

Smoking Modifies the Genetic Risk for Early-Onset Periodontitis

S. Freitag-Wolf, M. Munz, R. Wiehe, O. Junge, C. Graetz, Y. Jockel-Schneider, I. Staufienbiel, C. Bruckmann, W. Lieb, A. Franke, B.G. Loos, S. Jepsen, H. Dommisch, and A.S. Schaefer

APPENDIX

Supplementary Methods

Statistical analyses

The case-only design requires a validation of the two key assumptions: (i) The disease is rare and (ii) the interaction variables are uncorrelated in the general population. Assumption (i) was fulfilled, since the prevalence of the analyzed disease phenotype is $< 0.1\%$ (4). In order to analyze whether assumption (ii) was met, we tested the association of G and S in controls ($n=6823$) from our recent GWAS [9]. Specifically, we tested β_G of $\text{Logit}(P(S = 1)) = a + \beta_G G$ for each SNP.

The 918,514 SNPs with P-values < 0.05 (Wald-test) were excluded from further analyses, and the remaining 79,780,573 SNP were then evaluated in the cases for possible interactions with smoking. Following the case-only approach, the aforementioned estimator $\hat{\beta}_G$ in the cases is an unbiased estimator $\hat{\beta}_{G \times S}$ of the underlying interaction term of the equation

$$\text{Logit}(P(AGP = 1)) = a + \beta_G G + \beta_S S + \beta_{G \times S} G \times S.$$

To overcome the heterogeneity of the samples from Germany/Austria (Ger) and The Netherlands (NL), all described estimators were treated in a meta-analytical sense: $\beta_{\text{Ger} \times S}$ and $\beta_{\text{NL} \times S}$ were combined using the inverse variance–weight method (Sutton, 2000).

$$\text{The test statistic } T = \frac{w_{\text{Ger}} \beta_{\text{Ger} \times S} + w_{\text{NL}} \beta_{\text{NL} \times S}}{w_{\text{Ger}} + w_{\text{NL}}},$$

with weights $w_{\text{Ger}} = \text{var}(\beta_{\text{Ger} \times S})^{-1}$ and $w_{\text{NL}} = \text{var}(\beta_{\text{NL} \times S})^{-1}$ follows a normal distribution with standard error $\text{se}(T) = \sqrt{\frac{1}{w_{\text{Ger}} + w_{\text{NL}}}}$.

Data management and statistical analyses was conducted using GenABEL (impute2databel: gtool -M -g -s, ProbABEL v. 0.4.4 function palogistic) [13] and PLINK v2.049 as well as R, version 3.4.1.

The genome-wide significance threshold for G×S interaction was $P < 5 \times 10^{-8}$. Suggestive association was considered if the p-value for association was $P < 5 \times 10^{-5}$ for at least one SNP in a given locus, if that SNP was flanked by two or additional SNPs (located not more than 50 kilo base pairs (kb) distant to the lead SNP) that displayed association with a $P < 10^{-5}$.

Preparation of cigarette smoke extract

Construction of the cigarette smoke extraction system and preparation of the cigarette smoke extract (CSE) was prepared as described in [15]. CSE was prepared from Roth-Händle unfiltered cigarettes (Reemtsma, Germany). For each CSE sample, smoke from four cigarettes was blown through 10 mL of cell culture medium. The CSE was subsequently filtered using a 0.2 µm sterile filter and diluted 1:5 with cell culture medium. Afterwards the CSE was directly added to the cells (2 mL per well).

Collection of gingival *ex vivo* biopsies

Ex vivo biopsies from healthy oral masticatory mucosa were collected at the hard palate adjacent (<10 mm) to the fourth and fifth tooth by the use of a tissue puncher (3 mm diameter). The donors were orally and systemically healthy subjects. The Ethical Review Board of the Charité – Universitätsmedizin Berlin (EA4/088/15) approved this procedure.

Ten *ex vivo* biopsies from the hard palate were excised from the participants using a 3 mm tissue puncher. To separate the epithelial cells from the fibroblasts, the tissues were dissected enzymatically by overnight incubation in 5 mg/ml dispase II (Sigma Aldrich) diluted in cell growth medium (DMEM, 1% Pen/Strep) at 4 °C. The primary gingival fibroblast cells (pGFs) were subsequently cultured in cell growth medium (DMEM, 1% Amphotericin B, 1% Pen/Strep, 1% non-essential Amino acids). Prior to CSE stimulation, the pGFs (passage 3-6) were seeded in 6-well tissue culture plates (TPP Techno Plastic Products, Trasadingen, Switzerland) (1.8×10^5 cells per well) 24 hours before stimulation. The CSE was freshly prepared at the day of stimulation. CSE induction was performed for six hours in ten biological replicates (each with three technical replicates) of pGFs, with aliquots of the same CSE. 2 ml medium without CSE was added to the control cell plates (three technical replicates for each of the ten donors). After 6 hours of CSE incubation, the cells were washed 2x with PBS. Cell disruption and total RNA extraction was carried out using the RNeasy Mini Kit (Qiagen) according to the manufacturer's instructions.

Screening of participants for a matched genetic background and genotyping

Gingival *ex vivo* biopsies were harvested from 23 healthy patients and DNA was extracted using AllPrep DNA/RNA/miRNA Universal Kit (Qiagen). Blood samples were collected from the same individuals (N=22) in PAXgene Blood DNA Tubes and DNA was extracted using PAXgene Blood DNA Kit (Qiagen). To identify carriers of the common and minor alleles at the G×S associated haplotype blocks, we used the HiDi DNA polymerase (myPols, Germany) that allowed SNP discrimination for *SSH1* and *BMP7*. For *SSH1*, we genotyped rs73410922 (linkage disequilibrium [LD] to *SSH1* lead SNP rs59680006: $r^2 = 1$; **Appendix Table 1**). For *BMP7*, we genotyped SNP rs6025513 (LD to *BMP7* lead

SNP rs6099553 $r^2 = 1$). The PCR was performed with the following settings: 95°C: 2'; 30 x [95°C:15'', 62°: 10'', 72°C, 30''] and the following primer sequences:

SSH1-G-allele_HiDi-fw-1	CACATCTTCCGTCCTTCTTCCCAGTG
SSH1-A-allele_HiDi-fw-1	CACATCTTCCGTCCTTCTTCCCAGTA
SSH1-rev-HiDi-1	CTGTCCCCCAACTATGACGGCAGTG
BMP7-G-allele_HiDi-fw-1	ATTAGGATGTCCTGATCCAACATCGAGG
BMP7-C-allele_HiDi-fw-1	ATTAGGATGTCCTGATCCAACATCGAGC
BMP7-HiDi-rev-1	ACCACACAAGTCTAAGTGAGTTATTACAC

The genotypes of *SOST* and *ST8SIA1* were determined by Sanger sequencing. DNA was amplified at the position of a selected tSNP in complete LD ($r^2 > 0.95$; **Appendix Table 1**) by PCR (annealing temperature: *SOST* (54 °C), *ST8SIA1* (53°C), elongation time 30'') with Taq DNA Polymerase (Biozym) and the following primers:

SOST-rs1976960-fw-2: GACCCTTCTTCCTCCTTGCT
 SOST-rs1976960-rev-2: TGTCGTGACTATGCATCCCT
 ST8SIA1-rs2728821-fw-1: TGGCCACTCTGCTCAGTATAA
 ST8SIA1 rs2728821-rev-1: CTGAAACACTTACAGGGGCT

Appendix Table 1. LD associated SNPs_CSE genes

The genotyped SNPs are given in bold letters, # indicates the index SNPs of the regional association plots of Figure 3. LD and frequencies are calculated using 1000Genomes phase 3 EUR populations.

Position	Nearest gene	SNP	LD (r ²) EUR	EUR (freq)
chr12:109,222,331	<i>SSH1</i>	rs73410922	1	0.04
chr12:109,251,663		rs59680006 #	1	0.04
chr20:55,843,736	<i>BMP7</i>	rs6099553 #	1	0.39
chr20:55,933,749		rs6025513	1	0.39
chr17:41,809,268	<i>SOST</i>	rs1976960	0.98	0.67
chr17:41,804,464		rs6416905 #	0.98	0.67
chr12:22,463,786	<i>ST8SIA1</i>	rs2287169	1	0.55
chr12:22,462,611		rs2728821 #	1	0.55

RNA extraction, cDNA synthesis and qRT-PCR

After 6 hours of CSE incubation, the cells were washed 2x with PBS. Cell disruption and total RNA extraction was carried out using the RNeasy Mini Kit (Qiagen, Germany) according to the manufacturer's specifications. Subsequently, quantitative reverse transcription polymerase chain reaction (qRT-PCR) was performed with an amount of 200-500 ng of total RNA using the High-Capacity cDNA Reverse Transcription Kit and oligo-(dT)-primers (Thermo Fisher Scientific, USA) in accordance with the manufacturer's guidelines (using oligo-(dT)- and dNTP-primers instead of random primers). Control PCR reactions contained water instead of cDNA. qRT-PCR experiments were performed using the CFX Connect System (Bio-Rad, USA) in combination with SYBR Select Master Mix (Thermo Fisher Scientific) by following the manufacturer's instructions. The gene expression levels were normalized to the mRNA expression of *GAPDH*, and relative expression was calculated using the mathematical model delta delta ct (GraphPad Prism Software/R). Genes were first screened for stable expression in pGFs (cycle threshold Ct < 35). Genes that were expressed at levels below Ct < 35 were excluded from further analysis.

Primers were manufactured (metabion GmbH, Planegg/Steinkirchen, Germany) with the following sequences:

ABLIM2 (forward: TGGTGGTGAGATCCTGGACT; reverse: GTAGGAGATCATGTCGGGGC)
BMP7 (forward: CACCATCGAGAGTTCCGGTT; reverse: ACGTCTCATTGTCGAAGCGT)
POTEC (forward: ACTGCCCTCATACTTGCTGT; reverse: GCATACTCTCTGGCCGTCTG)
SOST (forward: TTCCCCGGATGTTTGGCTAC; reverse: AGTTGGGGCGGATGTGATTT).
SSH1 (forward: GGAGGCACAACTACTTCCCC; reverse: TTCCACTCGTTGATGCAGCT)
ST8SIA1 (forward: TGTGTCGTGGTCCTCTGTTG; reverse: CCCCTGCACGATCTCTTTCT)
GAPDH (forward: CAAATTCCATGGCACCGTCA; reverse: CCTGCAAATGAGCCCCAG)

Appendix Table 2. AgP-associated regions with G x S interactions

nearest gene	Chromosome	position	allele 1	allele 2	P-value G x S interaction, CO-Design	distance (kb) to next SNP
RP11-285B24.1	3	59357608	G	T	1.244E-05	0.126
RP11-285B24.1	3	59357734	C	G	1.577E-05	1.23
RP11-285B24.1	3	59358964	A	G	1.152E-05	0.736
RP11-285B24.1	3	59359700	A	G	1.979E-05	22.025
RP11-285B24.1	3	59381725	C	T	2.103E-05	2.39
RP11-285B24.1	3	59384115	A	C	3.237E-05	0.433
RP11-285B24.1	3	59384548	A	G	3.248E-05	0.36
RP11-285B24.1	3	59384908	A	C	2.125E-05	1.856
RP11-285B24.1	3	59386764	C	G	2.177E-05	0.707
RP11-285B24.1	3	59387471	A	G	1.964E-05	1.064
RP11-285B24.1	3	59388535	A	G	2.181E-05	0.394
RP11-285B24.1	3	59388929	C	T	2.188E-05	0.664
RP11-285B24.1	3	59389593	C	G	2.235E-05	4.492
RP11-285B24.1	3	59394085	G	T	2.981E-05	0.137
RP11-285B24.1	3	59394222	G	T	3.017E-05	0.261
RP11-285B24.1	3	59394483	A	G	3.090E-05	1.451
RP11-285B24.1	3	59395934	A	G	3.226E-05	0.866
RP11-285B24.1	3	59396800	A	C	3.261E-05	0.021
RP11-285B24.1	3	59396821	C	G	3.261E-05	2.562
RP11-285B24.1	3	59399383	C	T	3.318E-05	0.13
RP11-285B24.1	3	59399513	C	T	5.992E-05	2.774
RP11-285B24.1	3	59402287	A	G	3.586E-05	0.23
RP11-285B24.1	3	59402517	A	G	3.871E-05	3.419
RP11-285B24.1	3	59405936	C	T	4.006E-05	0.56
RP11-285B24.1	3	59406496	A	G	4.900E-05	NA
ABLIM2	4	8049694	C	T	9.909E-06	0.649
ABLIM2	4	8050343	A	G	4.019E-06	0.422
ABLIM2	4	8050765	C	T	4.990E-06	2.255
ABLIM2	4	8053020	A	G	7.542E-06	1.233
ABLIM2	4	8054253	C	T	9.899E-05	0.061
ABLIM2	4	8054314	A	G	6.994E-06	NA
NR_015410.1	6	21952824	A	AT	3.32E-05	1.69
NR_015410.1	6	21954514	A	T	2.99E-05	3.181
NR_015410.1	6	21957695	A	G	2.64E-05	9.419
NR_015410.1	6	21967114	C	T	2.90E-05	NA
NR_038371.1	7	53457951	A	G	8.99E-05	18.122
NR_038371.1	7	53476073	C	T	4.53E-05	0.001

NR_038371.1	7	53476074	C	T	4.53E-05	6.114
NR_038371.1	7	53482188	A	C	3.49E-05	6.134
NR_038371.1	7	53488322	C	G	2.26E-05	12.245
NR_038371.1	7	53500567	A	G	2.83E-05	NA
SFRP1	8	40939970	A	G	6.95E-05	2.785
SFRP1	8	40942755	C	T	7.04E-05	0.023
SFRP1	8	40942778	C	G	4.80E-05	0.729
SFRP1	8	40943507	A	G	7.07E-05	0.547
SFRP1	8	40944054	C	T	7.10E-05	0.062
SFRP1	8	40944116	C	T	7.10E-05	2.658
SFRP1	8	40946774	A	G	4.62E-05	2.629
SFRP1	8	40949403	C	T	4.76E-05	0.371
SFRP1	8	40949774	C	T	5.93E-05	NA
GRK5	10	12111849 2	A	C	5.813E-07	5.141
GRK5	10	12112363 3	C	T	3.150E-06	6.164
GRK5	10	12112979 7	A	G	1.281E-05	1.516
GRK5	10	12113131 3	A	G	7.855E-05	0.467
GRK5	10	12113178 0	C	T	9.612E-05	49.387
GRK5	10	12118116 7	A	G	9.822E-06	0.46
GRK5	10	12118162 7	G	T	8.956E-06	5.805
GRK5	10	12118743 2	A	ATC ACT GCC Ared	6.513E-05	15.409
GRK5	10	12120284 1	C	G	9.570E-07	5.721
GRK5	10	12120856 2	G	GT	1.684E-05	0.81
GRK5	10	12120937 2	A	G	2.660E-05	6.285
GRK5	10	12121565 7	A	G	5.879E-06	0.37
GRK5	10	12121602 7	A	G	1.948E-05	0.896
GRK5	10	12121692 3	A	G	6.050E-06	0.138
GRK5	10	12121706 1	A	T	5.994E-06	0.622
GRK5	10	12121768 3	C	T	3.022E-05	0.301

<i>GRK5</i>	10	12121798 4	C	T	4.009E-05	NA
<i>ST8SIA1</i>	12	22434841	C	T	9.931E-05	0.553
<i>ST8SIA1</i>	12	22435394	G	T	9.931E-05	3.03
<i>ST8SIA1</i>	12	22438424	A	G	9.629E-05	8.57
<i>ST8SIA1</i>	12	22446994	C	T	6.998E-05	1.435
<i>ST8SIA1</i>	12	22448429	A	G	6.794E-05	8.532
<i>ST8SIA1</i>	12	22456961	C	T	7.411E-05	0.62
<i>ST8SIA1</i>	12	22457581	A	G	6.104E-05	5.03
<i>ST8SIA1</i>	12	22462611	A	G	3.831E-05	1.175
<i>ST8SIA1</i>	12	22463786	A	C	5.639E-05	NA
<i>OR6C70</i>	12	55858613	C	T	5.317E-05	2.183
<i>OR6C70</i>	12	55860796	C	T	4.035E-05	8.69
<i>OR6C70</i>	12	55869486	G	GAA	3.878E-05	0.232
<i>OR6C70</i>	12	55869718	C	T	5.640E-05	0.119
<i>OR6C70</i>	12	55869837	A	G	5.634E-05	0.17
<i>OR6C70</i>	12	55870007	C	T	3.870E-05	0.625
<i>OR6C70</i>	12	55870632	A	T	5.613E-05	2.263
<i>OR6C70</i>	12	55872895	C	T	5.669E-05	0.125
<i>OR6C70</i>	12	55873020	C	T	5.666E-05	0.066
<i>OR6C70</i>	12	55873086	C	T	5.774E-05	0.577
<i>OR6C70</i>	12	55873663	A	G	5.547E-05	1.942
<i>OR6C70</i>	12	55875605	C	T	5.506E-05	1.456
<i>OR6C70</i>	12	55877061	A	C	5.481E-05	0.212
<i>OR6C70</i>	12	55877273	C	G	3.765E-05	0.68
<i>OR6C70</i>	12	55877953	C	T	3.842E-05	0.007
<i>OR6C70</i>	12	55877960	A	G	5.463E-05	1.039
<i>OR6C70</i>	12	55878999	A	C	2.806E-05	0.051
<i>OR6C70</i>	12	55879050	A	G	1.277E-05	0.104
<i>OR6C70</i>	12	55879154	C	T	8.311E-05	0.479
<i>OR6C70</i>	12	55879633	A	C	1.242E-05	4.943
<i>OR6C70</i>	12	55884576	G	T	3.686E-05	0.578
<i>OR6C70</i>	12	55885154	G	T	3.638E-05	1.14
<i>OR6C70</i>	12	55886294	A	G	4.324E-05	NA
<i>MGAT4C</i>	12	87198152	C	G	3.13E-05	2.534
<i>MGAT4C</i>	12	87200686	A	G	2.73E-05	1.644
<i>MGAT4C</i>	12	87202330	A	G	2.77E-05	1.908
<i>MGAT4C</i>	12	87204238	C	T	2.80E-05	0.875
<i>MGAT4C</i>	12	87205113	A	ATT	1.21E-05	0.708
<i>MGAT4C</i>	12	87205821	G	T	2.97E-05	3.96
<i>MGAT4C</i>	12	87209781	A	C	2.87E-05	6.564
<i>MGAT4C</i>	12	87216345	C	CTTT	2.96E-05	3.744

<i>MGAT4C</i>	12	87220089	G	T	2.97E-05	4.961
<i>MGAT4C</i>	12	87225050	A	G	3.08E-05	1.077
<i>MGAT4C</i>	12	87226127	A	G	3.13E-05	5.122
<i>MGAT4C</i>	12	87231249	C	T	3.78E-05	5.658
<i>MGAT4C</i>	12	87236907	C	T	3.99E-05	0.859
<i>MGAT4C</i>	12	87237766	A	T	3.44E-05	11.293
<i>MGAT4C</i>	12	87249059	G	T	3.79E-05	3.339
<i>MGAT4C</i>	12	87252398	G	T	3.80E-05	2.941
<i>MGAT4C</i>	12	87255339	C	T	3.80E-05	NA
<i>SSH1</i>	12	10918392 9	G	GT	7.710E-05	21.411
<i>SSH1</i>	12	10920534 0	A	G	5.420E-05	11.564
<i>SSH1</i>	12	10921690 4	A	G	5.528E-05	5.427
<i>SSH1</i>	12	10922233 1	A	G	5.188E-05	27.141
<i>SSH1</i>	12	10924947 2	A	G	6.862E-05	2.191
<i>SSH1</i>	12	10925166 3	G	T	2.555E-05	10.928
<i>SSH1</i>	12	10926259 1	A	G	4.056E-05	NA
<i>LINC00353</i>	13	90235576	T	TA	5.954E-05	0.496
<i>LINC00353</i>	13	90236072	A	T	5.767E-05	2.197
<i>LINC00353</i>	13	90238269	A	G	5.387E-05	1.505
<i>LINC00353</i>	13	90239774	C	T	5.177E-05	2.968
<i>LINC00353</i>	13	90242742	A	G	5.046E-05	0.517
<i>LINC00353</i>	13	90243259	A	AG	8.869E-05	0.004
<i>LINC00353</i>	13	90243263	A	T	5.026E-05	1.355
<i>LINC00353</i>	13	90244618	A	G	4.806E-05	0.001
<i>LINC00353</i>	13	90244619	C	T	4.859E-05	1.063
<i>LINC00353</i>	13	90245682	C	T	8.770E-05	1.089
<i>LINC00353</i>	13	90246771	A	G	9.258E-05	0.126
<i>LINC00353</i>	13	90246897	A	G	8.041E-05	3.151
<i>LINC00353</i>	13	90250048	G	T	7.436E-05	0.081
<i>LINC00353</i>	13	90250129	C	G	7.434E-05	3.662
<i>LINC00353</i>	13	90253791	A	G	7.395E-05	0.07
<i>LINC00353</i>	13	90253861	A	G	7.393E-05	2.079
<i>LINC00353</i>	13	90255940	C	T	7.438E-05	0.434
<i>LINC00353</i>	13	90256374	C	T	2.397E-05	0.145
<i>LINC00353</i>	13	90256519	C	T	7.447E-05	1.431
<i>LINC00353</i>	13	90257950	A	G	7.476E-05	0.045
<i>LINC00353</i>	13	90257995	C	T	7.476E-05	2.703

LINC00353	13	90260698	C	T	7.540E-05	0.889
LINC00353	13	90261587	A	T	7.555E-05	0.363
LINC00353	13	90261950	C	T	7.554E-05	1.432
LINC00353	13	90263382	A	G	7.506E-05	0.99
LINC00353	13	90264372	C	T	7.214E-05	0.044
LINC00353	13	90264416	A	G	7.456E-05	1.511
LINC00353	13	90265927	A	G	7.311E-05	4.889
LINC00353	13	90270816	A	G	6.822E-05	0.351
LINC00353	13	90271167	C	T	6.812E-05	8.374
LINC00353	13	90279541	C	CA	6.433E-05	0.006
LINC00353	13	90279547	C	G	6.433E-05	0.717
LINC00353	13	90280264	A	G	6.406E-05	0.368
LINC00353	13	90280632	A	G	6.391E-05	0.834
LINC00353	13	90281466	A	C	6.356E-05	7.151
LINC00353	13	90288617	C	T	5.909E-05	2.052
LINC00353	13	90290669	A	G	5.871E-05	2.718
LINC00353	13	90293387	A	G	5.871E-05	2.088
LINC00353	13	90295475	A	G	5.871E-05	0.525
LINC00353	13	90296000	C	T	5.871E-05	0.58
LINC00353	13	90296580	C	T	5.871E-05	0.038
LINC00353	13	90296618	C	T	5.871E-05	1.279
LINC00353	13	90297897	A	T	5.871E-05	0.393
LINC00353	13	90298290	A	G	5.871E-05	3.851
LINC00353	13	90302141	A	C	5.871E-05	3.021
LINC00353	13	90305162	A	AAA TAA T	5.871E-05	1.16
LINC00353	13	90306322	A	G	5.871E-05	0.006
LINC00353	13	90306328	C	T	5.858E-05	0.958
LINC00353	13	90307286	C	T	5.871E-05	0.392
LINC00353	13	90307678	C	CT	5.871E-05	0.04
LINC00353	13	90307718	A	G	5.871E-05	0.252
LINC00353	13	90307970	C	G	5.871E-05	0.303
LINC00353	13	90308273	A	C	5.871E-05	0.001
LINC00353	13	90308274	C	T	5.871E-05	0.005
LINC00353	13	90308279	C	T	5.871E-05	0.038
LINC00353	13	90308317	A	G	5.871E-05	0.144
LINC00353	13	90308461	C	T	5.871E-05	0.026
LINC00353	13	90308487	C	G	5.871E-05	0.48
LINC00353	13	90308967	C	T	5.871E-05	0.534
LINC00353	13	90309501	C	T	5.871E-05	0.032
LINC00353	13	90309533	C	T	5.871E-05	0.545

LINC00353	13	90310078	A	G	5.871E-05	0.663
LINC00353	13	90310741	C	T	5.871E-05	0.069
LINC00353	13	90310810	C	G	5.871E-05	0.062
LINC00353	13	90310872	A	C	5.871E-05	0.129
LINC00353	13	90311001	C	T	6.632E-05	0.054
LINC00353	13	90311055	C	G	5.871E-05	0.085
LINC00353	13	90311140	C	T	5.806E-05	0.15
LINC00353	13	90311290	A	G	5.871E-05	0.185
LINC00353	13	90311475	C	T	5.871E-05	0.051
LINC00353	13	90311526	A	T	5.871E-05	0.066
LINC00353	13	90311592	C	T	5.871E-05	0.153
LINC00353	13	90311745	A	C	5.871E-05	0.298
LINC00353	13	90312043	C	T	5.871E-05	0.181
LINC00353	13	90312224	C	CTA	5.871E-05	0.219
LINC00353	13	90312443	A	G	5.871E-05	0.368
LINC00353	13	90312811	C	T	5.871E-05	0.02
LINC00353	13	90312831	A	G	5.871E-05	0.327
LINC00353	13	90313158	C	G	5.871E-05	0.007
LINC00353	13	90313165	A	C	5.871E-05	0.172
LINC00353	13	90313337	A	G	5.871E-05	0.25
LINC00353	13	90313587	A	G	5.871E-05	0.18
LINC00353	13	90313767	A	G	5.871E-05	0.001
LINC00353	13	90313768	C	T	5.871E-05	0.698
LINC00353	13	90314466	A	G	5.871E-05	0.687
LINC00353	13	90315153	C	T	5.871E-05	1.995
LINC00353	13	90317148	A	G	5.871E-05	3.677
LINC00353	13	90320825	C	T	5.871E-05	1.046
LINC00353	13	90321871	A	T	5.628E-05	1.37
LINC00353	13	90323241	C	T	5.871E-05	0.387
LINC00353	13	90323628	A	G	8.713E-05	0.952
LINC00353	13	90324580	C	T	5.871E-05	1.549
LINC00353	13	90326129	C	T	5.871E-05	1.201
LINC00353	13	90327330	A	G	5.871E-05	0.348
LINC00353	13	90327678	A	G	5.871E-05	0.527
LINC00353	13	90328205	G	T	5.871E-05	0.658
LINC00353	13	90328863	C	T	5.871E-05	0.091
LINC00353	13	90328954	A	G	5.871E-05	5.796
LINC00353	13	90334750	A	G	5.871E-05	0.291
LINC00353	13	90335041	C	T	5.871E-05	0.383
LINC00353	13	90335424	G	T	5.871E-05	1.472
LINC00353	13	90336896	A	G	5.871E-05	5.7

LINC00353	13	90342596	A	C	5.811E-05	1.528
LINC00353	13	90344124	T	TAT AAG	5.785E-05	6.689
LINC00353	13	90350813	A	G	5.626E-05	1.192
LINC00353	13	90352005	C	T	5.595E-05	4.242
LINC00353	13	90356247	A	C	5.496E-05	3.381
LINC00353	13	90359628	A	G	5.385E-05	0.521
LINC00353	13	90360149	G	T	5.356E-05	0.537
LINC00353	13	90360686	A	G	5.308E-05	2.051
LINC00353	13	90362737	G	T	5.603E-05	0.287
LINC00353	13	90363024	C	T	5.636E-05	1.764
LINC00353	13	90364788	A	G	4.535E-05	1.402
LINC00353	13	90366190	A	AC	4.243E-05	1.005
LINC00353	13	90367195	C	T	4.196E-05	0.307
LINC00353	13	90367502	A	T	4.183E-05	0.68
LINC00353	13	90368182	A	T	4.152E-05	0.645
LINC00353	13	90368827	A	C	3.978E-05	0.629
LINC00353	13	90369456	A	AT	5.241E-05	0.967
LINC00353	13	90370423	A	T	3.896E-05	1.544
LINC00353	13	90371967	C	T	3.847E-05	1.685
LINC00353	13	90373652	G	T	3.786E-05	0.41
LINC00353	13	90374062	C	G	3.716E-05	1.032
LINC00353	13	90375094	C	T	3.256E-05	0.613
LINC00353	13	90375707	C	G	3.145E-05	0.043
LINC00353	13	90375750	A	T	3.145E-05	0.09
LINC00353	13	90375840	C	CAT TT	3.145E-05	0.834
LINC00353	13	90376674	A	G	3.145E-05	0.098
LINC00353	13	90376772	A	G	3.145E-05	0.21
LINC00353	13	90376982	G	T	3.145E-05	0.183
LINC00353	13	90377165	C	T	3.145E-05	0.132
LINC00353	13	90377297	A	C	3.145E-05	0.276
LINC00353	13	90377573	A	G	3.145E-05	0.097
LINC00353	13	90377670	G	T	3.145E-05	0.448
LINC00353	13	90378118	A	G	3.076E-05	0.031
LINC00353	13	90378149	A	G	3.145E-05	0.072
LINC00353	13	90378221	C	G	3.145E-05	0.113
LINC00353	13	90378334	C	T	3.145E-05	0.009
LINC00353	13	90378343	A	C	3.145E-05	0.452
LINC00353	13	90378795	A	T	3.145E-05	0.003
LINC00353	13	90378798	G	T	3.145E-05	1.471
LINC00353	13	90380269	C	T	3.145E-05	1.154

LINC00353	13	90381423	A	T	3.181E-05	0.757
LINC00353	13	90382180	A	G	3.206E-05	1.644
LINC00353	13	90383824	A	G	3.263E-05	3.299
LINC00353	13	90387123	C	T	3.726E-05	8.244
LINC00353	13	90395367	G	T	4.752E-05	7.635
LINC00353	13	90403002	C	T	4.748E-05	0.002
LINC00353	13	90403004	C	T	4.748E-05	0.757
LINC00353	13	90403761	A	G	4.972E-05	10.939
LINC00353	13	90414700	C	T	4.704E-05	1.007
LINC00353	13	90415707	C	T	4.700E-05	0.054
LINC00353	13	90415761	T	TAA	5.854E-05	0.164
LINC00353	13	90415925	C	T	4.695E-05	0.434
LINC00353	13	90416359	A	G	4.696E-05	0.16
LINC00353	13	90416519	A	T	4.696E-05	0.119
LINC00353	13	90416638	C	T	4.692E-05	0.112
LINC00353	13	90416750	C	T	4.690E-05	0.018
LINC00353	13	90416768	C	T	4.692E-05	0.366
LINC00353	13	90417134	G	T	4.692E-05	0.255
LINC00353	13	90417389	C	G	4.691E-05	0.237
LINC00353	13	90417626	A	C	4.692E-05	0.138
LINC00353	13	90417764	C	T	4.693E-05	4.423
LINC00353	13	90422187	C	T	3.535E-05	2.627
LINC00353	13	90424814	C	CT	3.055E-05	0.869
LINC00353	13	90425683	C	T	7.039E-05	NA
intergenic	16	63601490	A	G	7.097E-05	0.185
intergenic	16	63601675	C	T	7.056E-05	0.103
intergenic	16	63601778	A	G	6.571E-05	0.557
intergenic	16	63602335	C	T	5.041E-05	0.083
intergenic	16	63602418	C	T	5.100E-05	0.545
intergenic	16	63602963	C	G	3.410E-05	0.182
intergenic	16	63603145	C	T	3.581E-05	1.006
intergenic	16	63604151	C	T	3.165E-05	0.204
intergenic	16	63604355	G	GTC	3.165E-05	0.26
intergenic	16	63604615	C	T	3.167E-05	0.048
intergenic	16	63604663	A	G	3.162E-05	0.013
intergenic	16	63604676	G	GA	3.167E-05	0.054
intergenic	16	63604730	G	T	3.168E-05	1.103
intergenic	16	63605833	A	G	3.175E-05	1.315
intergenic	16	63607148	C	T	2.474E-05	0.444
intergenic	16	63607592	A	C	2.478E-05	0.541
intergenic	16	63608133	C	T	2.475E-05	0.791

<i>intergenic</i>	16	63608924	A	T	2.484E-05	0.13
<i>intergenic</i>	16	63609054	C	T	3.198E-05	0.261
<i>intergenic</i>	16	63609315	G	T	3.200E-05	0.391
<i>intergenic</i>	16	63609706	C	T	3.411E-05	1.306
<i>intergenic</i>	16	63611012	C	T	2.496E-05	0.218
<i>intergenic</i>	16	63611230	A	G	2.497E-05	0.162
<i>intergenic</i>	16	63611392	C	T	2.497E-05	0.419
<i>intergenic</i>	16	63611811	A	G	2.497E-05	0.402
<i>intergenic</i>	16	63612213	G	T	2.495E-05	0.78
<i>intergenic</i>	16	63612993	C	T	3.209E-05	0.894
<i>intergenic</i>	16	63613887	C	T	3.194E-05	0.049
<i>intergenic</i>	16	63613936	C	T	3.193E-05	2.396
<i>intergenic</i>	16	63616332	C	G	3.183E-05	0.63
<i>intergenic</i>	16	63616962	A	G	2.314E-05	40.16
<i>intergenic</i>	16	63657122	T	TTG	3.218E-05	0.664
<i>intergenic</i>	16	63657786	C	G	1.823E-05	3.852
<i>intergenic</i>	16	63661638	A	G	1.715E-05	NA
<i>SOST</i>	17	41803034	A	G	4.53E-05	0.049
<i>SOST</i>	17	41803083	C	G	7.30E-05	1.381
<i>SOST</i>	17	41804464	A	G	4.00E-05	2.507
<i>SOST</i>	17	41806971	A	G	5.59E-05	0.011
<i>SOST</i>	17	41806982	A	G	5.59E-05	0.328
<i>SOST</i>	17	41807310	C	G	6.25E-05	0.021
<i>SOST</i>	17	41807331	C	T	6.48E-05	0.39
<i>SOST</i>	17	41807721	A	G	5.66E-05	0.882
<i>SOST</i>	17	41808603	A	AG	5.69E-05	0.507
<i>SOST</i>	17	41809110	C	CT	2.91E-05	0.158
<i>SOST</i>	17	41809268	C	T	4.35E-05	0.579
<i>SOST</i>	17	41809847	C	T	5.74E-05	0.277
<i>SOST</i>	17	41810124	C	T	5.75E-05	0.189
<i>SOST</i>	17	41810313	A	G	5.74E-05	0.261
<i>SOST</i>	17	41810574	C	T	5.77E-05	0.434
<i>SOST</i>	17	41811008	A	G	5.79E-05	0.148
<i>SOST</i>	17	41811156	A	ACT CCA G	5.79E-05	1.405
<i>SOST</i>	17	41812561	C	T	5.85E-05	1.411
<i>SOST</i>	17	41813972	C	CT	6.92E-05	0.036
<i>SOST</i>	17	41814008	G	T	6.92E-05	3.144
<i>SOST</i>	17	41817152	A	T	7.99E-05	0.359
<i>SOST</i>	17	41817511	C	T	8.04E-05	0.119
<i>SOST</i>	17	41817630	C	T	8.13E-05	18.993

<i>SOST</i>	17	41836623	C	T	5.11E-05	0.237
<i>SOST</i>	17	41836860	A	G	6.27E-05	0.322
<i>SOST</i>	17	41837182	C	G	9.30E-05	0.323
<i>SOST</i>	17	41837505	G	GTC C	5.26E-05	0.724
<i>SOST</i>	17	41838229	C	T	5.03E-05	0.665
<i>SOST</i>	17	41838894	A	T	5.44E-05	0.175
<i>SOST</i>	17	41839069	C	T	5.13E-05	NA
<i>POTEC</i>	18	14569528	C	T	3.865E-05	0.036
<i>POTEC</i>	18	14569564	C	T	4.258E-05	1.051
<i>POTEC</i>	18	14570615	A	C	8.976E-05	1.248
<i>POTEC</i>	18	14571863	A	T	5.689E-05	0.194
<i>POTEC</i>	18	14572057	A	ACA TAA ATT CAre d	5.721E-05	1.314
<i>POTEC</i>	18	14573371	G	T	5.731E-05	4.285
<i>POTEC</i>	18	14577656	G	GT	5.788E-05	4.163
<i>POTEC</i>	18	14581819	A	G	2.515E-05	0.256
<i>POTEC</i>	18	14582075	A	G	2.612E-05	1.653
<i>POTEC</i>	18	14583728	C	T	2.532E-05	1.951
<i>POTEC</i>	18	14585679	A	T	2.825E-05	0.001
<i>POTEC</i>	18	14585680	A	T	2.825E-05	0.049
<i>POTEC</i>	18	14585729	A	C	2.572E-05	0.18
<i>POTEC</i>	18	14585909	C	T	2.581E-05	1.72
<i>POTEC</i>	18	14587629	C	CA	2.659E-05	1.123
<i>POTEC</i>	18	14588752	A	G	2.714E-05	2
<i>POTEC</i>	18	14590752	C	T	2.812E-05	7.386
<i>POTEC</i>	18	14598138	C	T	3.397E-05	1.146
<i>POTEC</i>	18	14599284	A	G	3.318E-05	1.3
<i>POTEC</i>	18	14600584	C	T	3.701E-05	0.368
<i>POTEC</i>	18	14600952	C	T	3.971E-05	1.188
<i>POTEC</i>	18	14602140	C	G	6.224E-05	1.889
<i>POTEC</i>	18	14604029	A	C	5.088E-05	0.287
<i>POTEC</i>	18	14604316	A	G	5.120E-05	2.892
<i>POTEC</i>	18	14607208	A	C	6.369E-05	NA
<i>BMP7</i>	20	55843736	A	G	9.105E-05	67.383
<i>BMP7</i>	20	55911119	C	G	4.217E-05	18.762
<i>BMP7</i>	20	55929881	C	T	6.546E-05	0.22
<i>BMP7</i>	20	55930101	G	T	6.707E-05	3.648
<i>BMP7</i>	20	55933749	C	G	6.244E-05	7.172

BMP7	20	55940921	C	T	6.240E-05	8.16
BMP7	20	55949081	C	T	7.158E-05	10.266
BMP7	20	55959347	A	G	6.944E-05	2.203
BMP7	20	55961550	C	T	8.229E-05	NA
CRYBB2P1	22	25826066	A	G	7.24502E-05	0.963
CRYBB2P1	22	25827029	C	G	7.16019E-05	0.498
CRYBB2P1	22	25827527	A	G	6.75886E-05	3.773
CRYBB2P1	22	25831300	A	G	2.06418E-05	0.161
CRYBB2P1	22	25831461	C	T	7.17841E-06	0.958
CRYBB2P1	22	25832419	C	T	5.93471E-06	0.788
CRYBB2P1	22	25833207	C	T	5.0271E-06	0.389
CRYBB2P1	22	25833596	C	T	5.02146E-06	0.222
CRYBB2P1	22	25833818	A	T	4.78713E-06	0.524
CRYBB2P1	22	25834342	C	T	4.23354E-06	0.259
CRYBB2P1	22	25834601	C	T	2.35538E-05	1.04
CRYBB2P1	22	25835641	G	GC	4.75217E-06	0.023
CRYBB2P1	22	25835664	C	CT	4.4725E-05	0.018
CRYBB2P1	22	25835682	A	G	4.69309E-06	0.118
CRYBB2P1	22	25835800	C	T	4.65812E-06	2.386
CRYBB2P1	22	25838186	A	T	2.91518E-05	0.013
CRYBB2P1	22	25838199	C	CAT T	4.90149E-06	0.296
CRYBB2P1	22	25838495	C	T	3.80275E-05	0.286
CRYBB2P1	22	25838781	C	G	3.57392E-05	0.299
CRYBB2P1	22	25839080	C	T	2.82371E-05	0.002
CRYBB2P1	22	25839082	A	G	2.82393E-05	0.006
CRYBB2P1	22	25839088	G	GA	3.19208E-05	0.093
CRYBB2P1	22	25839181	C	T	2.85724E-05	1.62
CRYBB2P1	22	25840801	C	G	2.62747E-05	0.65
CRYBB2P1	22	25841451	C	T	3.95377E-05	0.311
CRYBB2P1	22	25841762	C	T	3.95214E-05	0.106
CRYBB2P1	22	25841868	T	TGA	3.9674E-05	3.867
CRYBB2P1	22	25845735	C	T	6.98545E-05	60.582
CRYBB2P1	22	25906317	G	T	9.09321E-05	2.079
CRYBB2P1	22	25908396	C	T	2.28558E-05	0.045
CRYBB2P1	22	25908441	A	G	2.28868E-05	0.175
CRYBB2P1	22	25908616	C	G	2.18631E-05	0.042
CRYBB2P1	22	25908658	G	GTG AAT GCA GTre d	2.32908E-05	0.461
CRYBB2P1	22	25909119	A	G	1.31102E-05	0.085
CRYBB2P1	22	25909204	C	T	1.42157E-05	0.313

CRYBB2P1	22	25909517	A	G	4.34638E-05	0.16
CRYBB2P1	22	25909677	A	G	1.37351E-05	0.059
CRYBB2P1	22	25909736	C	T	1.42449E-05	0.003
CRYBB2P1	22	25909739	A	G	1.33182E-05	0.457
CRYBB2P1	22	25910196	A	G	2.10745E-05	0.194
CRYBB2P1	22	25910390	A	T	1.42466E-05	0.165
CRYBB2P1	22	25910555	A	C	1.41987E-05	0.05
CRYBB2P1	22	25910605	C	G	1.32642E-05	0.239
CRYBB2P1	22	25910844	C	G	9.66234E-05	0.227
CRYBB2P1	22	25911071	C	T	1.4382E-05	0.229
CRYBB2P1	22	25911300	G	T	8.36152E-05	0.763
CRYBB2P1	22	25912063	C	T	1.03574E-05	0.191
CRYBB2P1	22	25912254	C	T	1.24627E-05	0.539
CRYBB2P1	22	25912793	A	C	5.39391E-06	0.348
CRYBB2P1	22	25913141	A	G	1.25885E-05	0.627
CRYBB2P1	22	25913768	C	T	6.42027E-07	0.708
CRYBB2P1	22	25914476	C	CAT CT	8.28483E-05	0.716
CRYBB2P1	22	25915192	C	CA	1.70413E-05	0.298
CRYBB2P1	22	25915490	A	G	1.7783E-05	0.166
CRYBB2P1	22	25915656	C	T	1.14859E-05	0.428
CRYBB2P1	22	25916084	C	G	1.26139E-05	0.091
CRYBB2P1	22	25916175	A	ATG TTT GTA AAC C	1.26562E-05	1.019
CRYBB2P1	22	25917194	C	G	1.81689E-05	0.227
CRYBB2P1	22	25917421	C	T	1.38011E-05	0.287
CRYBB2P1	22	25917708	C	T	1.39503E-05	0.095
CRYBB2P1	22	25917803	A	G	1.23638E-05	0.052
CRYBB2P1	22	25917855	C	T	5.22822E-05	0.005
CRYBB2P1	22	25917860	G	T	5.22991E-05	0.339
CRYBB2P1	22	25918199	C	T	6.88282E-05	0.475
CRYBB2P1	22	25918674	C	T	9.47513E-05	0.02
CRYBB2P1	22	25918694	A	T	1.60625E-05	0.015
CRYBB2P1	22	25918709	A	G	1.60547E-05	NA

Appendix Table 3. eQTLs of the G x S associated SNPs_CO-design

chr3.594.4_RP11-285B24.1

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs17060560	-	POC1A	Brain (0.09)	POC1A
rs2279811	-	POC1A	Brain (0.15)	POC1A

chr4.805.0_ABLIM

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs12645762	-	TRIM5	Brain - Parietal lobe (0.0000019)	TRIM5

chr6.219.6_NR_015410 not found

chr7.534.9_NR_038371.1 not found

chr8.409.5_SFRP1

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs10958656	-	EIF4EBP1	Brain - Parietal lobe (0.0038)	-
rs7838096	-	EIF4EBP1	Brain - Parietal lobe (0.0038)	-

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs60458444	-	RGS10	Artery - Aorta (0.0000032)	RGS10
rs11198934	-	RGS10	Artery - Aorta (0.0000085), Cells - Monocytes (0.00041)	RGS10
rs1999628	-	RGS10	Artery - Aorta (0.0000085), Cells - Monocytes (0.00041)	RGS10
rs11198935	-	RGS10	Artery - Aorta (0.0000085), Cells - Monocytes (0.00045)	RGS10
rs1999627	-	RGS10	Artery - Aorta (0.0000085), Cells - Monocytes (0.00063)	RGS10
rs1889430	-	RGS10	Artery - Aorta (0.0000085), Cells - Monocytes (0.00073)	RGS10
rs291979	-	GSTM1	Cells - Lymphoblastoid cell lines (0.02)	-
rs291970	-	GSTM1	Cells - Lymphoblastoid cell lines (0.03)	-
rs291979	-	TREM1	Cells - Monocytes (0.0000048)	TREM1
rs291979	-	DNMT1	Cells - Monocytes (0.0000058)	DNMT1
rs1999628	-	GRK5	Peripheral blood (0.00022)	GRK5
rs11198934	-	GRK5	Peripheral blood (0.00024)	GRK5
rs10787959	-	RGS10	Peripheral blood (0.0022)	RGS10
rs11198898	-	GRK5	Peripheral blood (0.0029)	GRK5
rs291970	-	GRK5	Peripheral blood (0.003)	GRK5
rs1999627	-	GRK5	Peripheral blood (2.2e-7)	GRK5

chr12.224.6_ST8SIA1

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog	
rs4762901	-	ACYP2	Liver (0.000002)	ACYP2	
rs2012722	-	C2CD5	Peripheral blood (0.00086)	C2CD5	
rs2160536	-	C2CD5	Peripheral blood (0.00041)	C2CD5	
rs2193179	-	C2CD5	Peripheral blood (0.0007)	C2CD5	
rs2728818	-	C2CD5	Peripheral blood (0.00068)	C2CD5	
rs2728821	-	C2CD5	Peripheral blood (0.00081)	C2CD5	
rs2900502	-	C2CD5	Peripheral blood (0.0014)	C2CD5	
rs4762901	-	C2CD5	Peripheral blood (0.00069)	C2CD5	
rs1362601	-	C3orf49	Liver (0.0000052)	C3orf49	
rs4762901	-	FAM156A	Liver (2.5e-7)	-	
rs4762901	-	IARS2	Liver (0.0000028)	-	
rs4762901	-	NCOR1	Liver (0.0000017)	-	
rs2728821	-	SSPN	Brain - Parietal lobe (0.0049)	SSPN	
rs11046350	-	ST8SIA1	Adipose - Subcutaneous (1.1e-7), Artery - Tibial (0.000022), Nerve - Tibial (0.000029), Brain - Parietal lobe (0.0095)	ST8SIA1	
rs1362601	-	ST8SIA1	Adipose - Subcutaneous (6e-9), Nerve - Tibial (0.000012), Brain - Parietal lobe (0.0094)	ST8SIA1	
rs1985103	-	ST8SIA1	Adipose - Subcutaneous (3.1e-15), Nerve - Tibial (2.8e-8), Artery - Tibial (2.4e-7), Cells - Transformed fibroblasts (0.0000041), Skin - Sun exposed (Lower leg) (0.000023), Muscle skeletal (0.000061)	ST8SIA1	

rs2012722	-	ST8SIA1	Adipose - Subcutaneous (1.2e-14), Nerve - Tibial (1.3e-8), Artery - Tibial (6.9e-8), Cells - Transformed fibroblasts (5.2e-7), Skin - Sun exposed (Lower leg) (0.00003), Brain - Parietal lobe (0.0041)	ST8SIA1
rs2160536	-	ST8SIA1	Adipose - Subcutaneous (3.1e-14), Nerve - Tibial (4.8e-7), Brain - Temporal cortex in alzheimer's disease cases and controls (0.000088)	ST8SIA1
rs2193179	-	ST8SIA1	Adipose - Subcutaneous (1.3e-14), Nerve - Tibial (6.1e-7)	ST8SIA1
rs2216230	-	ST8SIA1	Adipose - Subcutaneous (2.1e-14), Nerve - Tibial (5.2e-7), Cells - Transformed fibroblasts (0.000053)	ST8SIA1
rs2287169	-	ST8SIA1	Adipose - Subcutaneous (4.5e-13), Nerve - Tibial (8.1e-7), Artery - Tibial (0.000022)	ST8SIA1
rs2728818	-	ST8SIA1	Adipose - Subcutaneous (1.3e-13), Nerve - Tibial (9.1e-7)	ST8SIA1
rs2728821	-	ST8SIA1	Adipose - Subcutaneous (2.2e-14), Nerve - Tibial (0.000001), Brain - Parietal lobe (0.0081)	ST8SIA1
rs2900502	-	ST8SIA1	Adipose - Subcutaneous (4.7e-10), Nerve - Tibial (0.000012)	ST8SIA1
rs4762898	-	ST8SIA1	Adipose - Subcutaneous (1.4e-8), Nerve - Tibial (0.0000074), Artery - Tibial (0.00002)	ST8SIA1
rs4762901	-	ST8SIA1	Adipose - Subcutaneous (5.7e-14), Nerve - Tibial (1.3e-8), Artery - Tibial (3.5e-7), Cells - Transformed fibroblasts (0.0000095), Skin - Sun exposed (Lower leg) (0.000037), Brain - Parietal lobe (0.0067)	ST8SIA1

chr12.558.8_OR6C70

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs10783748	-	ATP5G2	Brain - Parietal lobe (0.0028)	ATP5G2
rs6581061	-	ATP5G2	Brain - Parietal lobe (0.0026)	ATP5G2
rs7133698	-	ATP5G2	Brain - Parietal lobe (0.002)	ATP5G2
rs7302745	-	ATP5G2	Brain - Parietal lobe (0.0047)	ATP5G2
rs10783748	-	INHBC	Brain - Parietal lobe (0.0023)	INHBC
rs6581061	-	INHBC	Brain - Parietal lobe (0.0022)	INHBC
rs7133698	-	INHBC	Brain - Parietal lobe (0.0026)	INHBC
rs7302745	-	INHBC	Brain - Parietal lobe (0.004)	INHBC
rs10783748	-	KRT71	Brain - Cerebellum (0.0044)	-
rs6581061	-	KRT71	Brain - Cerebellum (0.0056)	-
rs7133698	-	KRT71	Brain - Cerebellum (0.0097)	-
rs7302745	-	KRT71	Brain - Cerebellum (0.0095)	-
rs10783748	-	NAB2	Brain - Cerebellum (0.0072)	NAB2
rs6581061	-	NAB2	Brain - Cerebellum (0.0063)	NAB2
rs7133698	-	NAB2	Brain - Cerebellum (0.0062)	NAB2
rs10783748	-	NPFF	Brain - Cerebellum (0.0089)	-
rs6581061	-	NPFF	Brain - Cerebellum (0.01)	-
rs7133698	-	NPFF	Brain - Cerebellum (0.0094)	-
rs10783748	-	OR6C6	Brain - Cerebellum (0.00045)	OR6C6
rs6581061	-	OR6C6	Brain - Cerebellum (0.00062)	OR6C6
rs7133698	-	OR6C6	Brain - Cerebellum (0.0009)	OR6C6
rs7302745	-	OR6C6	Brain - Cerebellum (0.00017)	OR6C6
rs10876787	-	RDH5	Peripheral blood (8.1e-7)	RDH5
rs4422358	-	RDH5	Peripheral blood (8.2e-7)	RDH5
rs6581061	-	RDH5	Peripheral blood (6.8e-7)	RDH5
rs7133698	-	RDH5	Peripheral blood (6e-7)	RDH5
rs7302745	-	RDH5	Peripheral blood (8.2e-7)	RDH5
rs7310158	-	RDH5	Peripheral blood (8.2e-7)	RDH5
rs7310415	-	RDH5	Peripheral blood (8.2e-7)	RDH5
rs7302745	-	TIMELESS	Brain - Cerebellum (0.0095)	TIMELESS
rs10783748	-	ZNF740	Brain - Parietal lobe (0.0019)	ZNF740
rs6581061	-	ZNF740	Brain - Parietal lobe (0.0022)	ZNF740
rs7133698	-	ZNF740	Brain - Parietal lobe (0.002)	ZNF740
rs7302745	-	ZNF740	Brain - Parietal lobe (0.0043)	ZNF740

chr12.872.1_MGAT4C, chr12.109.3_SSH1 not found

chr13.902.6_LINC00353

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs7319206	-	LINC00559	Testis (0.000028)	LINC00559
rs9301591	-	LINC00559	Testis (0.000028)	LINC00559

chr17.418.1_SOST

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs1969505	-	VAT1	Brain - Cerebellum (0.0086)	VAT1
rs8071941	-	VAT1	Brain - Cerebellum (0.0098)	VAT1
rs9303537	-	VAT1	Brain - Cerebellum (0.0086)	VAT1
rs1237278	-	SOST	Artery - Tibial (8.9e-18), Brain - Cortex (3.6e-9), Artery - Aorta (5.4e-9), Artery - Coronary (1.1e-7), Heart - Atrial appendage (0.000024)	SOST
rs1513669	-	SOST	Artery - Tibial (2.6e-19), Artery - Coronary (1.4e-9), Artery - Aorta (2.7e-9), Brain - Cortex (8.8e-9), Lung (0.00004), Brain - Parietal lobe (0.0042)	SOST
rs1513670	-	SOST	Artery - Tibial (2.6e-19), Artery - Coronary (4.9e-10), Artery - Aorta (2.1e-9), Brain - Cortex (8e-9), Lung (0.000041), Brain - Parietal lobe (0.0042)	rs1513670, SOST
rs1513671	-	SOST	Artery - Tibial (5.3e-21), Artery - Aorta (1.2e-9), Artery - Coronary (3e-9), Brain - Cortex (3.5e-9)	SOST
rs1534401	-	SOST	Artery - Tibial (3.2e-17), Brain - Cortex (1.1e-9), Artery - Aorta (6.8e-9), Artery - Coronary (1.1e-7)	SOST
rs1534402	-	SOST	Artery - Tibial (7.2e-18), Brain - Cortex (1.1e-9), Artery - Aorta (6.8e-9), Artery - Coronary (1.1e-7)	SOST
rs1634330	-	SOST	Artery - Tibial (3.8e-18), Artery - Aorta (5.4e-9), Brain - Cortex (7e-9), Artery - Coronary (3.8e-8), Heart - Atrial appendage (0.000012)	SOST
rs1708635	-	SOST	Artery - Tibial (2.1e-17), Artery - Aorta (5.4e-9), Brain - Cortex (7e-9), Artery - Coronary (3.8e-8), Heart - Atrial appendage (0.000012)	SOST
rs1969505	-	SOST	Artery - Tibial (7.2e-18), Brain - Cortex (1.1e-9), Artery - Aorta (6.8e-9), Artery - Coronary (1.1e-7), Brain - Parietal lobe (0.0042)	SOST
rs1976960	-	SOST	Artery - Tibial (2.6e-17), Brain - Cortex (4.3e-10), Artery - Aorta (8.2e-9), Artery - Coronary	SOST

			(0.0000012)	
rs2076793	-	SOST	Artery - Tibial (2.4e-21), Brain - Cortex (9e-10), Artery - Aorta (9.3e-10), Artery - Coronary (1.6e-9)	SOST
rs6416905	-	SOST	Artery - Tibial (8.6e-19), Artery - Coronary (3.2e-10), Artery - Aorta (3e-9), Brain - Cortex (8.8e-9), Lung (0.000019)	SOST
rs6503474	-	SOST	Artery - Mammary (2.7e-37), Artery - Tibial (7.8e-19), Artery - Coronary (4.9e-10), Artery - Aorta (2.5e-9), Brain - Cortex (8.8e-9), Atherosclerotic aortic root (1.5e-8), Lung (0.000036)	SOST
rs6503475	-	SOST	Artery - Tibial (7.2e-18), Brain - Cortex (1.1e-9), Artery - Aorta (6.8e-9), Artery - Coronary (1.1e-7)	SOST
rs8071941	-	SOST	Artery - Tibial (7.2e-18), Brain - Cortex (1.1e-9), Artery - Aorta (6.8e-9), Artery - Coronary (1.1e-7), Brain - Parietal lobe (0.0041)	SOST
rs8073524	-	SOST	Artery - Tibial (7.1e-20), Artery - Coronary (8.5e-10), Brain - Cortex (3.5e-9), Artery - Aorta (3.9e-9), Brain - Parietal lobe (0.0042)	SOST
rs8080687	-	SOST	Artery - Tibial (7.1e-20), Artery - Coronary (8.5e-10), Brain - Cortex (3.5e-9), Artery - Aorta (3.9e-9)	SOST
rs851054	-	SOST	Artery - Tibial (1.2e-17), Brain - Cortex (1e-8), Artery - Aorta (1.2e-8), Artery - Coronary (1.1e-7), Heart - Atrial appendage (0.000018), Lung (0.00003), Brain - Parietal lobe (0.0026)	SOST
rs851055	-	SOST	Artery - Tibial (4.4e-18), Artery - Aorta (1.2e-8), Brain - Cortex (1.8e-8), Artery - Coronary (1.1e-7), Heart - Atrial appendage (0.000008), Lung (0.000055)	SOST
rs851056	-	SOST	Artery - Tibial (4.3e-18), Brain - Cortex (7.5e-9), Artery - Aorta (2.1e-8), Artery - Coronary (2.8e-8), Heart - Atrial appendage (0.000017), Brain - Parietal lobe (0.0026)	SOST
rs9303537	-	SOST	Artery - Tibial (3.5e-20), Artery - Coronary (1.4e-9), Artery - Aorta (2.9e-9), Brain - Cortex (3.5e-9), Brain - Parietal lobe (0.0042)	SOST
rs9303540	-	SOST	Artery - Tibial (6.2e-21), Brain - Cortex (1.6e-10), Artery - Aorta (4.4e-9), Artery - Coronary (2.4e-7), Heart - Atrial appendage (0.000026)	SOST
rs955412	-	SOST	Artery - Tibial (3.2e-17), Brain - Cortex (1.1e-9), Artery - Aorta (6.8e-9), Artery - Coronary (1.1e-7)	SOST
rs9908933	-	SOST	Artery - Tibial (2.4e-21), Artery - Aorta (9.3e-10), Artery - Coronary (1.6e-9), Brain - Cortex	SOST

			(2.1e-9)	
rs9913749	-	SOST	Artery - Tibial (2.6e-17), Artery - Aorta (4.5e-9), Brain - Cortex (7.7e-8), Artery - Coronary (1.9e-7)	SOST
rs1513669	-	SLC25A39	Brain - Parietal lobe (0.0083)	SLC25A39
rs1513670	-	SLC25A39	Brain - Parietal lobe (0.0083)	rs1513670, SLC25A39
rs1969505	-	SLC25A39	Brain - Parietal lobe (0.0079)	SLC25A39
rs8071941	-	SLC25A39	Brain - Parietal lobe (0.0081)	SLC25A39
rs8073524	-	SLC25A39	Brain - Parietal lobe (0.0084)	SLC25A39
rs9303537	-	SLC25A39	Brain - Parietal lobe (0.0079)	SLC25A39
rs1513669	-	SH3GL2	Cells - Monocytes (0.000003)	SH3GL2
rs1534402	-	SH3GL2	Cells - Monocytes (0.0000078)	SH3GL2
rs1969505	-	SH3GL2	Cells - Monocytes (0.0000026)	SH3GL2
rs8071941	-	SH3GL2	Cells - Monocytes (0.0000024)	SH3GL2
rs8073524	-	SH3GL2	Cells - Monocytes (0.000004)	SH3GL2
rs1513669	-	PLXDC1	Brain - Parietal lobe (0.0026)	PLXDC1
rs1513670	-	PLXDC1	Brain - Parietal lobe (0.0026)	rs1513670, PLXDC1
rs1969505	-	PLXDC1	Brain - Parietal lobe (0.0025)	PLXDC1
rs8071941	-	PLXDC1	Brain - Parietal lobe (0.0026)	PLXDC1
rs8073524	-	PLXDC1	Brain - Parietal lobe (0.0026)	PLXDC1
rs851054	-	PLXDC1	Brain - Parietal lobe (0.0017)	PLXDC1
rs851056	-	PLXDC1	Brain - Parietal lobe (0.0017)	PLXDC1
rs9303537	-	PLXDC1	Brain - Parietal lobe (0.0026)	PLXDC1
rs1513669	-	P3H4	Brain - Parietal lobe (0.0073)	P3H4

rs1513670	-	P3H4	Brain - Parietal lobe (0.0073)	rs1513670, P3H4
rs8071941	-	P3H4	Brain - Parietal lobe (0.0082)	P3H4
rs8073524	-	P3H4	Brain - Parietal lobe (0.0073)	P3H4
rs1513670	-	MS4A10	Blood (7.9e-7)	rs1513670
rs1237278	-	MPP3	Thyroid (0.000013)	MPP3
rs1513669	-	MPP3	Thyroid (0.000012)	MPP3
rs1513670	-	MPP3	Thyroid (0.000018)	rs1513670, MPP3
rs1513671	-	MPP3	Thyroid (0.0000087)	MPP3
rs1534401	-	MPP3	Thyroid (0.0000021)	MPP3
rs1534402	-	MPP3	Thyroid (0.0000026)	MPP3
rs1634330	-	MPP3	Thyroid (0.000011)	MPP3
rs1708635	-	MPP3	Thyroid (0.0000087)	MPP3
rs1969505	-	MPP3	Thyroid (0.0000026)	MPP3
rs1976960	-	MPP3	Thyroid (0.0000012)	MPP3
rs2076793	-	MPP3	Thyroid (0.0000093)	MPP3
rs6416905	-	MPP3	Thyroid (0.00002)	MPP3
rs6503474	-	MPP3	Thyroid (0.000022)	MPP3
rs6503475	-	MPP3	Thyroid (0.0000026)	MPP3
rs8071941	-	MPP3	Thyroid (0.0000026)	MPP3
rs8073524	-	MPP3	Thyroid (0.0000045)	MPP3
rs8080687	-	MPP3	Thyroid (0.0000045)	MPP3
rs851054	-	MPP3	Thyroid (0.000012)	MPP3
rs851055	-	MPP3	Thyroid (0.000012)	MPP3

rs851056	-	MPP3	Thyroid (0.000024)	MPP3
rs9303537	-	MPP3	Thyroid (0.0000053)	MPP3
rs9303540	-	MPP3	Thyroid (0.0000092)	MPP3
rs955412	-	MPP3	Thyroid (0.0000019)	MPP3
rs9908933	-	MPP3	Thyroid (0.0000093)	MPP3
rs9913749	-	MPP3	Thyroid (0.0000012)	MPP3
rs1237278	-	MPP2	Cells - Transformed fibroblasts (0.000063)	MPP2
rs1513671	-	MPP2	Cells - Transformed fibroblasts (0.000089)	MPP2
rs1634330	-	MPP2	Cells - Transformed fibroblasts (0.000052)	MPP2
rs1708635	-	MPP2	Cells - Transformed fibroblasts (0.000052)	MPP2
rs1513669	-	MLLT6	Brain - Parietal lobe (0.0015)	-
rs1513670	-	MLLT6	Brain - Parietal lobe (0.0015)	rs1513670
rs1969505	-	MLLT6	Brain - Parietal lobe (0.0013)	-
rs8071941	-	MLLT6	Brain - Parietal lobe (0.0015)	-
rs8073524	-	MLLT6	Brain - Parietal lobe (0.0015)	-
rs851054	-	MLLT6	Brain - Parietal lobe (0.002)	-
rs851056	-	MLLT6	Brain - Parietal lobe (0.002)	-
rs9303537	-	MLLT6	Brain - Parietal lobe (0.0013)	-
rs1513669	-	KLHL11	Brain - Cerebellum (0.0084)	KLHL11
rs1513670	-	KLHL11	Brain - Cerebellum (0.0084)	rs1513670, KLHL11
rs1969505	-	KLHL11	Brain - Cerebellum (0.0055)	KLHL11
rs8071941	-	KLHL11	Brain - Cerebellum (0.0074)	KLHL11
rs8073524	-	KLHL11	Brain - Cerebellum (0.0084)	KLHL11
rs851054	-	KLHL11	Brain - Cerebellum (0.0055)	KLHL11

rs851056	-	KLHL11	Brain - Cerebellum (0.0055)	KLHL11
rs9303537	-	KLHL11	Brain - Cerebellum (0.0055)	KLHL11
rs851054	-	KIF18B	Brain - Parietal lobe (0.0071), Brain - Cerebellum (0.0079)	KIF18B
rs851056	-	KIF18B	Brain - Parietal lobe (0.0071), Brain - Cerebellum (0.0079)	KIF18B
rs1513669	-	IGFBP4	Brain - Cerebellum (0.0082)	IGFBP4
rs1513670	-	IGFBP4	Brain - Cerebellum (0.0082)	rs1513670, IGFBP4
rs1969505	-	IGFBP4	Brain - Cerebellum (0.0038)	IGFBP4
rs8071941	-	IGFBP4	Brain - Cerebellum (0.0067)	IGFBP4
rs8073524	-	IGFBP4	Brain - Cerebellum (0.0082)	IGFBP4
rs851054	-	IGFBP4	Brain - Cerebellum (0.0036)	IGFBP4
rs851056	-	IGFBP4	Brain - Cerebellum (0.0036)	IGFBP4
rs9303537	-	IGFBP4	Brain - Cerebellum (0.0038)	IGFBP4
rs1513670	-	HOXD13	Blood (0.0000042)	rs1513670
rs1513669	-	HIGD1B	Brain - Parietal lobe (0.0074)	-
rs1513670	-	HIGD1B	Brain - Parietal lobe (0.0074)	rs1513670
rs8071941	-	HIGD1B	Brain - Parietal lobe (0.0085)	-
rs8073524	-	HIGD1B	Brain - Parietal lobe (0.0074)	-
rs851054	-	HIGD1B	Brain - Parietal lobe (0.0071)	-
rs851056	-	HIGD1B	Brain - Parietal lobe (0.0071)	-
rs1237278	-	DUSP3	Cells - Monocytes (1.1e-7)	DUSP3
rs1513669	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.0000041)	DUSP3
rs1513670	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.0000047)	rs1513670, DUSP3
rs1513671	-	DUSP3	Cells - Monocytes (0.0000016)	DUSP3

rs1534401	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.000004)	DUSP3
rs1534402	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.0000038)	DUSP3
rs1634330	-	DUSP3	Cells - Monocytes (1.1e-7)	DUSP3
rs1708635	-	DUSP3	Cells - Monocytes (1.1e-7)	DUSP3
rs1969505	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.0000039)	DUSP3
rs1976960	-	DUSP3	Cells - Monocytes (0.0000016)	DUSP3
rs2076793	-	DUSP3	Cells - Monocytes (0.0000013)	DUSP3
rs6416905	-	DUSP3	Cells - Monocytes (0.0000013), Peripheral blood (0.0000033)	DUSP3
rs6503474	-	DUSP3	Cells - Monocytes (0.0000032)	DUSP3
rs6503475	-	DUSP3	Cells - Monocytes (0.0000017), Peripheral blood (0.0000039)	DUSP3
rs8071941	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.000004)	DUSP3
rs8073524	-	DUSP3	Cells - Monocytes (0.0000013), Peripheral blood (0.0000048)	DUSP3
rs8080687	-	DUSP3	Cells - Monocytes (0.0000013), Peripheral blood (0.0000051)	DUSP3
rs851054	-	DUSP3	Cells - Monocytes (1.7e-7)	DUSP3
rs851055	-	DUSP3	Cells - Monocytes (1.2e-7)	DUSP3
rs851056	-	DUSP3	Cells - Monocytes (1.7e-7), Peripheral blood (3.6e-7)	DUSP3
rs9303537	-	DUSP3	Cells - Monocytes (0.0000016), Peripheral blood (0.0000043)	DUSP3
rs9303540	-	DUSP3	Cells - Monocytes (0.0000013), Peripheral blood (0.0000045)	DUSP3
rs955412	-	DUSP3	Cells - Monocytes (0.0000016)	DUSP3
rs9908933	-	DUSP3	Cells - Monocytes (0.0000012)	DUSP3
rs9913749	-	DUSP3	Cells - Monocytes (0.000013)	DUSP3
rs1513669	-	CD300LG	Brain - Parietal lobe (0.0046)	CD300LG
rs1513670	-	CD300LG	Brain - Parietal lobe (0.0046)	rs1513670, CD300LG
rs1969505	-	CD300LG	Brain - Parietal lobe (0.0047)	CD300LG

rs8071941	-	CD300LG	Brain - Parietal lobe (0.0046)	CD300LG
rs8073524	-	CD300LG	Brain - Parietal lobe (0.0046)	CD300LG
rs851054	-	CD300LG	Brain - Parietal lobe (0.0041)	CD300LG
rs851056	-	CD300LG	Brain - Parietal lobe (0.0041)	CD300LG
rs9303537	-	CD300LG	Brain - Parietal lobe (0.0048)	CD300LG

chr18.145.8_POTEC

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs12454919	-	CEP192	Brain - Parietal lobe (0.0095)	CEP192
rs12454919	-	ELMO1	Cells - Monocytes (0.0000048)	ELMO1
rs1846090	-	CEP192	Brain - Parietal lobe (0.0095)	CEP192
rs3907551	-	CEP192	Brain - Parietal lobe (0.0095)	CEP192
rs3907551	-	ELMO1	Cells - Monocytes (0.0000013)	ELMO1
rs6505920	-	CEP192	Brain - Parietal lobe (0.0029)	CEP192
rs6505920	-	ELMO1	Cells - Monocytes (0.0000044)	ELMO1
rs6505920	-	SPIRE1	Brain - Cerebellum (0.0043)	SPIRE1

chr20.559.1_BMP7

Index variant	Proxy variants (r-square)	Gene	Samples (Best P-value)	GWAS Catalog
rs2208404	-	BMP7	Skin - Sun exposed (Lower leg) (0.000012)	BMP7
rs13044198	-	RAE1	Testis (0.0000012)	-
rs1884498	-	RAE1	Testis (0.000003)	-
rs193014	-	RAE1	Testis (3.9e-8)	-
rs2038612	-	RAE1	Testis (2.6e-8)	-
rs2208404	-	RAE1	Testis (8.3e-8)	-
rs2426708	-	RAE1	Testis (2.6e-8)	-
rs4810064	-	RAE1	Testis (3.6e-8)	-
rs4811836	-	RAE1	Testis (1.1e-8)	-
rs4811837	-	RAE1	Testis (0.000017)	-
rs4811839	-	RAE1	Testis (2.6e-8)	-
rs6014975	-	RAE1	Testis (1.1e-8)	-
rs6014978	-	RAE1	Testis (2.6e-8)	-
rs6025479	-	RAE1	Testis (1.6e-9)	-
rs6025513	-	RAE1	Testis (0.000017)	-
rs6025517	-	RAE1	Testis (0.000017)	-
rs6070073	-	RAE1	Testis (0.000001)	-
rs6070075	-	RAE1	Testis (0.0000067)	-
rs6099553	-	RAE1	Testis (0.0000068)	-
rs7270995	-	RAE1	Testis (9e-7)	-
rs911901	-	RAE1	Testis (9e-7)	-
rs13044198	-	RBM38	Peripheral blood (0.000095), Cells - Macrophages (0.00054)	RBM38
rs1884498	-	RBM38	Cells - Macrophages (0.000042)	RBM38
rs193014	-	RBM38	Cells - Macrophages (0.00044)	RBM38
rs2038612	-	RBM38	Cells - Macrophages (0.0001)	RBM38
rs2426708	-	RBM38	Peripheral blood (0.00011), Cells - Macrophages (0.00025)	RBM38

rs2426709	-	RBM38	Cells - Macrophages (0.000029)	RBM38
rs4810064	-	RBM38	Cells - Macrophages (0.00041)	RBM38
rs4811836	-	RBM38	Peripheral blood (0.000058), Cells - Macrophages (0.00017)	RBM38
rs4811837	-	RBM38	Cells - Macrophages (0.000027)	RBM38
rs4811839	-	RBM38	Peripheral blood (0.000071), Cells - Macrophages (0.00024)	RBM38
rs6014975	-	RBM38	Peripheral blood (0.000064), Cells - Macrophages (0.00017)	RBM38
rs6014978	-	RBM38	Cells - Macrophages (0.00013)	RBM38
rs6025479	-	RBM38	Cells - Macrophages (0.00072)	RBM38
rs6025494	-	RBM38	Cells - Macrophages (0.00045)	RBM38
rs6025513	-	RBM38	Cells - Macrophages (0.000028)	RBM38
rs6025517	-	RBM38	Cells - Macrophages (0.000028)	RBM38
rs6070073	-	RBM38	Cells - Macrophages (0.00014)	RBM38
rs6070075	-	RBM38	Cells - Macrophages (0.000027)	RBM38
rs6099553	-	RBM38	Cells - Macrophages (0.000015), Peripheral blood (0.0014)	RBM38
rs7270995	-	RBM38	Cells - Macrophages (0.0004)	RBM38
rs911901	-	RBM38	Peripheral blood (0.00013), Cells - Macrophages (0.00041)	RBM38

chr22.259.1_CRYBB2P1 no E-QTL data found

Appendix Table 4. TAD location of Lead-SNPs and GWAS-catalog SNPs

topSNP = index SNP in den LZs	Chromosome	TAD Start hg19	TAD End hg19	TAD ID	GWAS Catalog SNPs in same TAD	in same TAD
rs56906445	3	58304960	59864960	651	rs191663403	yes
rs10029338	4	7749100	8732840	804	rs188006861, rs6841948	yes
rs1328482	6	NA	NA	NA	rs2078543, rs1928168	no TAD annotated
rs17177546	7	51472506	54832506	1390	rs145460587	yes
rs2168570	8	39720843	41440843	1529	rs77924284	yes
rs11198898	10	120810010	121370010	1900	NA	yes
rs2728821	12	22228733	22628733	2098	rs182272664, rs184061709	yes
rs10876791	12	55553733	56113733	2132	rs143053231	yes
rs10858489	12	86355869	88435869		rs75750649, rs187035304	yes
rs59680006	12	NA	NA	NA	NA	yes
rs77765463	13	88321999	90361999	2268	NA	yes
rs6498910	16	63362499	64122499	2525	NA	yes
rs750668364	17	41404474	41844474	2595	rs1513670	yes
rs9959251	18	14130000	15410000	2652	NA	yes
rs2208404	20	55646593	55966593		rs78404372	yes
rs56217753	22	25070000	26150000	2898	NA	yes

Appendix Table 5. Genes in the same TAD as top SNPs

Top SNP	Chromosome	TAD Start hg19	TAD End hg19	ENSGID	Name	Description
rs56906445	3	58304960	59864960	ENSG00000168309	FAM107A	family with sequence similarity 107 member A [Source:HGNC Symbol;Acc:HGNC:30827]
rs56906445	3	58304960	59864960	ENSG00000168291	PDHB	pyruvate dehydrogenase (lipoamide) beta [Source:HGNC Symbol;Acc:HGNC:8808]
rs56906445	3	58304960	59864960	ENSG00000163689	C3orf67	chromosome 3 open reading frame 67 [Source:HGNC Symbol;Acc:HGNC:24763]
rs56906445	3	58304960	59864960	ENSG00000168297	PXK	PX domain containing serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:23326]
rs56906445	3	58304960	59864960	ENSG00000168301	KCTD6	potassium channel tetramerization domain containing 6 [Source:HGNC Symbol;Acc:HGNC:22235]
rs56906445	3	58304960	59864960	ENSG00000198643	FAM3D	family with sequence similarity 3 member D [Source:HGNC Symbol;Acc:HGNC:18665]
rs56906445	3	58304960	59864960	ENSG00000168306	ACOX2	acyl-CoA oxidase 2, branched chain [Source:HGNC Symbol;Acc:HGNC:120]
rs56906445	3	58304960	59864960	ENSG00000242428	C3orf67-AS1	C3orf67 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:41063]
rs56906445	3	58304960	59864960	ENSG00000244383	FAM3D-AS1	FAM3D antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:41276]
rs56906445	3	58304960	59864960	ENSG00000273493	RP11-80H18.4	NA
rs56906445	3	58304960	59864960	ENSG00000272182	RP11-802O23.3	NA
rs56906445	3	58304960	59864960	ENSG00000272360	RP11-359I18.5	NA
rs56906445	3	58304960	59864960	ENSG00000236722	RP11-359I18.1	NA
rs56906445	3	58304960	59864960	ENSG00000243384	RP11-475O23.2	NA
rs56906445	3	58304960	59864960	ENSG0000024329	CTD-	NA

5				5	2185K10.1	
rs5690644 5	3	58304960	59864960	ENSG0000024390 3	RP11- 285B24.1	NA
rs5690644 5	3	58304960	59864960	ENSG0000024254 5	RP11- 719N22.2	NA
rs5690644 5	3	58304960	59864960	ENSG0000024180 4	RP11- 719N22.1	NA
rs1002933 8	4	7749100	8732840	ENSG0000008700 8	ACOX3	acyl-CoA oxidase 3, pristanoyl [Source:HGNC Symbol;Acc:HGNC:121]
rs1002933 8	4	7749100	8732840	ENSG0000017080 1	HTRA3	HtrA serine peptidase 3 [Source:HGNC Symbol;Acc:HGNC:30406]
rs1002933 8	4	7749100	8732840	ENSG0000010962 5	CPZ	carboxypeptidase Z [Source:HGNC Symbol;Acc:HGNC:2333]
rs1002933 8	4	7749100	8732840	ENSG0000016399 5	ABLIM2	actin binding LIM protein family member 2 [Source:HGNC Symbol;Acc:HGNC:19195]
rs1002933 8	4	7749100	8732840	ENSG0000015527 5	TRMT44	tRNA methyltransferase 44 homolog (S. cerevisiae) [Source:HGNC Symbol;Acc:HGNC:26653]
rs1002933 8	4	7749100	8732840	ENSG0000019652 6	AFAP1	actin filament associated protein 1 [Source:HGNC Symbol;Acc:HGNC:24017]
rs1002933 8	4	7749100	8732840	ENSG0000012508 9	SH3TC1	SH3 domain and tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:26009]
rs1002933 8	4	7749100	8732840	ENSG0000015526 9	GPR78	G protein-coupled receptor 78 [Source:HGNC Symbol;Acc:HGNC:4528]
rs1002933 8	4	7749100	8732840	ENSG0000027262 0	AFAP1-AS1	AFAP1 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:28141]
rs1002933 8	4	7749100	8732840	ENSG0000020780 7	MIR95	microRNA 95 [Source:HGNC Symbol;Acc:HGNC:31647]
rs1002933 8	4	7749100	8732840	ENSG0000025047 1	GMPSP1	guanine monophosphate synthase pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39428]
rs1002933 8	4	7749100	8732840	ENSG0000020205 4	RNA5SP152	RNA, 5S ribosomal pseudogene 152 [Source:HGNC Symbol;Acc:HGNC:43052]
rs1002933 8	4	7749100	8732840	ENSG0000022891 9	AC097381.1	NA
rs1002933 8	4	7749100	8732840	ENSG0000027326 7	RP11- 338K13.1	NA
rs1002933	4	7749100	8732840	ENSG0000025146	RP11-	NA

8				0	1258F18.1	
rs10029338	4	7749100	8732840	ENSG00000249145	RP11-774O3.2	NA
rs10029338	4	7749100	8732840	ENSG00000248986	RP11-774O3.1	NA
rs10029338	4	7749100	8732840	ENSG00000251615	RP11-774O3.3	NA
rs10029338	4	7749100	8732840	ENSG00000251186	RP11-689P11.3	NA
rs10029338	4	7749100	8732840	ENSG00000205959	RP11-689P11.2	NA
rs17177546	7	51472506	54832506	ENSG00000132432	SEC61G	Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]
rs17177546	7	51472506	54832506	ENSG00000221900	POM121L12	POM121 transmembrane nucleoporin like 12 [Source:HGNC Symbol;Acc:HGNC:25369]
rs17177546	7	51472506	54832506	ENSG00000170419	VSTM2A	V-set and transmembrane domain containing 2A [Source:HGNC Symbol;Acc:HGNC:28499]
rs17177546	7	51472506	54832506	ENSG00000224223	VSTM2A-OT1	VSTM2A overlapping transcript 1 [Source:HGNC Symbol;Acc:HGNC:50770]
rs17177546	7	51472506	54832506	ENSG00000205628	LINC01446	long intergenic non-protein coding RNA 1446 [Source:HGNC Symbol;Acc:HGNC:50773]
rs17177546	7	51472506	54832506	ENSG00000231427	LINC01445	long intergenic non-protein coding RNA 1445 [Source:HGNC Symbol;Acc:HGNC:50771]
rs17177546	7	51472506	54832506	ENSG00000227344	HAUS6P1	HAUS augmin like complex subunit 6 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:43764]
rs17177546	7	51472506	54832506	ENSG00000235454	HAUS6P3	HAUS augmin like complex subunit 6 pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:50772]
rs17177546	7	51472506	54832506	ENSG00000271306	RAC1P9	ras-related C3 botulinum toxin substrate 1 pseudogene 9 [Source:HGNC Symbol;Acc:HGNC:50774]
rs17177546	7	51472506	54832506	ENSG00000232612	RPL31P35	ribosomal protein L31 pseudogene 35 [Source:HGNC Symbol;Acc:HGNC:36932]
rs17177546	7	51472506	54832506	ENSG00000271194	RNF138P2	ring finger protein 138, E3 ubiquitin protein ligase pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:50775]
rs1717754	7	51472506	54832506	ENSG0000022215	RN7SKP218	RNA, 7SK small nuclear pseudogene 218

6				4		[Source:HGNC Symbol;Acc:HGNC:45942]
rs1717754 6	7	51472506	54832506	ENSG0000024265 0	RN7SL292P	RNA, 7SL, cytoplasmic 292, pseudogene [Source:HGNC Symbol;Acc:HGNC:46308]
rs1717754 6	7	51472506	54832506	ENSG0000019962 9	RNU1-14P	RNA, U1 small nuclear 14, pseudogene [Source:HGNC Symbol;Acc:HGNC:10139]
rs1717754 6	7	51472506	54832506	ENSG0000022235 5	RNU2-29P	RNA, U2 small nuclear 29, pseudogene [Source:HGNC Symbol;Acc:HGNC:48522]
rs1717754 6	7	51472506	54832506	ENSG0000020047 1	RNU6-1125P	RNA, U6 small nuclear 1125, pseudogene [Source:HGNC Symbol;Acc:HGNC:48088]
rs1717754 6	7	51472506	54832506	ENSG0000022947 8	ROBO2P1	roundabout guidance receptor 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:44386]
rs1717754 6	7	51472506	54832506	ENSG0000023430 4	SGOL1P2	shugoshin-like 1 (S. pombe) pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:50777]
rs1717754 6	7	51472506	54832506	ENSG0000025302 8	SNORA31	Small nucleolar RNA SNORA31 [Source:RFAM;Acc:RF00322]
rs1717754 6	7	51472506	54832506	ENSG0000021367 3	SLC25A5P3	solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 5 pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:507]
rs1717754 6	7	51472506	54832506	ENSG0000022940 3	RP4-718N17.2	NA
rs1717754 6	7	51472506	54832506	ENSG0000023396 0	RP11- 153N17.1	NA
rs1717754 6	7	51472506	54832506	ENSG0000022397 0	RP11-598O8.1	NA
rs1717754 6	7	51472506	54832506	ENSG0000023410 5	GS1-278J22.1	NA
rs1717754 6	7	51472506	54832506	ENSG0000022862 7	GS1-278J22.2	NA
rs1717754 6	7	51472506	54832506	ENSG0000023241 8	RP11-678B3.1	NA
rs1717754 6	7	51472506	54832506	ENSG0000023813 1	RP11-806J6.1	NA
rs1717754 6	7	51472506	54832506	ENSG0000022873 5	GS1-18A18.2	NA
rs2168570	8	39720843	41440843	ENSG0000013120	IDO1	indoleamine 2,3-dioxygenase 1 [Source:HGNC

				3		Symbol;Acc:HGNC:6059]
rs2168570	8	39720843	41440843	ENSG0000018867 6	IDO2	indoleamine 2,3-dioxygenase 2 [Source:HGNC Symbol;Acc:HGNC:27269]
rs2168570	8	39720843	41440843	ENSG0000014753 3	GOLGA7	golgin A7 [Source:HGNC Symbol;Acc:HGNC:24876]
rs2168570	8	39720843	41440843	ENSG0000010433 2	SFRP1	secreted frizzled-related protein 1 [Source:HGNC Symbol;Acc:HGNC:10776]
rs2168570	8	39720843	41440843	ENSG0000014753 6	GIN54	GIN5 complex subunit 4 (Sld5 homolog) [Source:HGNC Symbol;Acc:HGNC:28226]
rs2168570	8	39720843	41440843	ENSG0000016506 1	ZMAT4	zinc finger, matrin-type 4 [Source:HGNC Symbol;Acc:HGNC:25844]
rs2168570	8	39720843	41440843	ENSG0000017690 7	C8orf4	chromosome 8 open reading frame 4 [Source:HGNC Symbol;Acc:HGNC:1357]
rs2168570	8	39720843	41440843	ENSG0000026337 2	MIR548AO	microRNA 548ao [Source:HGNC Symbol;Acc:HGNC:43539]
rs2168570	8	39720843	41440843	ENSG0000025339 6	RP11-15G16.1	NA
rs2168570	8	39720843	41440843	ENSG0000025394 3	KRT18P37	keratin 18 pseudogene 37 [Source:HGNC Symbol;Acc:HGNC:33406]
rs2168570	8	39720843	41440843	ENSG0000023928 1	RPS29P2	ribosomal protein S29 pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:31083]
rs2168570	8	39720843	41440843	ENSG0000020686 7	RNU6-356P	RNA, U6 small nuclear 356, pseudogene [Source:HGNC Symbol;Acc:HGNC:47319]
rs2168570	8	39720843	41440843	ENSG0000020685 2	RNU6-895P	RNA, U6 small nuclear 895, pseudogene [Source:HGNC Symbol;Acc:HGNC:47858]
rs2168570	8	39720843	41440843	ENSG0000023893 6	SNORD65	Small nucleolar RNA SNORD65 [Source:RFAM;Acc:RF00571]
rs2168570	8	39720843	41440843	ENSG0000025323 3	KB- 1582A10.2	NA
rs2168570	8	39720843	41440843	ENSG0000025393 9	RP11-44K6.3	NA
rs2168570	8	39720843	41440843	ENSG0000025383 8	RP11-44K6.2	NA
rs2168570	8	39720843	41440843	ENSG0000025428 7	RP11-44K6.4	NA
rs2168570	8	39720843	41440843	ENSG0000025379	RP11-44K6.5	NA

				0		
rs2168570	8	39720843	41440843	ENSG00000253381	RP11-359E19.1	NA
rs2168570	8	39720843	41440843	ENSG00000253665	RP11-359E19.2	NA
rs2168570	8	39720843	41440843	ENSG00000254143	RP11-470M17.2	NA
rs2168570	8	39720843	41440843	ENSG00000253802	CTA-392C11.1	NA
rs2168570	8	39720843	41440843	ENSG00000253354	CTA-392C11.2	NA
rs2168570	8	39720843	41440843	ENSG00000272479	RP11-301G7.1	NA
rs2168570	8	39720843	41440843	ENSG00000254383	RP11-465K16.1	NA
rs2168570	8	39720843	41440843	ENSG00000253509	CTD-3080F16.3	NA
rs2168570	8	39720843	41440843	ENSG00000253133	RP11-360L9.4	NA
rs2168570	8	39720843	41440843	ENSG00000253174	RP11-360L9.7	NA
rs11198898	10	120810010	121370010	ENSG00000148908	RGS10	regulator of G-protein signaling 10 [Source:HGNC Symbol;Acc:HGNC:9992]
rs11198898	10	120810010	121370010	ENSG00000165672	PRDX3	peroxiredoxin 3 [Source:HGNC Symbol;Acc:HGNC:9354]
rs11198898	10	120810010	121370010	ENSG00000198873	GRK5	G protein-coupled receptor kinase 5 [Source:HGNC Symbol;Acc:HGNC:4544]
rs11198898	10	120810010	121370010	ENSG00000151923	TIAL1	TIA1 cytotoxic granule-associated RNA binding protein-like 1 [Source:HGNC Symbol;Acc:HGNC:11804]
rs11198898	10	120810010	121370010	ENSG00000183605	SFXN4	sideroflexin 4 [Source:HGNC Symbol;Acc:HGNC:16088]
rs11198898	10	120810010	121370010	ENSG00000119979	FAM45A	family with sequence similarity 45 member A [Source:HGNC Symbol;Acc:HGNC:31793]
rs11198898	10	120810010	121370010	ENSG00000207468	SNORA19	small nucleolar RNA, H/ACA box 19 [Source:HGNC Symbol;Acc:HGNC:32609]

rs11198898	10	120810010	121370010	ENSG00000265719	MIR4681	microRNA 4681 [Source:HGNC Symbol;Acc:HGNC:41753]
rs11198898	10	120810010	121370010	ENSG00000228485	GRK5-IT1	GRK5 intronic transcript 1 [Source:HGNC Symbol;Acc:HGNC:49478]
rs11198898	10	120810010	121370010	ENSG00000242853	RN7SL749P	RNA, 7SL, cytoplasmic 749, pseudogene [Source:HGNC Symbol;Acc:HGNC:46765]
rs11198898	10	120810010	121370010	ENSG00000222588	SNORA19	Small nucleolar RNA SNORA19 [Source:RFAM;Acc:RF00413]
rs11198898	10	120810010	121370010	ENSG00000271343	RP11-435O11.5	NA
rs11198898	10	120810010	121370010	ENSG00000236426	RP11-79M19.2	NA
rs11198898	10	120810010	121370010	ENSG00000271353	RP11-179H18.8	NA
rs2728821	12	22228733	22628733	ENSG00000212172	RNU1-149P	RNA, U1 small nuclear 149, pseudogene [Source:HGNC Symbol;Acc:HGNC:48491]
rs2728821	12	22228733	22628733	ENSG00000256714	RP11-73M14.1	NA
rs2728821	12	22228733	22628733	ENSG00000256973	RP11-359J14.2	NA
rs10876791	12	55553733	56113733	ENSG00000197706	OR6C74	olfactory receptor family 6 subfamily C member 74 [Source:HGNC Symbol;Acc:HGNC:31303]
rs10876791	12	55553733	56113733	ENSG00000205327	OR6C68	olfactory receptor family 6 subfamily C member 68 [Source:HGNC Symbol;Acc:HGNC:31297]
rs10876791	12	55553733	56113733	ENSG00000188324	OR6C6	olfactory receptor family 6 subfamily C member 6 [Source:HGNC Symbol;Acc:HGNC:31293]
rs10876791	12	55553733	56113733	ENSG00000184954	OR6C70	olfactory receptor family 6 subfamily C member 70 [Source:HGNC Symbol;Acc:HGNC:31299]
rs10876791	12	55553733	56113733	ENSG00000205328	OR6C65	olfactory receptor family 6 subfamily C member 65 [Source:HGNC Symbol;Acc:HGNC:31295]
rs10876791	12	55553733	56113733	ENSG00000187857	OR6C75	olfactory receptor family 6 subfamily C member 75 [Source:HGNC Symbol;Acc:HGNC:31304]
rs10876791	12	55553733	56113733	ENSG00000185821	OR6C76	olfactory receptor family 6 subfamily C member 76 [Source:HGNC Symbol;Acc:HGNC:31305]
rs10876791	12	55553733	56113733	ENSG00000135424	ITGA7	integrin subunit alpha 7 [Source:HGNC Symbol;Acc:HGNC:6143]

rs1087679 1	12	55553733	56113733	ENSG0000017043 9	METTL7B	methyltransferase like 7B [Source:HGNC Symbol;Acc:HGNC:28276]
rs1087679 1	12	55553733	56113733	ENSG0000017962 6	OR6C4	olfactory receptor family 6 subfamily C member 4 [Source:HGNC Symbol;Acc:HGNC:19632]
rs1087679 1	12	55553733	56113733	ENSG0000017961 5	OR2AP1	olfactory receptor family 2 subfamily AP member 1 [Source:HGNC Symbol;Acc:HGNC:15335]
rs1087679 1	12	55553733	56113733	ENSG0000017539 8	OR10P1	olfactory receptor family 10 subfamily P member 1 [Source:HGNC Symbol;Acc:HGNC:15378]
rs1087679 1	12	55553733	56113733	ENSG0000017991 9	OR10A7	olfactory receptor family 10 subfamily A member 7 [Source:HGNC Symbol;Acc:HGNC:15329]
rs1087679 1	12	55553733	56113733	ENSG0000020533 0	OR6C1	olfactory receptor family 6 subfamily C member 1 [Source:HGNC Symbol;Acc:HGNC:8355]
rs1087679 1	12	55553733	56113733	ENSG0000020532 9	OR6C3	olfactory receptor family 6 subfamily C member 3 [Source:HGNC Symbol;Acc:HGNC:15437]
rs1087679 1	12	55553733	56113733	ENSG0000017969 5	OR6C2	olfactory receptor family 6 subfamily C member 2 [Source:HGNC Symbol;Acc:HGNC:15436]
rs1087679 1	12	55553733	56113733	ENSG0000027283 7	OR10AE3P	olfactory receptor family 10 subfamily AE member 3 pseudogene [Source:HGNC Symbol;Acc:HGNC:31235]
rs1087679 1	12	55553733	56113733	ENSG0000022742 3	OR10U1P	olfactory receptor family 10 subfamily U member 1 pseudogene [Source:HGNC Symbol;Acc:HGNC:15332]
rs1087679 1	12	55553733	56113733	ENSG0000023030 7	OR6C5P	olfactory receptor family 6 subfamily C member 5 pseudogene [Source:HGNC Symbol;Acc:HGNC:31292]
rs1087679 1	12	55553733	56113733	ENSG0000023467 0	OR6C64P	olfactory receptor family 6 subfamily C member 64 pseudogene [Source:HGNC Symbol;Acc:HGNC:31294]
rs1087679 1	12	55553733	56113733	ENSG0000023360 6	OR6C66P	olfactory receptor family 6 subfamily C member 66 pseudogene [Source:HGNC Symbol;Acc:HGNC:31296]
rs1087679 1	12	55553733	56113733	ENSG0000021345 1	OR6C69P	olfactory receptor family 6 subfamily C member 69 pseudogene [Source:HGNC Symbol;Acc:HGNC:31298]
rs1087679 1	12	55553733	56113733	ENSG0000025775 7	OR6C7P	olfactory receptor family 6 subfamily C member 7 pseudogene [Source:HGNC

						Symbol;Acc:HGNC:31306]
rs1087679 1	12	55553733	56113733	ENSG0000020340 8	OR6C71P	olfactory receptor family 6 subfamily C member 71 pseudogene [Source:HGNC Symbol;Acc:HGNC:31300]
rs1087679 1	12	55553733	56113733	ENSG0000020533 1	OR6C72P	olfactory receptor family 6 subfamily C member 72 pseudogene [Source:HGNC Symbol;Acc:HGNC:31301]
rs1087679 1	12	55553733	56113733	ENSG0000025741 4	OR6C73P	olfactory receptor family 6 subfamily C member 73 pseudogene [Source:HGNC Symbol;Acc:HGNC:31302]
rs1087679 1	12	55553733	56113733	ENSG0000027293 7	OR6U2P	olfactory receptor family 6 subfamily U member 2 pseudogene [Source:HGNC Symbol;Acc:HGNC:19631]
rs1087679 1	12	55553733	56113733	ENSG0000017989 9	PHC1P1	polyhomeotic homolog 1 (Drosophila) pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:34502]
rs1087679 1	12	55553733	56113733	ENSG0000025876 3	RP11- 110A12.2	NA
rs1087679 1	12	55553733	56113733	ENSG0000025892 1	RP11- 644F5.16	NA
rs1087679 1	12	55553733	56113733	ENSG0000025890 7	RP11- 644F5.15	NA
rs1087679 1	12	55553733	56113733	ENSG0000027045 8	RP11- 644F5.17	NA
rs1087679 1	12	55553733	56113733	ENSG0000026601 6	AC016993.1	NA
rs7776546 3	13	88321999	90361999	ENSG0000016530 0	SLITRK5	SLIT and NTRK like family member 5 [Source:HGNC Symbol;Acc:HGNC:20295]
rs7776546 3	13	88321999	90361999	ENSG0000023101 9	RP11-545P6.2	NA
rs7776546 3	13	88321999	90361999	ENSG0000022603 7	LINC01040	long intergenic non-protein coding RNA 1040 [Source:HGNC Symbol;Acc:HGNC:49028]
rs7776546 3	13	88321999	90361999	ENSG0000023222 5	LINC01047	long intergenic non-protein coding RNA 1047 [Source:HGNC Symbol;Acc:HGNC:49041]
rs7776546 3	13	88321999	90361999	ENSG0000023321 1	GRPEL2P1	GrpE-like 2, mitochondrial (E. coli) pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:41969]
rs7776546	13	88321999	90361999	ENSG0000023617	LINC00353	long intergenic non-protein coding RNA 353

3				6		[Source:HGNC Symbol;Acc:HGNC:42671]
rs7776546 3	13	88321999	90361999	ENSG0000022340 4	LINC00397	long intergenic non-protein coding RNA 397 [Source:HGNC Symbol;Acc:HGNC:42725]
rs7776546 3	13	88321999	90361999	ENSG0000022944 3	LINC00433	long intergenic non-protein coding RNA 433 [Source:HGNC Symbol;Acc:HGNC:42768]
rs7776546 3	13	88321999	90361999	ENSG0000023466 0	LINC00440	long intergenic non-protein coding RNA 440 [Source:HGNC Symbol;Acc:HGNC:42777]
rs7776546 3	13	88321999	90361999	ENSG0000026166 6	LINC00560	long intergenic non-protein coding RNA 560 [Source:HGNC Symbol;Acc:HGNC:43704]
rs7776546 3	13	88321999	90361999	ENSG0000022528 9	RPL29P29	ribosomal protein L29 pseudogene 29 [Source:HGNC Symbol;Acc:HGNC:36577]
rs7776546 3	13	88321999	90361999	ENSG0000022553 0	SP3P	Sp3 transcription factor pseudogene [Source:HGNC Symbol;Acc:HGNC:35430]
rs7776546 3	13	88321999	90361999	ENSG0000023220 4	TET1P1	tet methylcytosine dioxygenase 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:33586]
rs7776546 3	13	88321999	90361999	ENSG0000022724 7	TRIM60P13	tripartite motif containing 60 pseudogene 13 [Source:HGNC Symbol;Acc:HGNC:38485]
rs7776546 3	13	88321999	90361999	ENSG0000027204 6	RP11- 471M2.3	NA
rs7776546 3	13	88321999	90361999	ENSG0000022305 9	AL354896.1	NA
rs7776546 3	13	88321999	90361999	ENSG0000027139 5	RP11-75N6.3	NA
rs6498910	16	63362499	64122499	ENSG0000024180 8	RPS15AP34	ribosomal protein S15a pseudogene 34 [Source:HGNC Symbol;Acc:HGNC:35609]
rs6498910	16	63362499	64122499	ENSG0000026174 3	RP11-2K6.2	NA
rs6498910	16	63362499	64122499	ENSG0000025986 4	RP11- 370P15.1	NA
rs6498910	16	63362499	64122499	ENSG0000026101 4	RP11- 370P15.2	NA
rs6498910	16	63362499	64122499	ENSG0000026165 3	RP11-21L1.1	NA
rs6416905	17	41404474	41844474	ENSG0000017583 2	ETV4	ets variant 4 [Source:HGNC Symbol;Acc:HGNC:3493]
rs6416905	17	41404474	41844474	ENSG0000017590	ARL4D	ADP ribosylation factor like GTPase 4D

				6		[Source:HGNC Symbol;Acc:HGNC:656]
rs6416905	17	41404474	41844474	ENSG00000005102	MEOX1	mesenchyme homeobox 1 [Source:HGNC Symbol;Acc:HGNC:7013]
rs6416905	17	41404474	41844474	ENSG000000067596	DHX8	DEAH (Asp-Glu-Ala-His) box polypeptide 8 [Source:HGNC Symbol;Acc:HGNC:2749]
rs6416905	17	41404474	41844474	ENSG00000167941	SOST	sclerostin [Source:HGNC Symbol;Acc:HGNC:13771]
rs6416905	17	41404474	41844474	ENSG00000188825	LINC00910	long intergenic non-protein coding RNA 910 [Source:HGNC Symbol;Acc:HGNC:44361]
rs6416905	17	41404474	41844474	ENSG00000267151	MIR2117HG	MIR2117 host gene [Source:HGNC Symbol;Acc:HGNC:51999]
rs6416905	17	41404474	41844474	ENSG00000252882	RNU6-1137P	RNA, U6 small nuclear 1137, pseudogene [Source:HGNC Symbol;Acc:HGNC:48100]
rs6416905	17	41404474	41844474	ENSG00000252279	RNU6-406P	RNA, U6 small nuclear 406, pseudogene [Source:HGNC Symbol;Acc:HGNC:47369]
rs6416905	17	41404474	41844474	ENSG00000251763	RNU6-470P	RNA, U6 small nuclear 470, pseudogene [Source:HGNC Symbol;Acc:HGNC:47433]
rs6416905	17	41404474	41844474	ENSG00000252729	RNU6-971P	RNA, U6 small nuclear 971, pseudogene [Source:HGNC Symbol;Acc:HGNC:47934]
rs6416905	17	41404474	41844474	ENSG00000237888	AC087650.1	NA
rs6416905	17	41404474	41844474	ENSG00000267747	RP11-392O1.4	NA
rs6416905	17	41404474	41844474	ENSG00000267440	CTC-501O10.1	NA
rs6416905	17	41404474	41844474	ENSG00000267253	RP11-209M4.1	NA
rs9959251	18	14130000	15410000	ENSG00000183206	POTEC	POTE ankyrin domain family member C [Source:HGNC Symbol;Acc:HGNC:33894]
rs9959251	18	14130000	15410000	ENSG00000180777	ANKRD30B	ankyrin repeat domain 30B [Source:HGNC Symbol;Acc:HGNC:24165]
rs9959251	18	14130000	15410000	ENSG00000265787	CYP4F35P	cytochrome P450 family 4 subfamily F member 35, pseudogene [Source:HGNC Symbol;Acc:HGNC:39954]
rs9959251	18	14130000	15410000	ENSG00000266554	LINC01443	long intergenic non-protein coding RNA 1443 [Source:HGNC Symbol;Acc:HGNC:50768]

rs9959251	18	14130000	15410000	ENSG0000026549 9	MIR3156-2	microRNA 3156-2 [Source:HGNC Symbol;Acc:HGNC:38213]
rs9959251	18	14130000	15410000	ENSG0000026430 1	LINC01444	long intergenic non-protein coding RNA 1444 [Source:HGNC Symbol;Acc:HGNC:50769]
rs9959251	18	14130000	15410000	ENSG0000018648 1	ANKRD20A5 P	ankyrin repeat domain 20 family member A5, pseudogene [Source:HGNC Symbol;Acc:HGNC:33833]
rs9959251	18	14130000	15410000	ENSG0000026563 1	BNIP3P3	BCL2/adenovirus E1B 19kDa interacting protein 3 pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:39656]
rs9959251	18	14130000	15410000	ENSG0000026576 6	CXADRP3	coxsackie virus and adenovirus receptor pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:33974]
rs9959251	18	14130000	15410000	ENSG0000026529 6	FEM1AP2	fem-1 homolog a (C. elegans) pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:39830]
rs9959251	18	14130000	15410000	ENSG0000026406 1	FGF7P1	fibroblast growth factor 7 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:21455]
rs9959251	18	14130000	15410000	ENSG0000026770 4	FRG2LP	FSDH region gene 2 family member L, pseudogene [Source:HGNC Symbol;Acc:HGNC:51798]
rs9959251	18	14130000	15410000	ENSG0000026624 2	GRAMD4P7	GRAM domain containing 4 pseudogene 7 [Source:HGNC Symbol;Acc:HGNC:49142]
rs9959251	18	14130000	15410000	ENSG0000026660 5	LONRF2P1	LON peptidase N-terminal domain and ring finger 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39828]
rs9959251	18	14130000	15410000	ENSG0000017531 9	NF1P5	neurofibromin 1 pseudogene 5 [Source:HGNC Symbol;Acc:HGNC:7770]
rs9959251	18	14130000	15410000	ENSG0000026534 0	OR4K7P	olfactory receptor family 4 subfamily K member 7 pseudogene [Source:HGNC Symbol;Acc:HGNC:14756]
rs9959251	18	14130000	15410000	ENSG0000026669 3	OR4K8P	olfactory receptor family 4 subfamily K member 8 pseudogene [Source:HGNC Symbol;Acc:HGNC:14787]
rs9959251	18	14130000	15410000	ENSG0000026614 5	RHOT1P1	ras homolog family member T1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:23777]
rs9959251	18	14130000	15410000	ENSG0000020013 2	RNU6-1021P	RNA, U6 small nuclear 1021, pseudogene [Source:HGNC Symbol;Acc:HGNC:47984]
rs9959251	18	14130000	15410000	ENSG0000020064	RNU6-1210P	RNA, U6 small nuclear 1210, pseudogene

				5		[Source:HGNC Symbol;Acc:HGNC:48173]
rs9959251	18	14130000	15410000	ENSG00000212329	RNU6-316P	RNA, U6 small nuclear 316, pseudogene [Source:HGNC Symbol;Acc:HGNC:47279]
rs9959251	18	14130000	15410000	ENSG00000222087	RNU6-721P	RNA, U6 small nuclear 721, pseudogene [Source:HGNC Symbol;Acc:HGNC:47684]
rs9959251	18	14130000	15410000	ENSG00000264570	SNX19P3	sorting nexin 19 pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:38116]
rs9959251	18	14130000	15410000	ENSG00000187589	TERF1P2	telomeric repeat binding factor (NIMA-interacting) 1 pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:38110]
rs9959251	18	14130000	15410000	ENSG00000267324	RP11-411B10.5	NA
rs9959251	18	14130000	15410000	ENSG00000264222	RP11-757O6.1	NA
rs9959251	18	14130000	15410000	ENSG00000265437	RP11-757O6.4	NA
rs9959251	18	14130000	15410000	ENSG00000265481	AP006564.1	NA
rs9959251	18	14130000	15410000	ENSG00000265737	RP11-1157N2_B.2	NA
rs9959251	18	14130000	15410000	ENSG00000265786	RP11-527H14.6	NA
rs9959251	18	14130000	15410000	ENSG00000263618	RP11-527H14.4	NA
rs9959251	18	14130000	15410000	ENSG00000263821	RP11-527H14.1	NA
rs9959251	18	14130000	15410000	ENSG00000266522	RP11-805F19.4	NA
rs9959251	18	14130000	15410000	ENSG00000263635	RP11-805F19.2	NA
rs9959251	18	14130000	15410000	ENSG00000264880	RP11-805F19.1	NA
rs9959251	18	14130000	15410000	ENSG00000265015	RP11-454P7.3	NA
rs9959251	18	14130000	15410000	ENSG00000266818	RP11-454P7.1	NA

rs9959251	18	14130000	15410000	ENSG00000215512	AP005901.1	NA
rs56217753	22	25070000	26150000	ENSG00000100068	LRP5L	LDL receptor related protein 5 like [Source:HGNC Symbol;Acc:HGNC:25323]
rs56217753	22	25070000	26150000	ENSG00000100053	CRYBB3	crystallin beta B3 [Source:HGNC Symbol;Acc:HGNC:2400]
rs56217753	22	25070000	26150000	ENSG00000100077	ADRBK2	adrenergic, beta, receptor kinase 2 [Source:HGNC Symbol;Acc:HGNC:290]
rs56217753	22	25070000	26150000	ENSG00000244752	CRYBB2	crystallin beta B2 [Source:HGNC Symbol;Acc:HGNC:2398]
rs56217753	22	25070000	26150000	ENSG00000167037	SGSM1	small G protein signaling modulator 1 [Source:HGNC Symbol;Acc:HGNC:29410]
rs56217753	22	25070000	26150000	ENSG00000206069	TMEM211	transmembrane protein 211 [Source:HGNC Symbol;Acc:HGNC:33725]
rs56217753	22	25070000	26150000	ENSG00000184571	PIWIL3	piwi-like RNA-mediated gene silencing 3 [Source:HGNC Symbol;Acc:HGNC:18443]
rs56217753	22	25070000	26150000	ENSG00000197077	KIAA1671	KIAA1671 [Source:HGNC Symbol;Acc:HGNC:29345]
rs56217753	22	25070000	26150000	ENSG00000100058	CRYBB2P1	crystallin beta B2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:2399]
rs56217753	22	25070000	26150000	ENSG00000203280	CTA-221G9.12	NA
rs56217753	22	25070000	26150000	ENSG00000224806	ARL5AP4	ADP ribosylation factor like GTPase 5A pseudogene 4 [Source:HGNC Symbol;Acc:HGNC:43936]
rs56217753	22	25070000	26150000	ENSG00000182351	CRIP1P4	cysteine-rich protein 1 (intestinal) pseudogene 4 [Source:HGNC Symbol;Acc:HGNC:44519]
rs56217753	22	25070000	26150000	ENSG00000271138	IGLVIVOR22-1	immunoglobulin lambda variable (IV)/OR22-1 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:15694]
rs56217753	22	25070000	26150000	ENSG00000206066	IGLL3P	immunoglobulin lambda-like polypeptide 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:5872]
rs56217753	22	25070000	26150000	ENSG00000222585	RNA5SP494	RNA, 5S ribosomal pseudogene 494 [Source:HGNC Symbol;Acc:HGNC:43394]
rs56217753	22	25070000	26150000	ENSG00000199783	SNORD56	Small nucleolar RNA SNORD56 [Source:RFAM;Acc:RF00275]

rs5621775 3	22	25070000	26150000	ENSG0000022400 3	YES1P1	YES1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:12842]
rs5621775 3	22	25070000	26150000	ENSG0000022433 4	AP000357.4	NA
rs5621775 3	22	25070000	26150000	ENSG0000023760 1	AP000358.5	NA
rs5621775 3	22	25070000	26150000	ENSG0000027118 1	CTA- 221G9.10	NA
rs5621775 3	22	25070000	26150000	ENSG0000023664 1	CTA-221G9.7	NA
rs5621775 3	22	25070000	26150000	ENSG0000023357 7	RP3-462D8.2	NA
rs5621775 3	22	25070000	26150000	ENSG0000023063 7	CTA-246H3.8	NA
rs5621775 3	22	25070000	26150000	ENSG0000023146 6	CTA- 246H3.11	NA
rs5621775 3	22	25070000	26150000	ENSG0000027294 2	CTA- 246H3.12	NA
rs5621775 3	22	25070000	26150000	ENSG0000027279 8	CTA- 390C10.9	NA
rs5621775 3	22	25070000	26150000	ENSG0000027297 7	CTA- 390C10.10	NA
rs5621775 3	22	25070000	26150000	ENSG0000026597 8	AL008721.1	NA
rs5621775 3	22	25070000	26150000	ENSG0000023488 4	CTA- 407F11.8	NA
rs5621775 3	22	25070000	26150000	ENSG0000023738 7	CTA- 407F11.7	NA
rs1085848 9	12	86355869	88435869	ENSG0000018205 0	MGAT4C	MGAT4 family member C [Source:HGNC Symbol;Acc:HGNC:30871]
rs1085848 9	12	86355869	88435869	ENSG0000025789 7	RP11- 812D23.1	NA
rs1085848 9	12	86355869	88435869	ENSG0000025818 5	RP11-202H2.1	NA
rs1085848 9	12	86355869	88435869	ENSG0000026407 7	AC010196.1	NA

rs10858489	12	86355869	88435869	ENSG00000242850	RPL23AP68	ribosomal protein L23a pseudogene 68 [Source:HGNC Symbol;Acc:HGNC:35489]
rs10858489	12	86355869	88435869	ENSG00000258205	RP11-248E9.1	NA
rs10858489	12	86355869	88435869	ENSG00000257648	CYCSP30	cytochrome c, somatic pseudogene 30 [Source:HGNC Symbol;Acc:HGNC:24405]
rs10858489	12	86355869	88435869	ENSG00000258173	RP11-248E9.4	NA
rs10858489	12	86355869	88435869	ENSG00000258128	MKRN9P	makorin ring finger protein 9, pseudogene [Source:HGNC Symbol;Acc:HGNC:7116]
rs10858489	12	86355869	88435869	ENSG00000257912	RP11-248E9.5	NA
rs10858489	12	86355869	88435869	ENSG00000257940	RP11-248E9.6	NA
rs10858489	12	86355869	88435869	ENSG00000258179	RP11-248E9.7	NA
rs10858489	12	86355869	88435869	ENSG00000240721	RPS4XP15	ribosomal protein S4X pseudogene 15 [Source:HGNC Symbol;Acc:HGNC:36308]
rs10858489	12	86355869	88435869	ENSG00000165805	C12orf50	chromosome 12 open reading frame 50 [Source:HGNC Symbol;Acc:HGNC:26665]
rs2208404	20	55646593	55966593	ENSG00000231078	RP11-560A15.4	NA
rs2208404	20	55646593	55966593	ENSG00000203266	RP11-560A15.3	NA
rs2208404	20	55646593	55966593	ENSG00000101144	BMP7	bone morphogenetic protein 7 [Source:HGNC Symbol;Acc:HGNC:1074]
rs2208404	20	55646593	55966593	ENSG00000235032	BMP7-AS1	BMP7 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:40096]
rs2208404	20	55646593	55966593	ENSG00000226308	RP4-813D12.3	NA
rs2208404	20	55646593	55966593	ENSG00000252064	Y_RNA	Y RNA [Source:RFAM;Acc:RF00019]
rs2208404	20	55646593	55966593	ENSG00000266666	MIR4325	microRNA 4325 [Source:HGNC Symbol;Acc:HGNC:38304]
rs2208404	20	55646593	55966593	ENSG00000231005	RP3-481F12.1	NA

rs2208404	20	55646593	55966593	ENSG0000005479 6	SPO11	SPO11 meiotic protein covalently bound to DSB [Source:HGNC Symbol;Acc:HGNC:11250]
rs2208404	20	55646593	55966593	ENSG0000010114 6	RAE1	ribonucleic acid export 1 [Source:HGNC Symbol;Acc:HGNC:9828]
rs2208404	20	55646593	55966593	ENSG0000022899 5	MTND1P9	mitochondrially encoded NADH:ubiquinone oxidoreductase core subunit 1 pseudogene 9 [Source:HGNC Symbol;Acc:HGNC:42099]
rs2208404	20	55646593	55966593	ENSG0000025622 2	MTRNR2L3	MT-RNR2-like 3 [Source:HGNC Symbol;Acc:HGNC:37157]

Appendix Figure. Association plots of the 16 suggestive GxS associated loci





























