicing factor 1	Vernes et al. 2011	CEU
ENSG00000168569	Not available	<i>TMEM223</i>	transmembrane protein 223	Vernes et al. 2011	CEU
ENSG00000175374	Not available	<i>SPESP1</i>	sperm equatorial segment protein 1	Vernes et al. 2011	CEU
ENSG00000182255	176266	<i>KCNA4</i>	potassium voltage-gated channel, shaker-related subfamily, member 4	Vernes et al. 2011	CEU
ENSG00000183401	Not available	<i>CCDC159</i>	coiled-coil domain containing 159	Vernes et al. 2011	CEU
ENSG00000184378	Not available	<i>AC078802.1</i>	Actin-related protein M1	Vernes et al. 2011	CEU
ENSG00000198742	605568	<i>SMURF1</i>	SMAD specific E3 ubiquitin protein ligase 1	Vernes et al. 2011	CEU