Table S1: Heritability estimates of ADAMTS13 levels using inferred genetic relatedness based on genotype data for all individuals (Left) and using known familial relationships for only the sibs (Right)

Cohorts	h^2 (*GCTA*)*	h^2 (*MERLIN*)[†]	h^2 (2xICC)[‡]
GABC (1,152, 1,139 sibs)	82.1%±6.0%	82.10%	84.30%
TSS (2,304, 138 sibs)	56.7%±12.9%	70.30%	71.00%
GABC + TSS	59.1%±5.3%	79.50%	83.50%

∗ *GCTA* estimates phenotypic variance explained by SNPs for all individuals.

† *MERLIN-REGRESS* estimates heritability for only the sibs.

‡ 2 times ICC estimates the upper limit of narrow-sense heritability for only sibpairs.

Table S2: Genome-wide significant SNPs in GABC cohort

SNP	Position*	Gene	A1	A2	MAF	β (SE) %	*P*
rs28673647	136312456	*ADAMTS13*	G	A	0.36	6.93 (0.99)	8.1E-13
rs28663225	136296231	*ADAMTS13*	T	C	0.31	6.89 (1.02)	4.0E-12
rs28793911	136299937	*ADAMTS13*	C	T	0.31	6.81 (1.02)	7.2E-12
rs28868680	136300122	*ADAMTS13*	C	T	0.31	6.81 (1.02)	7.2E-12
rs28880037	136300524	*ADAMTS13*	T	G	0.31	6.81 (1.02)	7.2E-12
rs4327922	136300712	*ADAMTS13*	T	C	0.31	6.81 (1.02)	7.2E-12
rs28393999	136303888	*ADAMTS13*	C	G	0.31	6.81 (1.02)	7.2E-12
rs2073934	136304728	*ADAMTS13*	C	G	0.31	6.81 (1.02)	7.2E-12
rs2073933	136305275	*ADAMTS13*	G	A	0.31	6.81 (1.02)	7.2E-12
rs2301613	136314677	*ADAMTS13*	G	C	0.37	6.61 (0.99)	7.4E-12
rs28757785	136291621	*ADAMTS13*	T	A	0.31	6.75 (1.02)	1.1E-11
rs117300748	136294240	*ADAMTS13*	C	T	0.31	6.75 (1.02)	1.1E-11
rs28436085	136331819	*CACFD1*	A	G	0.33	6.15 (1.01)	4.3E-10
rs28552957	136332675	*CACFD1*	A	G	0.33	6.15 (1.01)	4.3E-10
rs4962154	136332437	*CACFD1*	C	G	0.33	6.15 (1.01)	4.3E-10
rs68011680	136331281	*CACFD1*	A	T	0.33	6.15 (1.01)	4.3E-10
rs75340988	136331183	*CACFD1*	C	T	0.33	6.15 (1.01)	4.3E-10
rs2285489	136289374	*ADAMTS13*	T	C	0.34	6.09 (1.00)	4.9E-10
rs1055432	136324239	*ADAMTS13*	A	C	0.34	6.10 (1.01)	5.0E-10
rs28680325	136316367	*ADAMTS13*	A	C	0.34	6.07 (1.01)	6.5E-10
rs36222576	136319288	*ADAMTS13*	C	G	0.34	6.07 (1.01)	6.5E-10
rs28742053	136288929	*ADAMTS13*	T	C	0.34	6.04 (1.01)	7.2E-10
rs41297217	136338580	*SLC2A6*	A	G	0.09	9.47 (1.64)	1.5E-09
rs4962150	136311391	*ADAMTS13*	G	A	0.39	5.72 (0.98)	1.9E-09
rs2301614	136325160	*CACFD1*	A	G	0.33	5.87 (1.01)	2.8E-09
rs3118666	136286130	*ADAMTS13*	G	A	0.36	5.64 (1.00)	6.3E-09
rs3124780	136281925	*REXO4*	A	G	0.37	5.50 (0.99)	1.3E-08
rs2285486	136277480	*REXO4*	A	G	0.37	5.51 (0.99)	1.3E-08
rs9411402	136276892	*REXO4*	A	C	0.37	5.51 (0.99)	1.3E-08
rs41306714	136260696	*C9orf96*	C	G	0.36	5.47 (1.00)	1.9E-08
rs3124749	136267811	*C9orf96*	T	C	0.36	5.44 (0.99)	2.0E-08
rs3124750	136266086	*C9orf96*	C	G	0.36	5.44 (0.99)	2.0E-08
rs3124751	136265906	*C9orf96*	T	C	0.36	5.44 (0.99)	2.0E-08
rs28517680	136299076	*ADAMTS13*	T	C	0.41	5.30 (0.97)	2.1E-08
rs11516155	136299615	*ADAMTS13*	C	A	0.41	5.30 (0.97)	2.1E-08
rs3780808	136302434	*ADAMTS13*	T	G	0.41	5.30 (0.97)	2.1E-08
rs3780809	136302683	*ADAMTS13*	C	T	0.41	5.30 (0.97)	2.1E-08
rs2028003	136303123	*ADAMTS13*	G	C	0.41	5.30 (0.97)	2.1E-08
rs2028002	136303253	*ADAMTS13*	C	T	0.41	5.30 (0.97)	2.1E-08
rs2301612	136301982	*ADAMTS13*	G	C	0.41	5.30 (0.97)	2.1E-08
rs3118662	136278870	*REXO4*	A	G	0.37	5.43 (0.99)	2.1E-08
rs3124781	136275313	*REXO4*	T	C	0.37	5.43 (0.99)	2.1E-08
rs28515121	136291594	*ADAMTS13*	A	G	0.41	5.24 (0.97)	2.9E-08
rs35314130	136292021	*ADAMTS13*	T	G	0.41	5.24 (0.97)	2.9E-08
rs3094375	136319068	*ADAMTS13*	C	T	0.45	5.34 (0.99)	3.2E-08
rs3758349	136293066	*ADAMTS13*	C	T	0.41	5.23 (0.97)	3.2E-08

A1, allele 1, is minor allele in GABC dataset and tested allele; A2, allele 2, is major allele;
 MAF: minor allele frequency; β: percentage change per allele.;
∗ Position uses NCBI Build 37 coordinates (UCSC hg19), which is used throughout the study.

Table S3: Genome-wide significant SNPs in TSS cohort

SNP	Position*	Region	Gene	A1	A2	MAF	β (SE) %	P	Annotation
rs28680325	136316367	9q34.2	ADAMTS13	A	C	0.38	6.70 (0.50)	1.3E-42	intronic
rs28757785	136291621	9q34.2	ADAMTS13	T	A	0.36	6.70 (0.50)	2.4E-42	intronic
9:136294729:C:CT	136294729	9q34.2	ADAMTS13	CT	C	0.36	6.70 (0.50)	2.4E-42	intronic
rs28663225	136296231	9q34.2	ADAMTS13	T	C	0.36	6.70 (0.50)	2.4E-42	intronic
rs28793911	136299937	9q34.2	ADAMTS13	C	T	0.36	6.68 (0.50)	2.8E-42	intronic
rs28868680	136300122	9q34.2	ADAMTS13	C	T	0.36	6.68 (0.50)	2.8E-42	intronic
rs28880037	136300524	9q34.2	ADAMTS13	T	G	0.36	6.68 (0.50)	2.8E-42	intronic
rs4327922	136300712	9q34.2	ADAMTS13	T	C	0.36	6.68 (0.50)	2.8E-42	intronic
9:136301483:G:GCAGTGTGGT	136301483	9q34.2	ADAMTS13	G	GCAGTGTGGT	0.36	6.68 (0.50)	2.8E-42	intronic
rs28393999	136303888	9q34.2	ADAMTS13	C	G	0.36	6.68 (0.50)	2.8E-42	intronic
rs2073934	136304728	9q34.2	ADAMTS13	C	G	0.36	6.68 (0.50)	2.8E-42	intronic
rs2073933	136305275	9q34.2	ADAMTS13	G	A	0.36	6.68 (0.50)	2.8E-42	intronic
rs36222576	136319288	9q34.2	ADAMTS13	C	G	0.38	6.67 (0.50)	3.5E-42	intronic
rs2301614	136325160	9q34.2	CACFD1	A	G	0.37	6.68 (0.50)	3.5E-42	5'-utr
rs2301613	136314677	9q34.2	ADAMTS13	G	C	0.39	6.62 (0.49)	4.1E-42	intronic
9:136296084:C:CT	136296084	9q34.2	ADAMTS13	CT	C	0.37	6.67 (0.50)	5.7E-42	intronic
rs117300748	136294240	9q34.2	ADAMTS13	C	T	0.36	6.67 (0.50)	6.3E-42	intronic
rs1055432	136324239	9q34.2	ADAMTS13	A	C	0.38	6.64 (0.50)	8.1E-42	synonymous (T>T)
rs28673647	136312456	9q34.2	ADAMTS13	G	A	0.39	6.59 (0.49)	9.3E-42	intronic
rs28436085	136331819	9q34.2	CACFD1	A	G	0.38	6.63 (0.50)	1.3E-41	intronic
rs75340988	136331183	9q34.2	CACFD1	C	T	0.38	6.63 (0.50)	1.3E-41	intronic
rs28552957	136332675	9q34.2	CACFD1	A	G	0.38	6.62 (0.50)	1.5E-41	intronic
rs3837294	136331700	9q34.2	CACFD1	C	CAT	0.38	6.61 (0.50)	2.3E-41	intronic
rs68011680	136331281	9q34.2	CACFD1	A	T	0.38	6.61 (0.50)	2.3E-41	intronic
rs4962150	136311391	9q34.2	ADAMTS13	G	A	0.44	6.42 (0.49)	6.4E-41	intronic
rs3094375	136319068	9q34.2	ADAMTS13	C	T	0.48	6.19 (0.48)	6.0E-39	intronic
rs4962154	136332437	9q34.2	CACFD1	C	G	0.38	6.10 (0.50)	1.8E-35	intronic
rs144473590	136298286	9q34.2	ADAMTS13	C	G	0.02	-26.46 (1.91)	2.3E-34	intronic
rs74715985	136304114	9q34.2	ADAMTS13	G	A	0.02	-26.46 (1.91)	2.3E-34	intronic
rs41314453	136307825	9q34.2	ADAMTS13	T	C	0.02	-26.46 (1.91)	2.3E-34	missense (A>V)
rs2285489	136289374	9q34.2	ADAMTS13	T	C	0.40	5.94 (0.50)	6.8E-34	intronic
rs3118667	136291063	9q34.2	ADAMTS13	C	T	0.50	5.69 (0.48)	2.4E-33	synonymous (A>A)
rs28742053	136288929	9q34.2	ADAMTS13	T	C	0.4045	5.80 (0.50)	1.8E-32	intronic
rs28515121	136291594	9q34.2	ADAMTS13	A	G	0.4427	5.45 (0.49)	1.4E-29	intronic
rs35314130	136292021	9q34.2	ADAMTS13	T	G	0.4427	5.45 (0.49)	1.4E-29	intronic
rs3758349	136293066	9q34.2	ADAMTS13	C	T	0.4427	5.45 (0.49)	1.4E-29	intronic
rs28517680	136299076	9q34.2	ADAMTS13	T	C	0.4431	5.45 (0.49)	1.5E-29	intronic
rs11516155	136299615	9q34.2	ADAMTS13	C	A	0.4431	5.45 (0.49)	1.5E-29	intronic
rs3780808	136302434	9q34.2	ADAMTS13	T	G	0.4431	5.45 (0.49)	1.5E-29	intronic
rs3780809	136302683	9q34.2	ADAMTS13	C	T	0.4431	5.45 (0.49)	1.5E-29	intronic
rs2028003	136303123	9q34.2	ADAMTS13	G	C	0.4431	5.45 (0.49)	1.5E-29	intronic
rs2028002	136303253	9q34.2	ADAMTS13	C	T	0.4431	5.45 (0.49)	1.5E-29	intronic
rs2301612	136301982	9q34.2	ADAMTS13	G	C	0.4431	5.45 (0.49)	1.5E-29	missense (Q>E)
9:136297157:G:GGC	136297157	9q34.2	ADAMTS13	GGC	G	0.4427	5.45 (0.49)	1.7E-29	intronic
rs77533110	136286789	9q34.2	ADAMTS13	A	G	0.0178	-23.74 (1.90)	5.8E-29	intronic
rs671410	136311679	9q34.2	ADAMTS13	G	T	0.4536	-5.66 (0.49)	7.7E-29	intronic
rs74538790	136215511	9q34.2	RPL7A	C	T	0.01823	-23.30 (1.88)	1.0E-28	intronic
rs3118666	136286130	9q34.2	ADAMTS13	G	A	0.4178	5.44 (0.50)	1.3E-28	intronic
rs139428144	136223537	9q34.2	SURF2	T	C	0.01801	-23.33 (1.89)	2.0E-28	synonymous (D>D)
rs77812622	136224174	9q34.2	SURF2	A	G	0.01801	-23.33 (1.89)	2.0E-28	intronic
rs28400378	136242607	9q34.2	SURF4	A	G	0.01801	-23.33 (1.89)	2.0E-28	intronic
rs28407036	136252654	9q34.2	C9orf96	T	C	0.01801	-23.33 (1.89)	2.0E-28	intronic
rs3739893	136243324	9q34.2	C9orf96	T	C	0.01801	-23.33 (1.89)	2.0E-28	5'-utr
rs78883179	136241818	9q34.2	SURF4	C	G	0.01801	-23.33 (1.89)	2.0E-28	intronic
rs8181039	136253927	9q34.2	C9orf96	A	G	0.01801	-23.33 (1.89)	2.0E-28	intronic
rs28519070	136204198	9q34.2	MED22	T	A	0.3832	5.42 (0.50)	7.1E-28	3'-downstream
rs2285486	136277480	9q34.2	REXO4	A	G	0.4151	5.30 (0.50)	3.2E-27	synonymous (T>T)
rs3118662	136278870	9q34.2	REXO4	A	G	0.4151	5.30 (0.50)	3.2E-27	intronic
rs3124781	136275313	9q34.2	REXO4	T	C	0.4151	5.30 (0.50)	3.2E-27	intronic
rs9411402	136276892	9q34.2	REXO4	A	C	0.4151	5.30 (0.50)	3.2E-27	intronic
rs3124780	136281925	9q34.2	REXO4	A	G	0.4164	5.28 (0.50)	4.2E-27	intronic
rs3124749	136267811	9q34.2	C9orf96	T	C	0.4214	5.25 (0.50)	6.1E-27	intronic
rs3124750	136266086	9q34.2	C9orf96	C	G	0.4214	5.25 (0.50)	6.1E-27	intronic
rs41306714	136260696	9q34.2	C9orf96	C	G	0.4214	5.25 (0.50)	6.1E-27	intronic
rs79030145	136341776	9q34.2	SLC2A6	G	C	0.02062	-20.79 (1.76)	9.5E-27	intronic
rs3124751	136265906	9q34.2	C9orf96	T	C	0.423	5.21 (0.50)	1.3E-26	intronic
rs1141748	136195840	9q34.2	SURF6	C	T	0.3783	5.32 (0.51)	1.4E-26	3'-downstream
rs886089	136199466	9q34.2	SURF6	A	G	0.3776	5.31 (0.51)	1.8E-26	missense (T>M)
rs886090	136199503	9q34.2	SURF6	A	G	0.3776	5.31 (0.51)	1.8E-26	missense (R>W)
rs2353633	136197135	9q34.2	SURF6	T	C	0.378	5.31 (0.51)	1.9E-26	3'-downstream
rs877560	136197131	9q34.2	SURF6	A	G	0.378	5.31 (0.51)	1.9E-26	3'-downstream
rs10751505	136195374	9q34.2	SURF6	G	A	0.3798	5.26 (0.51)	3.6E-26	3'-downstream
rs76896860	136196174	9q34.2	SURF6	A	G	0.3798	5.26 (0.51)	3.6E-26	3'-downstream
rs3124767	136308542	9q34.2	ADAMTS13	T	C	0.4058	-5.32 (0.49)	2.7E-25	synonymous (G>G)
rs3118664	136281917	9q34.2	ADAMTS13	A	C	0.4455	5.00 (0.49)	4.1E-25	intronic
rs3124779	136281966	9q34.2	ADAMTS13	A	G	0.4455	5.00 (0.49)	4.1E-25	intronic
rs62575995	136268311	9q34.2	C9orf96	A	G	0.4818	-5.22 (0.49)	5.4E-25	intronic
9:136292927:T:TA	136292927	9q34.2	ADAMTS13	TA	T	0.4227	-5.21 (0.49)	1.1E-24	intronic
rs3118669	136295815	9q34.2	ADAMTS13	A	T	0.4132	-5.23 (0.49)	1.6E-24	intronic
rs739469	136298729	9q34.2	ADAMTS13	C	G	0.4219	-5.19 (0.49)	2.3E-24	intronic
rs3124768	136304497	9q34.2	ADAMTS13	G	A	0.4221	-5.18 (0.49)	2.8E-24	synonymous (T>T)
rs2073932	136305439	9q34.2	ADAMTS13	A	G	0.4221	-5.18 (0.49)	2.8E-24	intronic

rs3124769	136304137	9q34.2	*ADAMTS13*	T	A	0.4234	-5.17 (0.49)	3.0E-24	intronic
rs4962130	136195607	9q34.2	*SURF6*	C	T	0.0191	-19.85 (1.80)	1.4E-23	3'-downstream
rs11244090	136201191	9q34.2	*SURF6*	A	G	0.01866	-20.09 (1.83)	1.5E-23	intronic
rs604402	136213056	9q34.2	*MED22*	A	C	0.4158	4.88 (0.50)	5.5E-23	intronic
rs616836	136213521	9q34.2	*MED22*	T	C	0.4158	4.88 (0.50)	5.5E-23	5'-utr
rs553877	136214955	9q34.2	*MED22*	A	G	0.4147	4.88 (0.50)	5.7E-23	5'-utr
rs59358281	136223043	9q34.2	*SURF1*	G	C	0.4156	4.87 (0.50)	6.1E-23	intronic
rs12763	136227260	9q34.2	*SURF2*	A	G	0.416	4.86 (0.50)	7.0E-23	missense (S>G)
rs2296810	136227694	9q34.2	*SURF2*	G	C	0.416	4.86 (0.50)	7.0E-23	intronic
rs1059773	136228865	9q34.2	*SURF4*	A	C	0.416	4.86 (0.50)	7.0E-23	3'-utr
rs2269894	136232758	9q34.2	*SURF4*	C	T	0.416	4.86 (0.50)	7.0E-23	intronic
rs2494	136229833	9q34.2	*SURF4*	G	C	0.416	4.86 (0.50)	7.0E-23	3'-utr
rs28374096	136235100	9q34.2	*SURF4*	C	G	0.416	4.86 (0.50)	7.0E-23	intronic
rs7030175	136274058	9q34.2	*REXO4*	G	T	0.4818	4.67 (0.49)	4.5E-22	intronic
rs187680653	136322351	9q34.2	*ADAMTS13*	T	C	0.01063	-25.99 (2.44)	2.1E-21	intronic
rs28479961	136312074	9q34.2	*ADAMTS13*	T	G	0.1953	5.47 (0.62)	1.0E-19	intronic
rs3124776	136284450	9q34.2	*ADAMTS13*	C	T	0.4742	-4.58 (0.49)	1.8E-19	intronic
rs3124747	136268084	9q34.2	*C9orf96*	A	G	0.3247	-4.82 (0.52)	3.7E-19	missense (K>E)
rs3118663	136281753	9q34.2	*REXO4*	A	G	0.4766	-4.44 (0.49)	2.1E-18	intronic
rs2182812	136272618	9q34.2	*REXO4*	A	G	0.4761	-4.42 (0.49)	2.9E-18	intronic
rs3124782	136270996	9q34.2	*C9orf96*	T	C	0.4761	-4.42 (0.49)	2.9E-18	3'-utr
rs3124753	136249929	9q34.2	*C9orf96*	A	G	0.4698	-4.40 (0.49)	3.8E-18	intronic
rs943623	136267371	9q34.2	*C9orf96*	T	G	0.4685	-4.40 (0.49)	4.1E-18	intronic
rs3124752	136264493	9q34.2	*C9orf96*	T	C	0.4657	-4.32 (0.49)	1.6E-17	intronic
rs10793964	136198589	9q34.2	*SURF6*	G	C	0.4486	4.13 (0.50)	2.3E-17	3'-utr
rs183622578	136342830	9q34.2	*SLC2A6*	A	G	0.01541	-18.37 (2.05)	1.6E-16	intronic
rs10901263	136192872	9q34.2	*SURF6*	A	G	0.2648	4.50 (0.57)	7.0E-16	3'-downstream
rs11244083	136190948	9q34.2	*SURF6*	A	G	0.2652	4.49 (0.57)	7.3E-16	3'-downstream
rs10901262	136192116	9q34.2	*SURF6*	A	G	0.2652	4.49 (0.57)	7.3E-16	3'-downstream
rs17150482	136194595	9q34.2	*SURF6*	C	T	0.3125	4.23 (0.54)	1.2E-15	3'-downstream
rs558599	136192551	9q34.2	*SURF6*	A	C	0.3138	4.20 (0.54)	3.2E-15	3'-downstream
rs571549	136221213	9q34.2	*SURF1*	T	C	0.4755	-3.99 (0.50)	3.7E-15	intronic
rs658517	136222490	9q34.2	*SURF1*	G	A	0.4755	-3.99 (0.50)	3.7E-15	intronic
rs484248	136218590	9q34.2	*SURF1*	A	C	0.4753	-3.99 (0.50)	4.0E-15	3'-downstream
rs599924	136218591	9q34.2	*SURF1*	G	A	0.4753	-3.99 (0.50)	4.0E-15	3'-downstream
rs1179037	136238509	9q34.2	*SURF4*	A	G	0.4753	-3.97 (0.50)	4.9E-15	intronic
rs1179038	136241189	9q34.2	*SURF4*	T	C	0.475	-3.97 (0.50)	4.9E-15	intronic
rs1179040	136241639	9q34.2	*SURF4*	T	C	0.475	-3.97 (0.50)	4.9E-15	intronic
9:136192551:A:AC	136192551	9q34.2	*SURF6*	A	AC	0.26	4.38 (0.57)	5.0E-15	3'-downstream
rs523304	136223366	9q34.2	*SURF1*	A	G	0.475	-3.95 (0.50)	7.3E-15	5'-upstream
rs28660186	136331879	9q34.2	*CACFD1*	C	A	0.3292	-4.14 (0.52)	1.4E-14	intronic
rs9645009	136211248	9q34.2	*MED22*	A	G	0.4972	-3.90 (0.50)	1.6E-14	intronic
rs4962155	136339797	9q34.2	*SLC2A6*	A	G	0.3257	-4.12 (0.53)	2.0E-14	intronic
rs2301615	136325462	9q34.2	*CACFD1*	T	C	0.3296	-4.11 (0.52)	2.1E-14	intronic
rs1858879	136325907	9q34.2	*CACFD1*	C	G	0.3296	-4.11 (0.52)	2.1E-14	intronic
9:136326145:A:AGTCT	136326145	9q34.2	*CACFD1*	A	AGTCT	0.3296	-4.11 (0.52)	2.1E-14	intronic
rs655911	136312897	9q34.2	*ADAMTS13*	C	T	0.3058	-4.18 (0.53)	2.2E-14	intronic
rs1179041	136242669	9q34.2	*SURF4*	C	T	0.4709	-3.85 (0.49)	3.0E-14	intronic
rs4962050	136323845	9q34.2	*ADAMTS13*	C	G	0.3303	-4.06 (0.52)	4.1E-14	intronic
rs487820	136212369	9q34.2	*MED22*	A	G	0.4705	-3.80 (0.49)	5.6E-14	intronic
rs652600	136311017	9q34.2	*ADAMTS13*	G	A	0.3177	-3.99 (0.53)	1.7E-13	intronic
9:136326150:G:GT	136326150	9q34.2	*CACFD1*	G	GT	0.2289	-4.35 (0.58)	2.2E-13	intronic
rs590858	136205775	9q34.2	*MED22*	C	T	0.4696	-3.67 (0.49)	3.1E-13	3'-downstream
rs3124748	136268038	9q34.2	*C9orf96*	T	C	0.4444	-3.64 (0.50)	6.0E-13	synonymous (N>N)
rs120858	136200810	9q34.2	*SURF6*	A	G	0.4557	-3.47 (0.49)	3.9E-12	intronic
rs3739890	136194812	9q34.2	*SURF6*	A	G	0.4564	-3.45 (0.49)	5.0E-12	3'-downstream
rs642059	136195734	9q34.2	*SURF6*	C	A	0.4557	-3.45 (0.49)	5.5E-12	3'-downstream
rs642060	136195736	9q34.2	*SURF6*	C	G	0.4557	-3.45 (0.49)	5.5E-12	3'-downstream
rs12335	136197834	9q34.2	*SURF6*	A	G	0.4557	-3.45 (0.49)	5.5E-12	3'-utr
rs551154	136197278	9q34.2	*SURF6*	T	G	0.4557	-3.45 (0.49)	5.5E-12	3'-downstream
rs551169	136197286	9q34.2	*SURF6*	A	G	0.4557	-3.45 (0.49)	5.5E-12	3'-downstream
9:136160859:C:CA	136160859	9q34.2	*ABO*	CA	C	0.3613	3.45 (0.51)	7.3E-12	5'-upstream
rs75499965	136361582	9q34.2	*SLC2A6*	A	C	0.02756	-10.58 (1.52)	2.8E-11	5'-upstream
rs176691	136163306	9q34.2	*ABO*	A	G	0.3557	-3.36 (0.52)	1.6E-10	5'-upstream
rs176692	136163329	9q34.2	*ABO*	G	A	0.3557	-3.36 (0.52)	1.6E-10	5'-upstream
rs11244064	136161837	9q34.2	*ABO*	A	G	0.3077	-3.39 (0.53)	2.8E-10	5'-upstream
rs3118671	136297407	9q34.2	*ADAMTS13*	T	G	0.2014	-3.93 (0.61)	3.0E-10	intronic
rs11244061	136153981	9q34.2	*ABO*	T	C	0.0816	-5.69 (0.89)	4.6E-10	5'-upstream
rs176699	136168086	9q34.2	*ABO*	A	C	0.3557	-3.25 (0.52)	5.8E-10	5'-upstream
rs7869258	136170732	9q34.2	*ABO*	A	G	0.3557	-3.25 (0.52)	5.8E-10	5'-upstream
rs532861	136171344	9q34.2	*ABO*	T	C	0.3529	-3.15 (0.51)	1.7E-09	5'-upstream
rs4962126	136176998	9q34.2	*ABO*	T	C	0.3657	-3.16 (0.52)	1.8E-09	5'-upstream
rs623179	136174678	9q34.2	*ABO*	T	C	0.3155	-3.14 (0.53)	4.2E-09	5'-upstream
rs509001	136176269	9q34.2	*ABO*	A	T	0.4681	-2.87 (0.50)	1.6E-08	5'-upstream
rs9411492	136160617	9q34.2	*ABO*	C	T	0.2878	3.02 (0.55)	1.8E-08	5'-upstream
rs10901257	136163570	9q34.2	*ABO*	A	G	0.2869	3.02 (0.54)	1.8E-08	5'-upstream
rs3118665	136283389	9q34.2	*ADAMTS13*	T	C	0.1519	-3.92 (0.68)	1.9E-08	intronic
rs609202	136173855	9q34.2	*ABO*	T	A	0.4674	-2.84 (0.51)	2.0E-08	5'-upstream
rs10901256	136163447	9q34.2	*ABO*	C	T	0.286	3.01 (0.55)	2.4E-08	5'-upstream
rs12683804	136186586	9q34.2	*SURF6*	T	C	0.2272	-3.27 (0.59)	5.0E-08	3'-downstream

A1, allele 1, is minor allele in TSS dataset and tested allele; A2, allele 2, is major allele; MAF: minor allele frequency; β: percentage change per allele.

∗ Position uses NCBI Build 37 coordinates (UCSC hg19), which is used throughout the study.

Table S4. Significant SNPs in meta-analysis and their statistics in individual cohorts
Meta-analysis of GABC + TSS (5,821,939 SNPs)

										GABC (N=934)		TSS (N=2,304)		
CHR	SNP	Position*	A1	A2	Gene	Function	P	Dir	FREQ	β (SE) %	P2	FREQ3	β (SE) %4	P3
9	rs28673647	136312456	G	A	ADAMTS13	intronic	1.3E-52	--	0.36	6.9 (1.0)	8.1E-13	0.39	6.6 (0.5)	9.3E-42
9	rs28663225	136296231	T	C	ADAMTS13	intronic	2.3E-52	--	0.31	6.9 (1.0)	4.0E-12	0.36	6.7 (0.5)	2.4E-42
9	rs28793911	136299937	C	T	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs28868680	136300122	C	T	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs28880037	136300524	T	G	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs4327922	136300712	T	C	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs28393999	136303888	C	G	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs2073934	136304728	C	G	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs2073933	136305275	G	A	ADAMTS13	intronic	5.2E-52	--	0.31	6.8 (1.0)	7.2E-12	0.36	6.7 (0.5)	2.8E-42
9	rs28757785	136291621	T	A	ADAMTS13	intronic	7.6E-52	--	0.31	6.8 (1.0)	1.1E-11	0.36	6.7 (0.5)	2.4E-42
9	rs2301613	136314677	G	C	ADAMTS13	intronic	7.7E-52	--	0.37	6.6 (1.0)	7.4E-12	0.39	6.6 (0.5)	4.1E-42
9	rs117300748	136294240	C	T	ADAMTS13	intronic	1.9E-51	--	0.31	6.8 (1.0)	1.1E-11	0.36	6.7 (0.5)	6.3E-42
9	rs28680325	136316367	A	C	ADAMTS13	intronic	6.1E-50	--	0.34	6.1 (1.0)	6.5E-10	0.38	6.7 (0.5)	1.3E-42
9	rs36222576	136319288	C	G	ADAMTS13	intronic	1.5E-49	--	0.34	6.1 (1.0)	6.5E-10	0.38	6.7 (0.5)	3.5E-42
9	rs1055432	136324239	A	C	ADAMTS13	synonymous(T>T)	2.3E-49	--	0.34	6.1 (1.0)	5.0E-10	0.38	6.6 (0.5)	8.1E-42
9	rs28436085	136331819	A	G	CACFD1	intronic	2.9E-49	--	0.33	6.2 (1.0)	4.3E-10	0.38	6.6 (0.5)	1.3E-41
9	rs75340988	136331183	C	T	CACFD1	intronic	2.9E-49	--	0.33	6.2 (1.0)	4.3E-10	0.38	6.6 (0.5)	1.3E-41
9	rs28552957	136332675	A	G	CACFD1	intronic	3.4E-49	--	0.33	6.2 (1.0)	4.3E-10	0.38	6.6 (0.5)	1.5E-41
9	rs68011680	136331281	A	T	CACFD1	intronic	5.0E-49	--	0.33	6.2 (1.0)	4.3E-10	0.38	6.6 (0.5)	2.3E-41
9	rs2301614	136325160	A	G	CACFD1	5'-utr	9.8E-49	--	0.33	5.9 (1.0)	2.8E-09	0.37	6.7 (0.5)	3.5E-42
9	rs4962150	136311391	G	A	ADAMTS13	intronic	8.4E-48	--	0.39	5.7 (1.0)	1.9E-09	0.44	6.4 (0.5)	6.4E-41
9	rs3094375	136319068	C	T	ADAMTS13	intronic	2.0E-44	--	0.45	5.3 (1.0)	3.2E-08	0.48	6.2 (0.5)	6.0E-39
9	rs4962154	136332437	C	G	CACFD1	intronic	1.5E-43	--	0.33	6.2 (1.0)	4.3E-10	0.38	6.1 (0.5)	1.8E-35
9	rs2285489	136289374	T	C	ADAMTS13	intronic	5.4E-42	--	0.34	6.1 (1.0)	4.9E-10	0.40	5.9 (0.5)	6.8E-34
9	rs28742053	136288929	T	C	ADAMTS13	intronic	1.8E-40	--	0.34	6.0 (1.0)	7.2E-10	0.40	5.8 (0.5)	1.8E-32
9	rs3118667	136291063	C	T	ADAMTS13	synonymous(A>A)	2.6E-36	--	0.45	4.3 (1.0)	5.8E-06	0.50	5.7 (0.5)	2.4E-33
9	rs28517680	136299076	T	C	ADAMTS13	intronic	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs11516155	136299615	C	A	ADAMTS13	intronic	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs3780808	136302434	T	G	ADAMTS13	intronic	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs3780809	136302683	C	T	ADAMTS13	intronic	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs2028003	136303123	G	C	ADAMTS13	intronic	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs2028002	136303253	C	T	ADAMTS13	intronic	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs2301612	136301982	G	C	ADAMTS13	missense(Q>E)	4.9E-36	--	0.41	5.3 (1.0)	2.1E-08	0.44	5.4 (0.5)	1.5E-29
9	rs28515121	136291594	A	G	ADAMTS13	intronic	7.0E-36	--	0.41	5.2 (1.0)	2.9E-08	0.44	5.5 (0.5)	1.4E-29
9	rs35314130	136292021	T	G	ADAMTS13	intronic	7.0E-36	--	0.41	5.2 (1.0)	2.9E-08	0.44	5.5 (0.5)	1.4E-29
9	rs3758349	136293066	C	T	ADAMTS13	intronic	7.9E-36	--	0.41	5.2 (1.0)	3.2E-08	0.44	5.5 (0.5)	1.4E-29
9	rs3118666	136286130	G	A	ADAMTS13	intronic	9.6E-36	--	0.36	5.6 (1.0)	6.3E-09	0.42	5.4 (0.5)	1.3E-28
9	rs671410	136311679	G	T	ADAMTS13	intronic	4.3E-34	++	0.47	-5.2 (1.0)	2.4E-07	0.45	-5.7 (0.5)	7.7E-29
9	rs2285486	136277480	A	G	REXO4	synonymous(T>T)	4.4E-34	--	0.37	5.5 (1.0)	1.3E-08	0.42	5.3 (0.5)	3.2E-27
9	rs9411402	136276892	A	C	REXO4	intronic	4.4E-34	--	0.37	5.5 (1.0)	1.3E-08	0.42	5.3 (0.5)	3.2E-27
9	rs3124780	136281925	A	G	REXO4	intronic	5.6E-34	--	0.37	5.5 (1.0)	1.3E-08	0.42	5.3 (0.5)	4.2E-27
9	rs3118662	136278870	A	G	REXO4	intronic	7.8E-34	--	0.37	5.4 (1.0)	2.1E-08	0.42	5.3 (0.5)	3.2E-27
9	rs3124781	136275313	T	C	REXO4	intronic	7.8E-34	--	0.37	5.4 (1.0)	2.1E-08	0.42	5.3 (0.5)	3.2E-27
9	rs41306714	136260696	C	G	C9orf96	intronic	1.3E-33	--	0.36	5.5 (1.0)	1.9E-08	0.42	5.3 (0.5)	6.1E-27
9	rs3124749	136267811	T	C	C9orf96	intronic	1.3E-33	--	0.36	5.4 (1.0)	2.0E-08	0.42	5.3 (0.5)	6.1E-27
9	rs3124750	136266086	C	G	C9orf96	intronic	1.3E-33	--	0.36	5.4 (1.0)	2.0E-08	0.42	5.3 (0.5)	6.1E-27
9	rs3124751	136265906	T	C	C9orf96	intronic	2.7E-33	--	0.36	5.4 (1.0)	2.0E-08	0.42	5.2 (0.5)	1.3E-26
9	rs28519070	136204198	T	A	MED22	3'-downstream	3.2E-33	--	0.34	5.2 (1.0)	2.3E-07	0.38	5.4 (0.5)	7.1E-28
9	rs1141748	136195840	C	T	SURF6	3'-downstream	8.2E-32	--	0.33	5.1 (1.0)	3.4E-07	0.38	5.3 (0.5)	1.4E-26
9	rs2353633	136197135	T	C	SURF6	3'-downstream	1.1E-31	--	0.33	5.1 (1.0)	3.4E-07	0.38	5.3 (0.5)	1.9E-26
9	rs877560	136197131	A	G	SURF6	3'-downstream	1.1E-31	--	0.33	5.1 (1.0)	3.4E-07	0.38	5.3 (0.5)	1.9E-26
9	rs10751505	136195374	G	A	SURF6	3'-downstream	1.2E-31	--	0.34	5.2 (1.0)	2.3E-07	0.38	5.3 (0.5)	3.6E-26
9	rs76896860	136196174	A	G	SURF6	3'-downstream	1.2E-31	--	0.34	5.2 (1.0)	2.3E-07	0.38	5.3 (0.5)	3.6E-26
9	rs886089	136199466	A	G	SURF6	missense(T>M)	2.2E-31	--	0.33	5.0 (1.0)	6.4E-07	0.38	5.3 (0.5)	1.8E-26
9	rs886090	136199503	A	G	SURF6	missense(R>W)	2.2E-31	--	0.33	5.0 (1.0)	6.4E-07	0.38	5.3 (0.5)	1.8E-26
9	rs62575995	136268311	A	G	C9orf96	intronic	1.1E-28	++	0.56	-4.8 (1.0)	1.2E-06	0.48	-5.2 (0.5)	5.4E-25
9	rs59358281	136223043	G	C	SURF1	intronic	3.2E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	6.1E-23
9	rs553877	136214955	A	G	MED22	5'-utr	3.2E-28	--	0.36	4.9 (1.0)	5.4E-07	0.41	4.9 (0.5)	5.7E-23
9	rs28407036	136252654	T	C	C9orf96	intronic	3.4E-28	++	0.01	-15.6 (4.7)	1.7E-03	0.02	-23.3 (1.9)	2.0E-28
9	rs3739893	136243324	T	C	C9orf96	5'-utr	3.4E-28	++	0.01	-15.6 (4.7)	1.7E-03	0.02	-23.3 (1.9)	2.0E-28
9	rs8181039	136253927	A	G	C9orf96	intronic	3.4E-28	++	0.01	-15.6 (4.7)	1.7E-03	0.02	-23.3 (1.9)	2.0E-28
9	rs616836	136213521	T	C	MED22	5'-utr	3.6E-28	--	0.36	4.9 (1.0)	6.1E-07	0.42	4.9 (0.5)	5.5E-23
9	rs12763	136227260	A	G	SURF2	missense(S>G)	3.6E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	7.0E-23
9	rs2296810	136227694	G	C	SURF2	intronic	3.6E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	7.0E-23
9	rs1059773	136228865	A	C	SURF4	3'-utr	3.6E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	7.0E-23
9	rs2269894	136232758	C	T	SURF4	intronic	3.6E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	7.0E-23
9	rs2494	136229833	G	C	SURF4	3'-utr	3.6E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	7.0E-23
9	rs28374096	136235100	C	G	SURF4	intronic	3.6E-28	--	0.36	4.9 (1.0)	5.1E-07	0.42	4.9 (0.5)	7.0E-23
9	rs3118917	136281917	A	C	ADAMTS13	intronic	1.0E-27	--	0.40	3.9 (1.0)	5.0E-05	0.45	5.0 (0.5)	4.1E-25
9	rs3124779	136281966	A	G	ADAMTS13,REXO4	intronic	1.0E-27	--	0.40	3.9 (1.0)	5.0E-05	0.45	5.0 (0.5)	4.1E-25
9	rs3124767	136308542	T	C	ADAMTS13	synonymous(G>G)	5.6E-27	++	0.45	-3.7 (1.0)	2.1E-04	0.41	-5.3 (0.5)	2.7E-25
9	rs3118669	136295815	A	T	ADAMTS13	intronic	8.1E-27	++	0.44	-3.9 (1.0)	9.2E-05	0.41	-5.2 (0.5)	1.6E-24
9	rs3124769	136304137	T	A	ADAMTS13	intronic	3.5E-26	++	0.45	-3.7 (1.0)	1.8E-04	0.42	-5.2 (0.5)	3.0E-24
9	rs739469	136298729	C	G	ADAMTS13	intronic	3.7E-26	++	0.45	-3.7 (1.0)	2.1E-04	0.42	-5.2 (0.5)	2.3E-24
9	rs3124768	136304497	G	A	ADAMTS13	synonymous(T>T)	4.4E-26	++	0.45	-3.7 (1.0)	2.1E-04	0.42	-5.2 (0.5)	2.8E-24
9	rs2073932	136305439	A	G	ADAMTS13	intronic	4.4E-26	++	0.45	-3.7 (1.0)	2.1E-04	0.42	-5.2 (0.5)	2.8E-24
9	rs11244090	136201191	A	G	SURF6	intronic	1.3E-24	++	0.02	-13.1 (3.7)	7.6E-04	0.02	-20.1 (1.8)	1.5E-23
9	rs7030175	136274058	G	T	REXO4	intronic	5.1E-23	--	0.76	3.8 (1.2)	1.3E-03	0.48	4.7 (0.5)	4.5E-22
9	rs943623	136272618	T	G	C9orf96	intronic	2.9E-22	++	0.53	-4.4 (1.0)	8.9E-06	0.47	-4.4 (0.5)	4.1E-18
9	rs3124747	136268084	A	G	C9orf96	missense(K>E)	1.6E-21	++	0.34	-3.8 (1.0)	2.2E-04	0.32	-4.8 (0.5)	3.7E-19
9	rs3124776	136284450	C	T	ADAMTS13	intronic	1.8E-21	++	0.50	-3.4 (1.0)	4.0E-04	0.47	-4.6 (0.5)	1.8E-19
9	rs10793589	136198589	G	C	SURF6	3'-utr	2.3E-21	--	0.39	4.2 (1.0)	1.3E-05	0.45	4.1 (0.5)	2.3E-17
9	rs3118663	136281753	A	G	REXO4	intronic	2.3E-20	++	0.50	-3.4 (1.0)	5.1E-04	0.48	-4.4 (0.5)	2.1E-18
9	rs4962130	136195607	C	T	SURF6	3'-downstream	2.5E-20	++	0.01	-7.3 (4.8)	1.4E-01	0.02	-19.8 (1.8)	1.4E-23
9	rs2182812	136272618	A	G	REXO4	intronic	3.1E-20	++	0.50	-3.4 (1.0)	5.1E-04	0.48	-4.4 (0.5)	2.9E-18
9	rs3124753	136249929	A	G	C9orf96	intronic	3.2E-20	++	0.49	-3.4 (1.0)	4.4E-04	0.47	-4.4 (0.5)	3.8E-18
9	rs3124796	136270996	T	C	C9orf96	3'-utr	3.4E-20	++	0.50	-3.4 (1.0)	5.5E-04	0.48	-4.4 (0.5)	2.9E-18
9	rs3124752	136264493	T	C	C9orf96	intronic	3.0E-19	++	0.49	-3.2 (1.0)	9.1E-04	0.47	-4.3 (0.5)	1.6E-17
9	rs17150482	136194595	C	T	SURF6	3'-downstream	1.2E-18	--	0.24	4.2 (1.1)	1.3E-04	0.31	4.2 (0.5)	1.2E-15
9	rs9645009	136211248	A	G	MED22	intronic	3.2E-18	++	0.54	-4.1 (1.0)	3.3E-05	0.50	-3.9 (0.5)	1.6E-14
9	rs655911	136312897	C	T	ADAMTS13	intronic	5.1E-18	++	0.27	-4.6 (1.1)	4.0E-05	0.31	-4.2 (0.5)	2.2E-14
9	rs10901263	136192872	A	G	SURF6	3'-downstream	6.0E-18	--	0.23	3.9 (1.2)	6.8E-04	0.26	4.5 (0.6)	7.0E-16
9	rs10901262	136192116	A	G	SURF6	3'-downstream	6.4E-18	--	0.23	3.9 (1.2)	6.9E-04	0.27	4.5 (0.6)	7.3E-16
9	rs11244083	136190948	A	G	SURF6	3'-downstream	6.8E-18	--	0.23	3.8 (1.2)	7.3E-04	0.27	4.5 (0.6)	7.3E-16
9	rs3124748	136268038	T	C	C9orf96	synonymous(N>N)	3.3E-17	++	0.53	-4.3 (1.0)	1.1E-05	0.44	-3.6 (0.5)	6.0E-13
9	rs28660186	136331879	C	A	CACFD1	intronic	9.0E-17	++	0.30	-3.7 (1.1)	6.9E-04	0.33	-4.1 (0.5)	1.4E-14
9	rs484248	136218590	A	C	SURF1	3'-downstream	1.0E-16	++	0.50	-3.0 (1.0)	1.8E-03	0.48	-3.9 (0.5)	4.0E-15
9	rs4962155	136339797	A	G	SLC2A6	intronic	1.3E-16	++	0.30	-3.7 (1.1)	6.9E-04	0.33	-4.1 (0.5)	2.0E-14
9	rs1858879	136325907	C	G	CACFD1	intronic	1.5E-16	++	0.30	-3.6 (1.1)	7.4E-04	0.33	-4.1 (0.5)	2.1E-14
9	rs2301615	136325462	T	C	CACFD1	intronic	1.5E-16	++	0.31	-3.6 (1.1)	7.5E-04	0.33	-4.1 (0.5)	2.1E-14
9	rs1179038	136241189	T	C	SURF4	intronic	1.5E-16	++	0.50	-3.0 (1.0)	2.1E-03	0.48	-4.0 (0.5)	4.9E-15
9	rs1179037	136238509	A	G	SURF4	intronic	1.6E-16	++	0.50	-3.0 (1.0)	2.2E-03	0.48	-4.0 (0.5)	4.9E-15

9	rs1179040	136241639	T	C	*SURF4*	intronic	1.6E-16	++	0.50	-3.0 (1.0)	2.2E-03	0.48	-4.0 (0.5)	4.9E-15
9	rs571549	136221213	T	C	*SURF1*	intronic	1.9E-16	++	0.50	-2.9 (1.0)	2.9E-03	0.48	-4.0 (0.5)	3.7E-15
9	rs658517	136222490	G	A	*SURF1*	intronic	1.9E-16	++	0.50	-2.9 (1.0)	2.9E-03	0.48	-4.0 (0.5)	3.7E-15
9	rs652600	136311017	G	A	*ADAMTS13*	intronic	1.9E-16	++	0.28	-4.1 (1.1)	1.8E-04	0.32	-4.0 (0.5)	1.7E-13
9	rs1179041	136242669	C	T	*SURF4*	intronic	1.9E-16	++	0.49	-3.3 (1.0)	7.1E-04	0.47	-3.8 (0.5)	3.0E-14
9	rs4962050	136323845	C	G	*ADAMTS13*	intronic	2.4E-16	++	0.30	-3.7 (1.1)	6.7E-04	0.33	-4.1 (0.5)	4.1E-14
9	rs487820	136212369	A	G	*MED22*	intronic	5.9E-16	++	0.47	-3.2 (1.0)	1.1E-03	0.47	-3.8 (0.5)	5.6E-14
9	rs590858	136205775	C	T	*MED22*	3'-downstream	3.1E-14	++	0.51	-2.6 (1.0)	7.1E-03	0.47	-3.7 (0.5)	3.1E-13
9	rs120858	136200810	A	G	*SURF6*	intronic	6.2E-13	++	0.50	-2.4 (1.0)	1.3E-02	0.46	-3.5 (0.5)	3.9E-12
9	rs3739890	136194812	A	G	*SURF6*	3'-downstream	8.1E-13	++	0.50	-2.4 (1.0)	1.3E-02	0.46	-3.4 (0.5)	5.0E-12
9	rs642059	136195734	C	A	*SURF6*	3'-downstream	8.4E-13	++	0.50	-2.4 (1.0)	1.3E-02	0.46	-3.4 (0.5)	5.5E-12
9	rs642060	136195736	C	G	*SURF6*	3'-downstream	8.4E-13	++	0.50	-2.4 (1.0)	1.3E-02	0.46	-3.4 (0.5)	5.5E-12
9	rs12335	136197834	A	G	*SURF6*	3'-utr	8.4E-13	++	0.50	-2.4 (1.0)	1.3E-02	0.46	-3.4 (0.5)	5.5E-12
9	rs551154	136197278	T	G	*SURF6*	3'-downstream	8.4E-13	++	0.50	-2.4 (1.0)	1.3E-02	0.46	-3.4 (0.5)	5.5E-12
9	rs551169	136197286	A	G	*SURF6*	3'-downstream	9.1E-13	++	0.51	-2.4 (1.0)	1.3E-02	0.46	-3.4 (0.5)	5.5E-12
9	rs176691	136163306	A	G	*ABO*	5'-upstream	2.6E-11	++	0.38	-2.4 (1.0)	1.8E-02	0.36	-3.4 (0.5)	1.6E-10
9	rs176692	136163329	G	A	*ABO*	5'-upstream	2.6E-11	++	0.38	-2.4 (1.0)	1.8E-02	0.36	-3.4 (0.5)	1.6E-10
9	rs3118671	136297407	T	G	*ADAMTS13*	intronic	5.3E-11	++	0.13	-3.3 (1.4)	2.0E-02	0.20	-3.9 (0.6)	3.0E-10
9	rs7869258	136170732	A	G	*ABO*	5'-upstream	6.1E-11	++	0.38	-2.5 (1.0)	1.4E-02	0.36	-3.3 (0.5)	5.8E-10
9	rs176699	136168086	A	C	*ABO*	5'-upstream	8.0E-11	++	0.38	-2.4 (1.0)	1.8E-02	0.36	-3.3 (0.5)	5.8E-10
9	rs532861	136171344	T	C	*ABO*	5'-upstream	1.6E-10	++	0.38	-2.5 (1.0)	1.4E-02	0.35	-3.1 (0.5)	1.7E-09
9	rs41297217	136338580	A	G	*SLC2A6*	synonymous(Y>Y)	2.5E-10	--	0.09	9.5 (1.6)	1.5E-09	0.17	2.4 (0.7)	2.6E-04
9	rs4962126	136176998	T	C	*ABO*	5'-upstream	7.2E-10	++	0.41	-2.1 (1.0)	4.2E-02	0.37	-3.2 (0.5)	1.8E-09
9	rs3118665	136283389	T	C	*ADAMTS13*	intronic	8.8E-10	++	0.11	-4.0 (1.5)	9.8E-03	0.15	-3.9 (0.7)	1.9E-08
9	rs551924	136181539	A	G	*SURF6*	3'-downstream	1.3E-09	++	0.17	-3.7 (1.3)	5.9E-03	0.28	-3.1 (0.6)	5.2E-08
9	rs79473315	136362682	G	A	*TMEM8C*	3'-downstream	1.6E-09	--	0.14	5.2 (1.4)	1.3E-04	0.14	3.3 (0.7)	2.4E-06
9	rs28668122	136370204	T	C	*TMEM8C*	3'-downstream	2.5E-09	--	0.14	5.4 (1.4)	7.7E-05	0.14	3.2 (0.7)	5.3E-06
9	rs11244064	136161837	A	G	*ABO*	5'-upstream	2.6E-09	++	0.32	-1.2 (1.0)	2.4E-01	0.31	-3.4 (0.5)	2.8E-10
9	rs509001	136176269	A	T	*ABO*	5'-upstream	3.2E-09	++	0.51	-2.2 (1.0)	3.1E-02	0.47	-2.9 (0.5)	1.6E-08
9	rs11562629	136375057	T	A	*TMEM8C*	3'-downstream	3.4E-09	--	0.14	4.9 (1.4)	2.8E-04	0.14	3.3 (0.7)	2.7E-06
9	rs28417862	136363670	A	G	*TMEM8C*	3'-downstream	3.6E-09	--	0.14	5.2 (1.4)	1.3E-04	0.14	3.2 (0.7)	5.0E-06
9	rs9411492	136160617	C	T	*ABO*	5'-upstream	4.0E-09	--	0.23	2.4 (1.2)	3.4E-02	0.29	3.0 (0.5)	1.8E-08
9	rs10901257	136163570	A	G	*ABO*	5'-upstream	4.0E-09	--	0.23	2.4 (1.2)	3.4E-02	0.29	3.0 (0.5)	1.8E-08
9	rs10901256	136163447	C	T	*ABO*	5'-upstream	5.0E-09	--	0.23	2.4 (1.2)	3.4E-02	0.29	3.0 (0.5)	2.4E-08
9	rs609202	136173855	T	A	*ABO*	5'-upstream	5.7E-09	++	0.52	-2.1 (1.0)	4.3E-02	0.47	-2.8 (0.5)	2.0E-08
9	rs11531875	136361286	C	T	*SLC2A6*	5'-upstream	6.1E-09	--	0.13	5.5 (1.4)	8.6E-05	0.14	3.1 (0.7)	1.1E-05
9	rs4962125	136176977	T	C	*ABO*	5'-upstream	6.7E-09	--	0.23	2.7 (1.1)	1.7E-02	0.29	2.9 (0.5)	8.8E-08
9	rs9411393	136176125	G	A	*ABO*	5'-upstream	7.1E-09	--	0.23	2.7 (1.2)	1.8E-02	0.29	2.9 (0.5)	8.8E-08
9	rs3124778	136284050	G	T	*ADAMTS13*	intronic	9.8E-09	++	0.11	-4.0 (1.5)	9.8E-03	0.16	-3.5 (0.7)	2.6E-07
9	rs3124777	136284098	C	T	*SLC2A6*	5'-upstream	9.8E-09	++	0.11	-4.0 (1.5)	9.8E-03	0.16	-3.5 (0.7)	2.6E-07
9	rs1887519	136279234	A	G	*ADAMTS13*	intronic	1.4E-08	++	0.11	-4.1 (1.6)	8.6E-03	0.16	-3.5 (0.7)	4.4E-07
9	rs79784812	136378812	A	G	*TMEM8C*	3'-downstream	1.5E-08	--	0.13	5.1 (1.4)	2.5E-04	0.14	3.1 (0.7)	1.2E-05
9	rs529309	136191641	A	G	*SURF6*	3'-downstream	1.6E-08	--	0.35	2.1 (1.0)	3.3E-02	0.38	2.7 (0.5)	9.2E-08
9	rs517608	136192000	C	T	*SURF6*	3'-downstream	1.8E-08	--	0.35	2.1 (1.0)	3.7E-02	0.38	2.7 (0.5)	9.2E-08
9	rs597411	136192624	T	G	*SURF6*	3'-downstream	1.8E-08	--	0.35	2.1 (1.0)	3.7E-02	0.38	2.7 (0.5)	9.2E-08
9	rs56161877	136378662	A	C	*TMEM8C*	3'-downstream	2.0E-08	--	0.14	4.9 (1.4)	2.8E-04	0.15	3.0 (0.7)	1.4E-05
9	rs57445522	136378618	G	C	*TMEM8C*	3'-downstream	2.0E-08	--	0.14	4.9 (1.4)	2.8E-04	0.15	3.0 (0.7)	1.4E-05
9	rs10901261	136191754	G	A	*SURF6*	3'-downstream	2.0E-08	--	0.35	2.1 (1.0)	3.3E-02	0.38	2.7 (0.5)	1.2E-07
9	rs11535669	136371468	C	G	*REXO4*	intronic	2.2E-08	--	0.14	5.3 (1.4)	8.9E-05	0.15	2.9 (0.7)	3.5E-05
9	rs554710	136181848	C	T	*SURF6*	3'-downstream	3.9E-08	++	0.28	-3.1 (1.1)	5.7E-03	0.29	-2.6 (0.5)	2.0E-06
9	rs623179	136174678	T	C	*ABO*	5'-upstream	4.8E-08	++	0.34	-1.0 (1.0)	3.5E-01	0.32	-3.1 (0.5)	4.2E-09

Dir indicates direction of effect for the tested allele; A1, allele 1, is minor allele in TSS dataset and tested allele; A2, allele 2, is major allele in TSS; MAF: minor allele frequency; β: percentage change per allele.
∗ Position uses NCBI Build 37 coordinates (UCSC hg19), which is used throughout the study.

Table S5. ABO haplotype frequencies and associations with ADAMTS13 level

ABO Haplotype				GABC		TSS	
Allele	rs8176749	rs8176704	rs687289	Freq	P	Freq	P
A2	C	A	A	0.06	0.01	0.05	0.58
B	T	G	A	0.07	0.48	0.07	0.16
A1	C	G	A	0.22	0.15	0.13	4.14E-05
O	C	G	G	0.64	0.83	0.75	0.01

Freq: Haplotype frequency

Figure S1
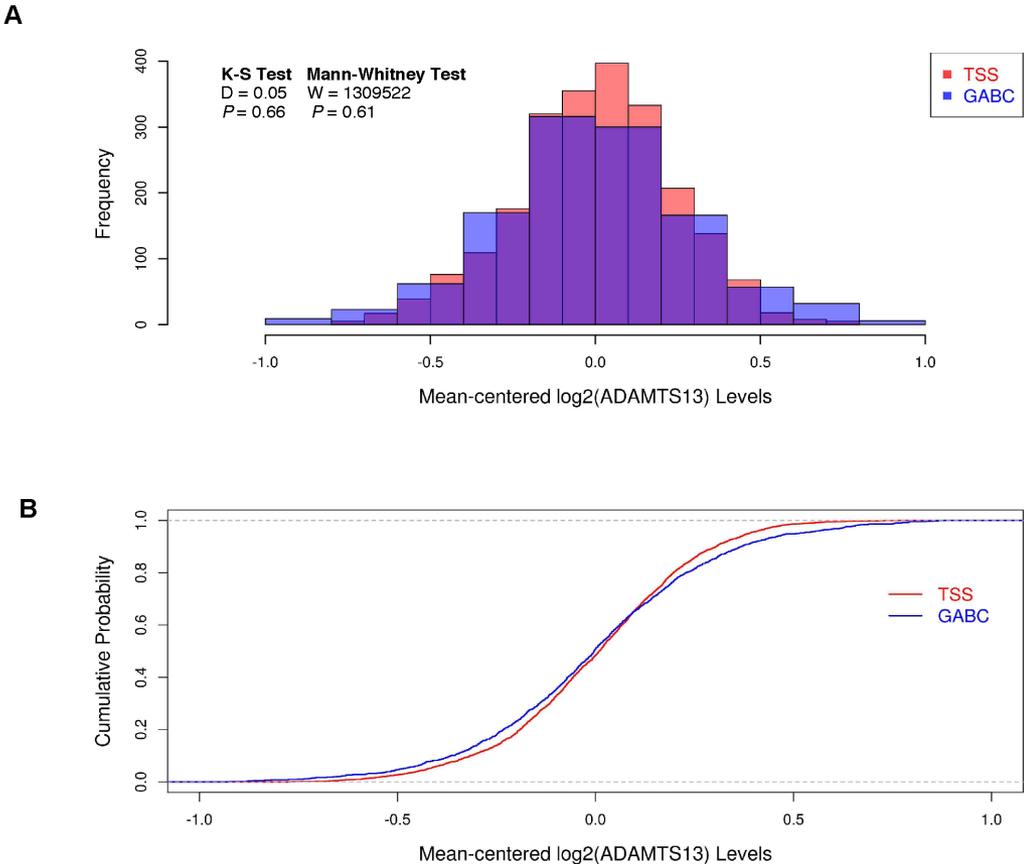
Figure S1. Comparison of ADAMTS13 level distribution between GABC and TSS. Shown are mean-centered log-transformed and outlier-removed values. (A) Histogram for mean centered and log2-transformed ADAMTS13 levels in GABC and TSS, along with results of two statistical tests that showed no difference between the distributions. (B) Cumulative probability distribution of ADAMTS13 levels in GABC and TSS.

Figure S2
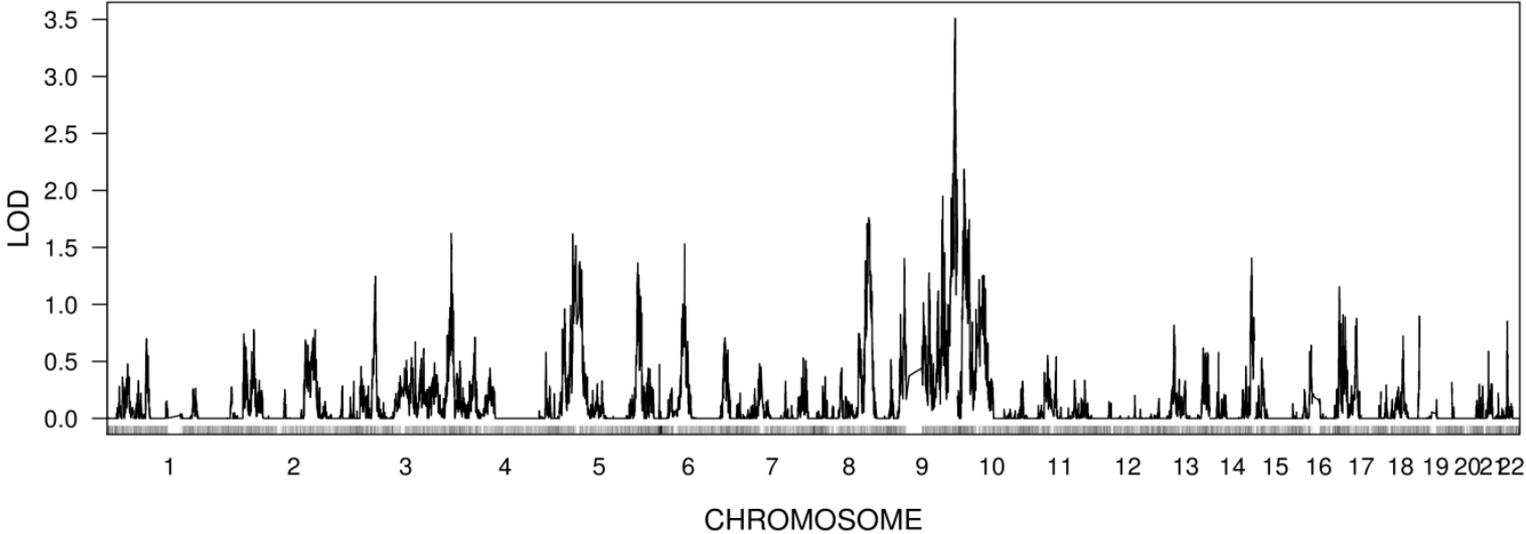
Figure S2. Linkage analysis in GABC and TSS sibs (n = 557 sibships). Genome-wide plot of LOD scores for GABC and TSS sibs using 35,356 independent LD clusters.

Figure S3
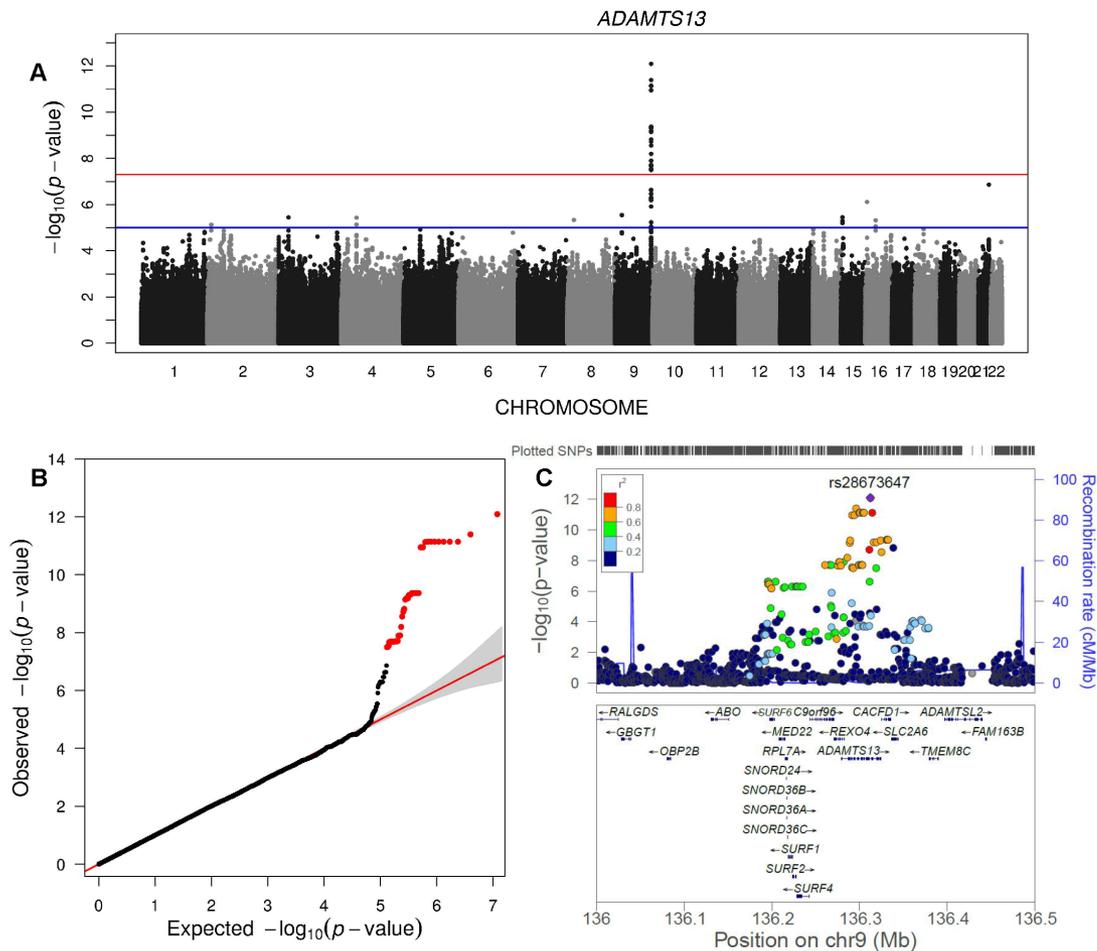
Figure S3. Association results for GABC. Using ~5.96 million SNPs. (A) Genome-wide -log10(*P*) plot. The red line marks the 5.0E-8 threshold of genome-wide significance. (B) Quantile-quantile plot of observed vs. expected -log10(*P*) for ADAMTS13 association. The observed *P* <5.0E-8 are shown in red. (C) Regional plot for *ADAMTS13* gene on Chr9.

Figure S4
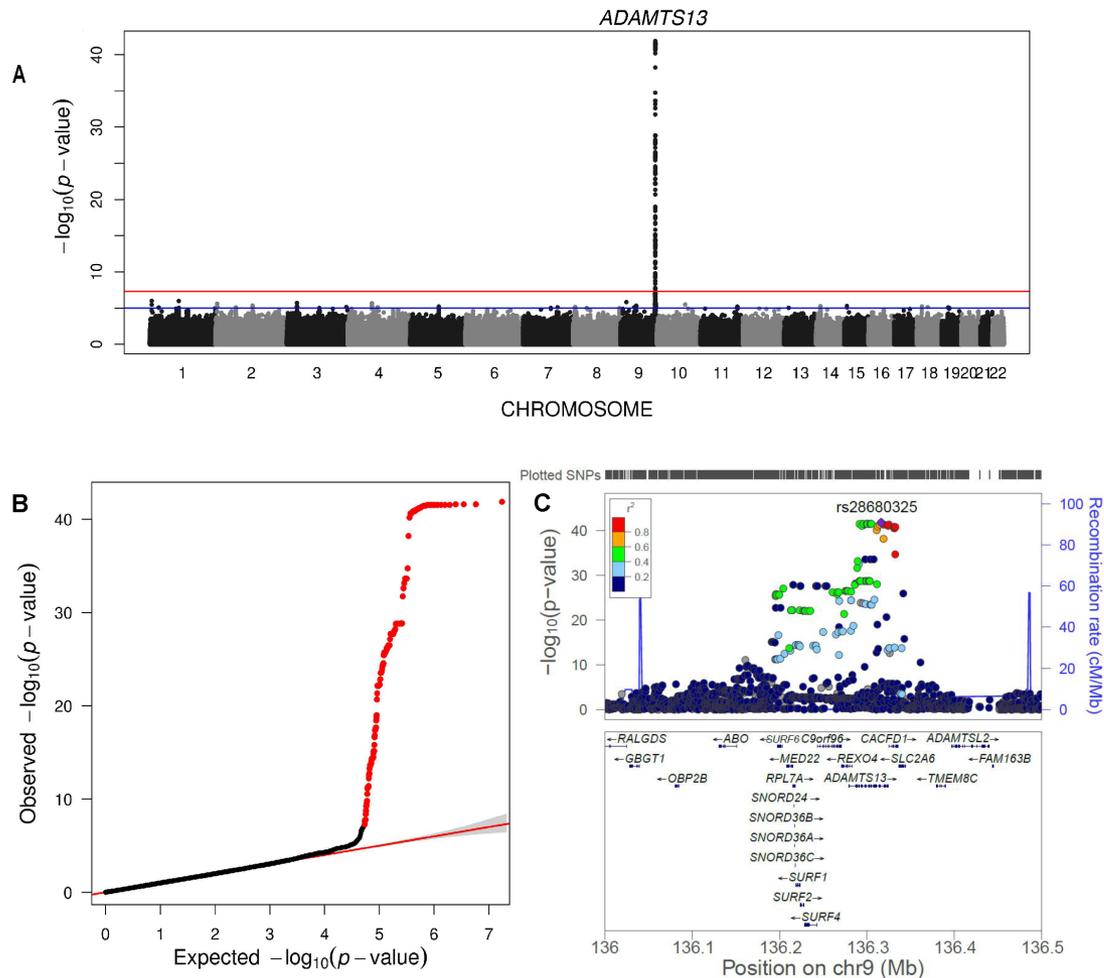
Figure S4. Association results for TSS. Using ~8.70 million SNPs. (A) Genome-wide -log10(*P*) plot. The red line marks the 5.0E-8 threshold of genome-wide significance. (B) Quantile-quantile plot of observed vs. expected -log10(*P*) for ADAMTS13 association. The observed *P* <5.0E-8 are shown in red. (C) Regional plot for *ADAMTS13* gene on Chr9.

Figure S5
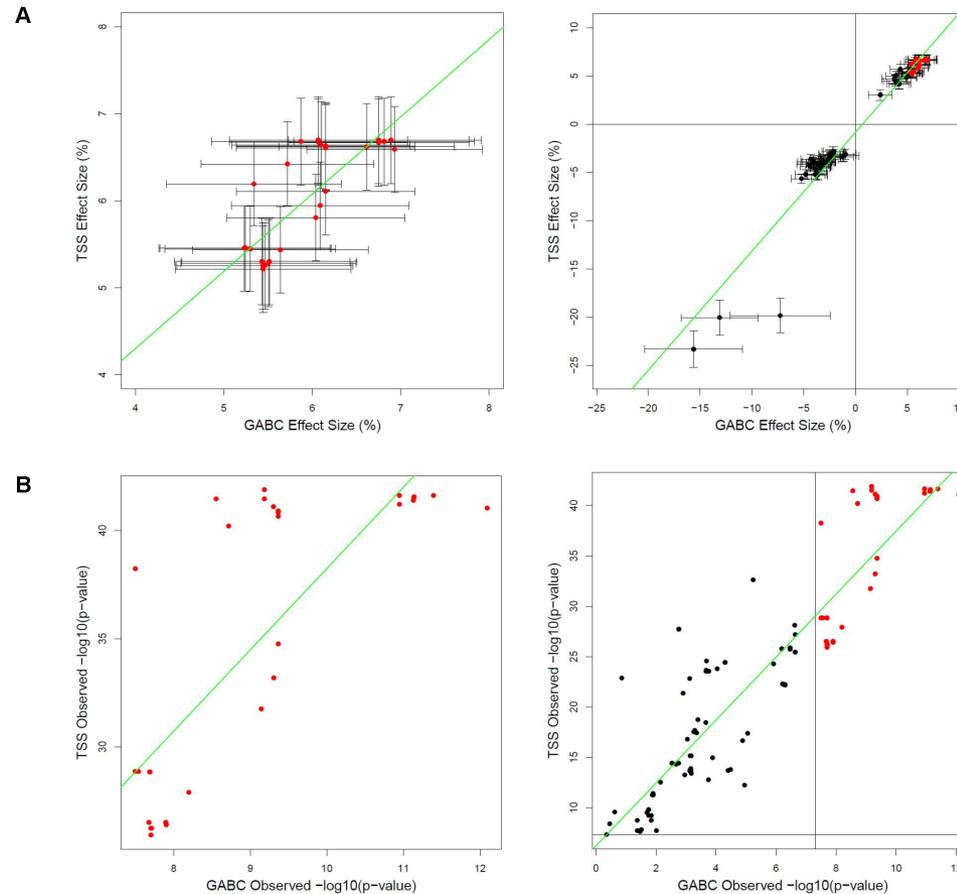
Figure S5. Comparisons of effect sizes and directions as well as *P*-values between GABC and TSS for SNPs significantly associated with ADAMTS13 in each cohort. Comparison of effect sizes and directions (A) and *P*-values (B) between GABC and TSS for top 45 SNPs in GABC (left) and top 133 SNPs in TSS (right). (A) Plotted are β-values in GABC (x-axis) and in TSS (y-axis), with 2 standard errors of β shown as error bars (r = 0.86, *P* = 2.3E-14 for top GABC SNPs; r = 0.98, *P* < 2.2E-16 for top TSS SNPs); (B) Shown are –log10(*P*) in GABC and TSS (r = 0.83, *P* = 1.5E-12 for top GABC SNPs; r = 0.92, *P* < 2.2E-16 for top TSS SNPs). Marked in red are SNPs that are significant in both GABC and TSS, for 45/45 SNPs (left) and 45/133 SNPs (right).

Figure S6
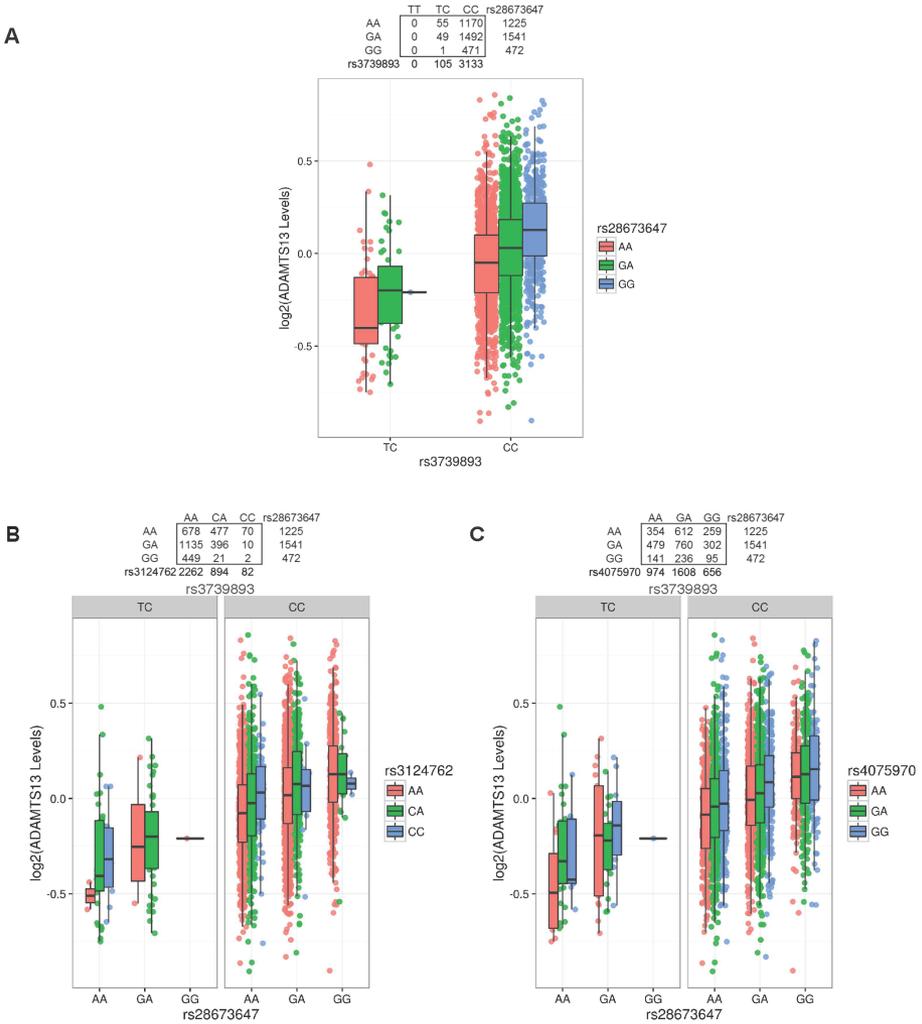
Figure S6. Independent Signals from Conditional analysis in GABC and TSS. (A) Boxplot of the distribution of ADAMTS13 levels in all genotype combinations of the top 2 independent SNPs, rs28673647 and rs3739893, ordered by allelic effect sizes and directions, which showed additive effects of rs28673647 in every stratum of rs3739893 genotype. One-way ANOVA test by coding the available genotype combinations as integers 1 – 6 revealed P = 3.6E-70. (B) Boxplot of ADAMTS13 levels in genotypes of the 3 independent signals at *ADAMTS13* locus – rs28673647, rs3739893 and rs3124762, demonstrating additive effects of rs3124762 in every stratum of rs28673647 and rs3739893 genotypes. One-way ANOVA test by coding the available genotypes as integers 1 – 16 revealed P = 9.1E-76. (C) Boxplot of ADAMTS13 levels in genotypes of rs28673647, rs3739893 in *ADAMTS13* and rs4075970 in *PRDM15*, showing additive effects of rs4075970 in every stratum of rs28673647 and rs3739893 genotypes. One-way ANOVA test by coding the genotypes as integers 1 – 16 revealed P = 7.2E-78. The inserted tables show the number of subjects of all genotype combinations.

Figure S7
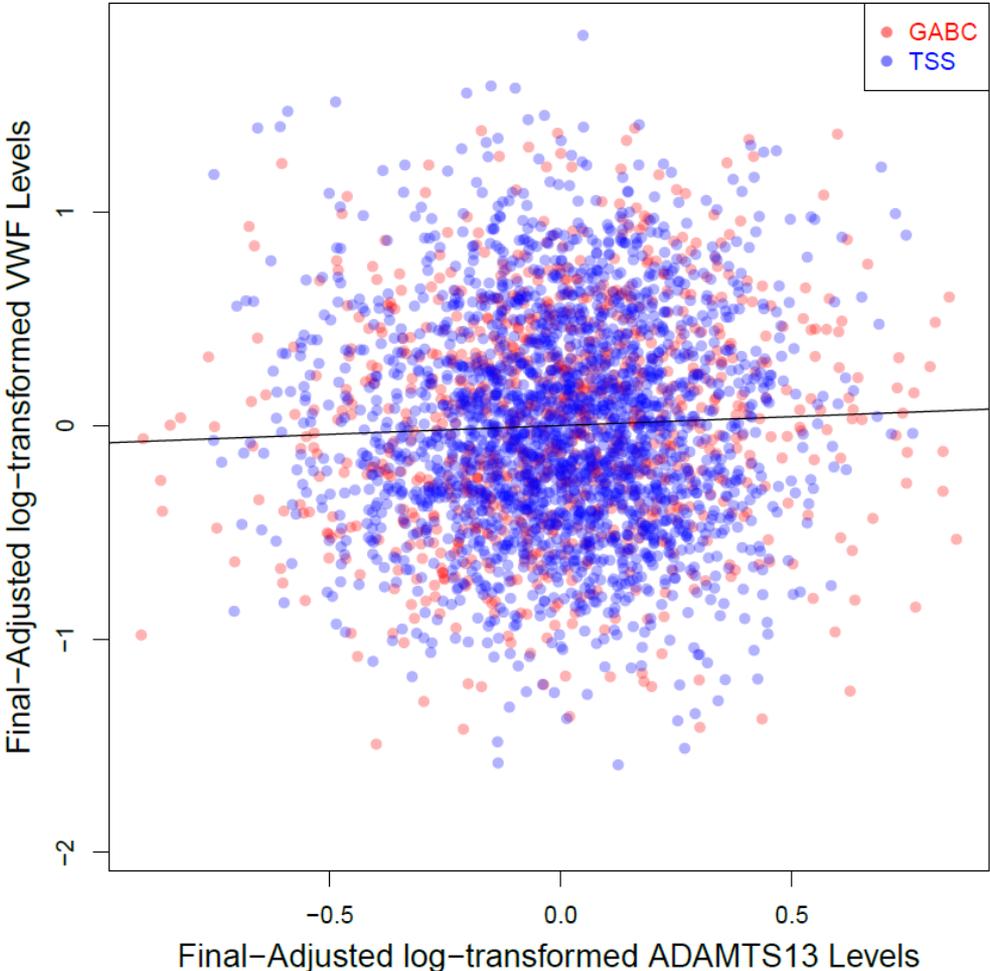
Figure S7: Dot plot for VWF and ADAMTS13 antigen levels in GABC (red) and TSS (blue). The VWF and ADAMTS13 levels were mean-centered, log2-transformed and adjusted for significant covariates as described in methods, respectively. The black line is the linear regression of VWF against ADAMTS13 levels.

Figure S8
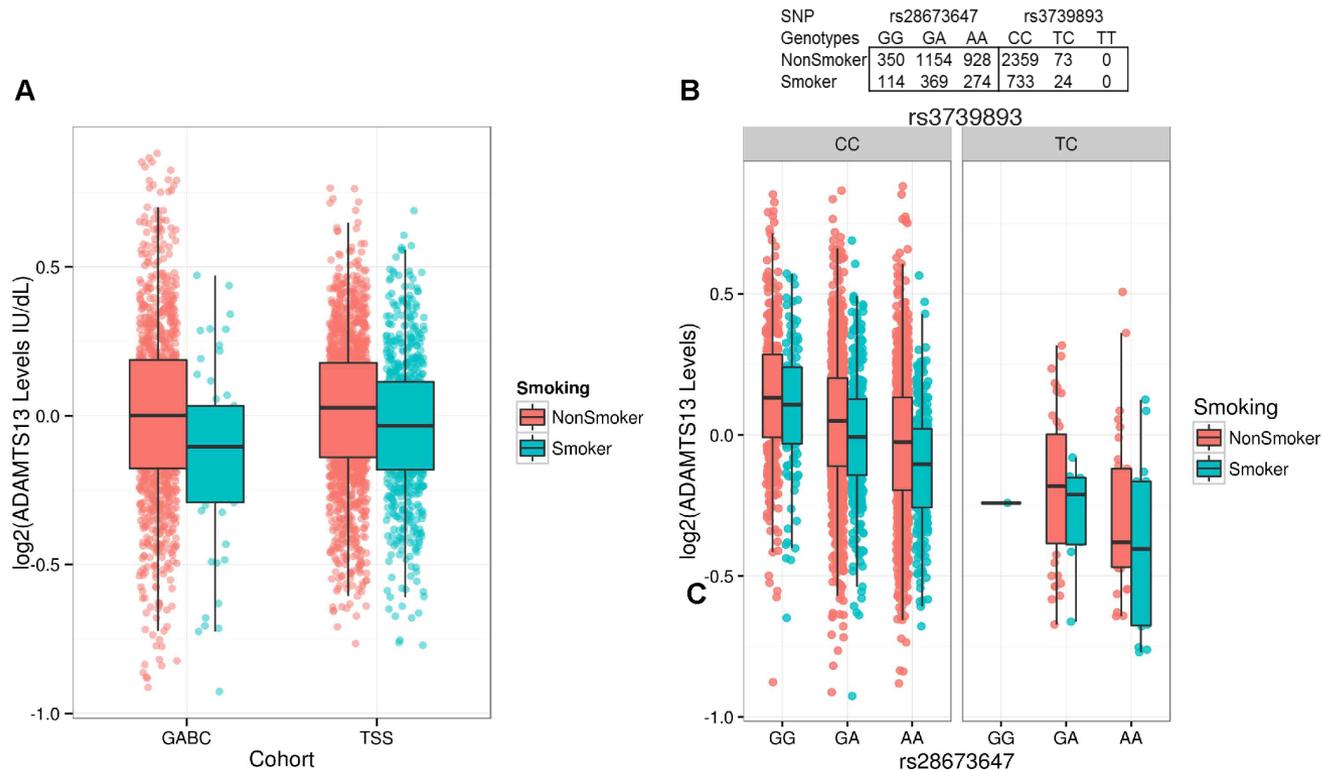
Figure S8. Effect of smoking on ADAMTS13 antigen level. (A) Boxplot of ADAMTS13 levels for smokers and non-smokers in GABC and TSS. (B) Boxplot of ADAMTS13 levels in GABC and TSS against smoking status and genotypes of the top 2 independent SNPs at *ADAMTS13* locus – rs28673647 and rs3739893. The inserted table shows the number of subjects for each genotype and smoking status. One-way ANOVA test by coding the available genotype and smoking status combinations ordered by allelic effect directions as integers 1 – 11 revealed *P* = 1.4E-73.