Supplemental Information:

An exome-wide sequencing study of lipid response to high-fat meal and fenofibrate in Caucasians: the GOLDN cohort

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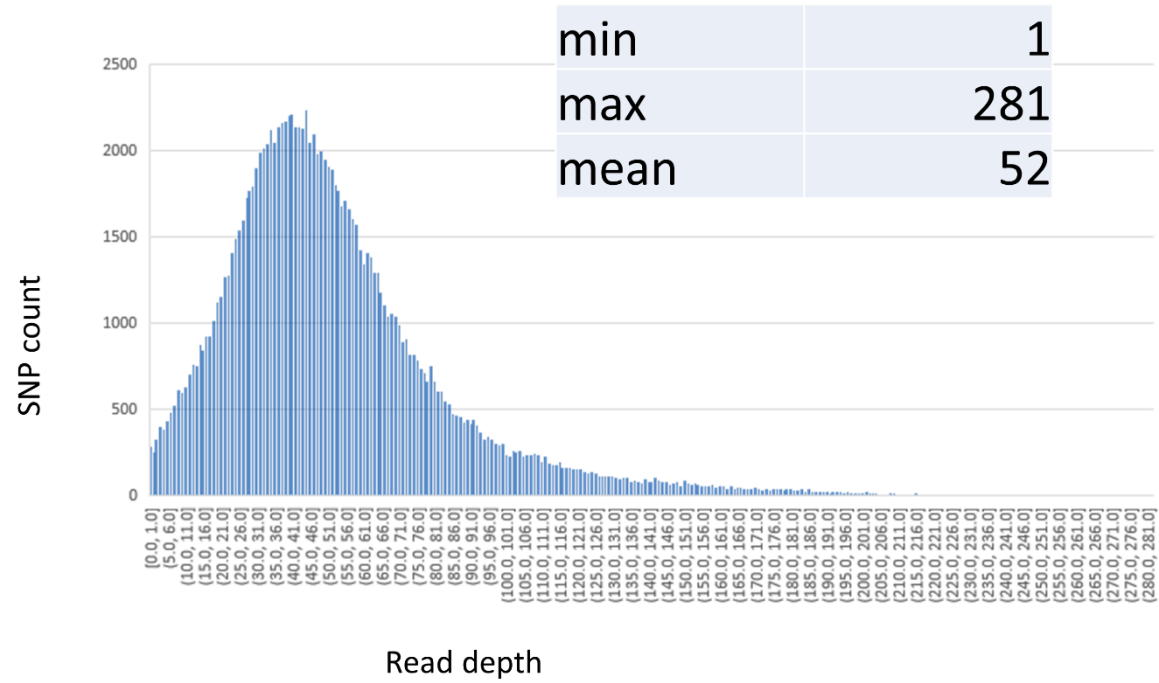[13] College of Public Health, University of Kentucky, Lexington, KY, 40506, USA

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Supplemental Figure S1. **Average read depth of each exonic SNP.**

min	1
max	281
mean	52

Supplemental Table S1: Regression models used in the analyses.

Full model
baseline ~ covariates + SNP
fenofibrate-response ~ baseline + covariates + SNP
postprandial clearance ~ value at draw2 + covariates + SNP
postprandial uptake ~ baseline + covariates + SNP
postprandial AUI ~ baseline + covariates + SNP
postprandial clearance response to FFB~ clearance + fenofibrate-response + covariates + SNP
postprandial uptake response to response to FFB ~ uptake + fenofibrate-response + covariates + SNP
postprandial AUI response to FFB ~ AUI + fenofibrate-response + covariates + SNP
Minimal model
baseline ~ covariates + SNP
fenofibrate-response ~ covariates + SNP
postprandial clearance ~ covariates + SNP
postprandial uptake ~ covariates + SNP
postprandial AUI ~ covariates + SNP
postprandial clearance response to FFB~ covariates + SNP
postprandial uptake response to response to FFB ~ covariates + SNP
postprandial AUI response to FFB ~ covariates + SNP

Covariates included sex, age, age^2, age^3, and recruiting center. For post-fenofibrate phenotypes, covariates also included pills per day in addition to those covariates. The postprandial phenotype response to FFB were the values of post-fenofibrate treatment subtracted by the values of pre-fenofibrate treatment. For example, postprandial AUI response to FFB = post-fenofibrate AUI – pre-fenofibrate AUI.

Supplemental Table S2: Demographic and clinical characteristics of samples in GOLDN, and HAPI Heart Study.

	GOLDN	HAPI Heart Study
gender	male:435 female:459	male:404 female:366
age	50.2 ± 6.1	43.50 ± 13.90
BMI(kg/m^2)	28.5 ± 5.6	26.62 ± 4.46
LDL 0h (mg/dL)	122.77 ± 31.88	—
HDL 0h (mg/dL)	46.73 ± 13.06	—
TG 0h (mg/dL)	139.34 ± 97.63	68.56 ± 41.37
Glucose (mg/dL)	101.51 ± 18.74	—
Systolic blood pressure (mmHg)	116.08 ± 16.82	121.5 ± 0.7
Diastolic blood pressure (mmHg)	68.57 ± 9.6	76.75 ± 0.4

Supplemental Table S3 Single variant association test for candidate genes whose common variants were found to be associated with lipid response phenotypes in previous GOLDN study

Chr	Position	Reference allele	Alternative allele	Number of samples analyzed	Alternative allele frequency	Effect size direction	Phenotype variance explained	P-Value	Trait	Gene
11	116662407	G	C	885	0.052542	+	0.017992	6.60E-05	TG baseline	APOA5
19	45411941	T	C	764	0.169503	+	0.019979	9.35E-05	LDL fasting level response to FFB	APOE
11	116662407	G	C	782	0.056266	-	1.23E-02	0.001906	TG fasting level response to FFB	APOA5
11	116661001	G	A	890	0.000562	+	0.008184	0.006958	TG baseline	APOA5
11	116662407	G	C	782	0.056266	+	0.008108	0.0118	HDL fasting level response to FFB	APOA5
11	116662407	G	C	808	0.054455	+	0.007701	0.012617	TG clearance	APOA5
11	116662407	G	C	885	0.052542	-	0.00661	0.015576	HDL baseline	APOA5
11	116662407	G	C	782	0.056266	+	0.007291	0.016953	LDL fasting level response to FFB	APOA5
11	116660983	T	A	815	0.000613	+	0.006112	0.02562	TG uptake	APOA5
19	45411941	T	C	865	0.165896	+	0.005091	0.035864	LDL baseline	APOE
11	116660983	T	A	789	0.000634	-	0.005364	0.039667	LDL fasting level response to FFB	APOA5
11	116660983	T	A	815	0.000613	+	0.004336	0.060121	TG AUI	APOA5
11	116701353	C	T	884	0.000566	-	0.003883	0.06392	TG baseline	APOC3
11	116661001	G	A	890	0.000562	-	0.003784	0.066472	HDL baseline	APOA5
11	116660983	T	A	815	0.000613	-	0.004053	0.069135	TG clearance	APOA5
19	45411110	T	C	788	0.005076	+	0.003958	0.077397	TG clearance	APOE
19	45411941	T	C	865	0.165896	+	0.003438	0.084608	TG baseline	APOE
11	116701353	C	T	884	0.000566	+	0.003195	0.09286	HDL baseline	APOC3
11	116660983	T	A	707	0.000707	-	0.00366	0.107684	TG AUI response to FFB	APOA5

11	116661001	G	A	787	0.000635	+	0.002951	0.127506	HDL fasting level response to FFB	APOA5
11	116661001	G	A	890	0.000562	-	0.002456	0.139278	LDL baseline	APOA5
11	116703575	G	C	816	0.001225	-	0.002501	0.153117	TG AUI	APOC3
11	116661001	G	A	813	0.000615	+	0.002457	0.157579	TG clearance	APOA5
11	116703575	G	C	790	0.000633	-	0.002485	0.161165	HDL fasting level response to FFB	APOC3
11	116660983	T	A	892	0.000561	-	0.001817	0.203037	TG baseline	APOA5
19	45411110	T	C	864	0.005787	-	0.001868	0.203881	HDL baseline	APOE
11	116703561	G	C	894	0.001678	-	0.001723	0.214563	HDL baseline	APOC3
19	45411110	T	C	763	0.004587	+	0.001944	0.223307	LDL fasting level response to FFB	APOE
11	116703575	G	C	708	0.000706	-	0.002039	0.229502	TG clearance response to FFB	APOC3
11	116662407	G	C	700	0.056429	+	0.001971	0.240196	TG clearance response to FFB	APOA5
11	116703575	G	C	708	0.000706	-	0.001818	0.256569	TG uptake response to FFB	APOC3
11	116660983	T	A	789	0.000634	-	1.60E-03	0.260847	TG fasting level response to FFB	APOA5
11	116662407	G	C	808	0.054455	+	0.001562	0.261226	TG AUI	APOA5
19	45411941	T	C	865	0.165896	-	0.00145	0.262679	HDL baseline	APOE
11	116703575	G	C	816	0.001225	-	0.001492	0.269892	TG clearance	APOC3
19	45411941	T	C	790	0.164557	+	0.001522	0.272878	TG clearance	APOE
19	45411941	T	C	764	0.169503	-	0.001537	0.278564	HDL fasting level response to FFB	APOE
11	116703575	G	C	893	0.00112	+	0.001226	0.295312	HDL baseline	APOC3
11	116703575	G	C	816	0.001225	-	0.001278	0.3071	TG uptake	APOC3
19	45411941	T	C	764	0.169503	+	0.001338	0.312013	TG fasting level response to FFB	APOE
19	45411110	T	C	763	0.004587	+	0.001325	0.314738	HDL fasting level response to FFB	APOE

11	116703575	G	C	893	0.00112	-	0.00107	0.328385	TG baseline	APOC3
11	116701353	C	T	781	0.00064	-	0.001214	0.330222	LDL fasting level response to FFB	APOC3
19	45411110	T	C	682	0.003666	+	0.00137	0.33371	TG clearance response to FFB	APOE
11	116660983	T	A	707	0.000707	-	0.001299	0.337852	TG clearance response to FFB	APOA5
11	116701353	C	T	781	0.00064	-	0.00105	0.365117	HDL fasting level response to FFB	APOC3
19	45411110	T	C	864	0.005787	+	0.000889	0.380761	LDL baseline	APOE
11	116703561	G	C	817	0.001224	-	0.000865	0.400512	TG uptake	APOC3
19	45411941	T	C	684	0.166667	+	0.00098	0.412888	TG clearance response to FFB	APOE
11	116703561	G	C	817	0.001224	+	0.000816	0.414244	TG clearance	APOC3
11	116703575	G	C	790	0.000633	+	0.000788	0.430186	TG fasting level response to FFB	APOC3
11	116703561	G	C	791	0.001264	+	0.000783	0.431323	TG fasting level response to FFB	APOC3
11	116662407	G	C	885	0.052542	+	0.000535	0.491532	LDL baseline	APOA5
11	116703575	G	C	708	0.000706	-	0.000639	0.501067	TG AUI response to FFB	APOC3
11	116662407	G	C	700	0.056429	+	0.000613	0.512319	TG AUI response to FFB	APOA5
11	116660983	T	A	789	0.000634	+	0.000525	0.519923	HDL fasting level response to FFB	APOA5
19	45411110	T	C	864	0.005787	+	0.000475	0.521623	TG baseline	APOE
11	116661001	G	A	705	0.000709	-	0.000515	0.546985	TG uptake response to FFB	APOA5
11	116703561	G	C	817	0.001224	-	0.000424	0.556186	TG AUI	APOC3
19	45411110	T	C	763	0.004587	+	0.000451	0.55731	TG fasting level response to FFB	APOE
11	116661001	G	A	787	0.000635	+	4.29E-04	0.561354	TG fasting level response to FFB	APOA5

11	116703561	G	C	894	0.001678	-	0.000323	0.591086	LDL baseline	APOC3
11	116701353	C	T	884	0.000566	-	0.000312	0.599513	LDL baseline	APOC3
11	116703575	G	C	893	0.00112	-	0.000301	0.604023	LDL baseline	APOC3
11	116662407	G	C	808	0.054455	+	0.000325	0.608071	TG uptake	APOA5
11	116703561	G	C	791	0.001264	+	0.000323	0.613145	LDL fasting level response to FFB	APOC3
19	45411110	T	C	682	0.003666	+	0.000374	0.613355	TG AUI response to FFB	APOE
19	45411110	T	C	788	0.005076	+	0.000234	0.66776	TG AUI	APOE
19	45411941	T	C	684	0.166667	-	0.000255	0.676017	TG uptake response to FFB	APOE
11	116660983	T	A	892	0.000561	-	0.000149	0.715625	LDL baseline	APOA5
11	116661001	G	A	813	0.000615	-	0.000147	0.729661	TG uptake	APOA5
11	116661001	G	A	787	0.000635	+	0.000131	0.747714	LDL fasting level response to FFB	APOA5
11	116703561	G	C	709	0.000705	+	0.000133	0.758373	TG AUI response to FFB	APOC3
11	116660983	T	A	892	0.000561	-	0.000103	0.762318	HDL baseline	APOA5
11	116703561	G	C	709	0.000705	+	0.000108	0.781578	TG clearance response to FFB	APOC3
19	45411941	T	C	790	0.164557	-	8.64E-05	0.793912	TG uptake	APOE
11	116661001	G	A	705	0.000709	+	9.30E-05	0.797914	TG AUI response to FFB	APOA5
11	116703561	G	C	894	0.001678	+	7.32E-05	0.798134	TG baseline	APOC3
11	116703575	G	C	790	0.000633	+	8.09E-05	0.800372	LDL fasting level response to FFB	APOC3
11	116660983	T	A	707	0.000707	+	7.74E-05	0.814984	TG uptake response to FFB	APOA5
19	45411941	T	C	684	0.166667	+	6.43E-05	0.833831	TG AUI response to FFB	APOE
11	116703561	G	C	791	0.001264	-	5.42E-05	0.835961	HDL fasting level response to FFB	APOC3

11	116661001	G	A	705	0.000709	-	5.39E-05	0.845436	TG clearance response to FFB	APOA5
11	116701353	C	T	781	0.00064	+	4.44E-05	0.852299	TG fasting level response to FFB	APOC3
11	116662407	G	C	700	0.056429	+	4.09E-05	0.865681	TG uptake response to FFB	APOA5
11	116661001	G	A	813	0.000615	-	2.71E-05	0.882057	TG AUI	APOA5
19	45411110	T	C	788	0.005076	-	2.07E-05	0.898277	TG uptake	APOE
19	45411941	T	C	790	0.164557	+	2.01E-05	0.899607	TG AUI	APOE
19	45411110	T	C	682	0.003666	+	1.19E-05	0.928248	TG uptake response to FFB	APOE
11	116703561	G	C	709	0.000705	-	3.86E-06	0.958301	TG uptake response to FFB	APOC3

Supplemental Table S4 Gene-based association test for candidate genes whose common variants were found to be associated with lipid response phenotypes in previous GOLDN study

Group name	Number of variants	Variant position	Minor alleles of frequencies	Single variant P-values	Gene based P-value	Method	Minor allele frequency threshold	Trait
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.203037, 0.0069579	0.011655	SKAT	0.05	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.203037, 0.0069579	0.011655	SKAT	0.01	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0691347, 0.157579	0.070623	SKAT	0.05	TG clearance
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0691347, 0.157579	0.070623	SKAT	0.01	TG clearance
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0256204, 0.729661	0.078039	SKAT	0.05	TG uptake
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0256204, 0.729661	0.078039	SKAT	0.01	TG uptake
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0639202, 0.798134, 0.328385	0.10998	MB	0.05	TG baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0639202, 0.798134, 0.328385	0.10998	MB	0.01	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.0396668, 0.747714	0.114423	SKAT	0.05	LDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.0396668, 0.747714	0.114423	SKAT	0.01	LDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.125074	Burden	0.05	HDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.125074	Burden	0.01	HDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.125172	MB	0.05	HDL fasting level response to FFB

APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.125172	MB	0.01	HDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.130345	Burden	0.05	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.130345	Burden	0.01	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.1305	MB	0.05	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.1305	MB	0.01	HDL baseline
APOC3	2	11:116701353:C:T; 11:116703575:G:C	0.000565611, 0.00111982	0.0639202, 0.328385	0.130882	VT	0.01	TG baseline
APOC3	2	11:116701353:C:T; 11:116703575:G:C	0.000565611, 0.00111982	0.0928598, 0.295312	0.140301	VT	0.01	HDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.365117, 0.835961, 0.161165	0.142182	MB	0.05	HDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.365117, 0.835961, 0.161165	0.142182	MB	0.01	HDL fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.151915	Burden	0.05	TG AUI
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.151915	Burden	0.01	TG AUI
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.151966	MB	0.05	TG AUI
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.151966	MB	0.01	TG AUI
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0601213, 0.882057	0.16896	SKAT	0.05	TG AUI
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0601213, 0.882057	0.16896	SKAT	0.01	TG AUI

APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0928598, 0.214563, 0.295312	0.170713	SKAT	0.05	HDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0928598, 0.214563, 0.295312	0.170713	SKAT	0.01	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.177336	SKAT	0.05	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.177336	SKAT	0.01	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0256204, 0.729661	0.181605	MB	0.05	TG uptake
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0256204, 0.729661	0.181605	MB	0.01	TG uptake
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0256204, 0.729661	0.181972	Burden	0.05	TG uptake
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0256204, 0.729661	0.181972	Burden	0.01	TG uptake
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.365117, 0.835961, 0.161165	0.185653	Burden	0.05	HDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.365117, 0.835961, 0.161165	0.185653	Burden	0.01	HDL fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.187232	Burden	0.05	TG uptake
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.187232	Burden	0.01	TG uptake
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.187244	MB	0.05	TG uptake
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.187244	MB	0.01	TG uptake
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.192215	Burden	0.05	LDL baseline

Gene		Variants				Test		Phenotype
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.192215	Burden	0.01	LDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.192366	MB	0.05	LDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.192366	MB	0.01	LDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.197549	VT	0.01	HDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0639202, 0.798134, 0.328385	0.203458	Burden	0.05	TG baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0639202, 0.798134, 0.328385	0.203458	Burden	0.01	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.762318, 0.0664718	0.205309	VT	0.01	HDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.0396668, 0.747714	0.21896	MB	0.05	LDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.0396668, 0.747714	0.21896	MB	0.01	LDL fasting level response to FFB
APOC3	2	11:116701353:C:T; 11:116703575:G:C	0.000640205, 0.000632911	0.365117, 0.161165	0.218966	VT	0.01	HDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.0396668, 0.747714	0.219361	Burden	0.05	LDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.0396668, 0.747714	0.219361	Burden	0.01	LDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0601213, 0.882057	0.220165	MB	0.05	TG AUI
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0601213, 0.882057	0.220165	MB	0.01	TG AUI
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0601213, 0.882057	0.220497	Burden	0.05	TG AUI
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0601213, 0.882057	0.220497	Burden	0.01	TG AUI

Gene	N	Variants				Method		Phenotype
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.237561	VT	0.01	TG AUI
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.254543	SKAT	0.05	HDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.519923, 0.127506	0.254543	SKAT	0.01	HDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.107684, 0.797914	0.265327	SKAT	0.05	TG AUI response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.107684, 0.797914	0.265327	SKAT	0.01	TG AUI response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.287791	VT	0.01	TG uptake
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.294304	VT	0.01	LDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0928598, 0.214563, 0.295312	0.294614	MB	0.05	HDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0928598, 0.214563, 0.295312	0.294614	MB	0.01	HDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.298186	Burden	0.05	TG fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.298186	Burden	0.01	TG fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.299038	SKAT	0.05	TG AUI
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.556186, 0.153117	0.299038	SKAT	0.01	TG AUI
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.312202	MB	0.05	TG fasting level response to FFB

Gene		Variants				Method		Phenotype
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.312202	MB	0.01	TG fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.203037, 0.0069579	0.312956	Burden	0.05	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.203037, 0.0069579	0.312956	Burden	0.01	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.313709	SKAT	0.05	LDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.715625, 0.139278	0.313709	SKAT	0.01	LDL baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.203037, 0.0069579	0.313713	MB	0.05	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000560538, 0.000561798	0.203037, 0.0069579	0.313713	MB	0.01	TG baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0639202, 0.798134, 0.328385	0.333394	SKAT	0.05	TG baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0639202, 0.798134, 0.328385	0.333394	SKAT	0.01	TG baseline
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.107684, 0.797914	0.33796	MB	0.05	TG AUI response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.107684, 0.797914	0.33796	MB	0.01	TG AUI response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.107684, 0.797914	0.338431	Burden	0.05	TG AUI response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.107684, 0.797914	0.338431	Burden	0.01	TG AUI response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.362428	MB	0.05	LDL baseline

Gene	N	Variant			P	Test	Threshold	Phenotype
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.362428	MB	0.01	LDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.364874	Burden	0.05	LDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.364874	Burden	0.01	LDL baseline
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.414244, 0.269892	0.386484	SKAT	0.05	TG clearance
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.414244, 0.269892	0.386484	SKAT	0.01	TG clearance
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.406303	Burden	0.05	TG uptake response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.406303	Burden	0.01	TG uptake response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.406458	MB	0.05	TG uptake response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.406458	MB	0.01	TG uptake response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.337852, 0.845436	0.414152	MB	0.05	TG clearance response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.337852, 0.845436	0.414152	MB	0.01	TG clearance response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.337852, 0.845436	0.414371	Burden	0.05	TG clearance response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.337852, 0.845436	0.414371	Burden	0.01	TG clearance response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.416295	SKAT	0.05	TG uptake
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.400512, 0.3071	0.416295	SKAT	0.01	TG uptake

APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.260847, 0.561354	0.448957	SKAT	0.05	TG fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.260847, 0.561354	0.448957	SKAT	0.01	TG fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.781578, 0.229502	0.468632	SKAT	0.01	TG clearance response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.365117, 0.835961, 0.161165	0.501333	SKAT	0.05	HDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.365117, 0.835961, 0.161165	0.501333	SKAT	0.01	HDL fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.781578, 0.229502	0.514237	Burden	0.05	TG clearance response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.781578, 0.229502	0.514237	Burden	0.01	TG clearance response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.781578, 0.229502	0.514475	MB	0.05	TG clearance response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.781578, 0.229502	0.514475	MB	0.01	TG clearance response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.532881	SKAT	0.05	TG uptake response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.532881	SKAT	0.01	TG uptake response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0928598, 0.214563, 0.295312	0.53628	Burden	0.05	HDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.0928598, 0.214563, 0.295312	0.53628	Burden	0.01	HDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.547126	VT	0.01	TG fasting level response to FFB

Gene		Variants				Test	Threshold	Phenotype
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.958301, 0.256569	0.574537	VT	0.01	TG uptake response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.337852, 0.845436	0.619832	SKAT	0.01	TG clearance response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.650545	VT	0.01	LDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.693764	SKAT	0.05	TG fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.852299, 0.431323, 0.430186	0.693764	SKAT	0.01	TG fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.260847, 0.561354	0.699926	MB	0.05	TG fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.260847, 0.561354	0.699926	MB	0.01	TG fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.260847, 0.561354	0.700493	Burden	0.05	TG fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000633714, 0.000635324	0.260847, 0.561354	0.700493	Burden	0.01	TG fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.781578, 0.229502	0.702109	VT	0.01	TG clearance response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.330222, 0.613145, 0.800372	0.740336	SKAT	0.05	LDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.330222, 0.613145, 0.800372	0.740336	SKAT	0.01	LDL fasting level response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.758373, 0.501067	0.761221	SKAT	0.05	TG AUI response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.758373, 0.501067	0.761221	SKAT	0.01	TG AUI response to FFB

Gene		Variants				Test		Phenotype
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0691347, 0.157579	0.773747	MB	0.05	TG clearance
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0691347, 0.157579	0.773747	MB	0.01	TG clearance
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0691347, 0.157579	0.774822	Burden	0.05	TG clearance
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000613497, 0.000615006	0.0691347, 0.157579	0.774822	Burden	0.01	TG clearance
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.794356	Burden	0.05	TG uptake response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.794356	Burden	0.01	TG uptake response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.794679	MB	0.05	TG uptake response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.794679	MB	0.01	TG uptake response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.758373, 0.501067	0.797299	Burden	0.05	TG AUI response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.758373, 0.501067	0.797299	Burden	0.01	TG AUI response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.758373, 0.501067	0.797488	MB	0.05	TG AUI response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.000705219, 0.000706215	0.758373, 0.501067	0.797488	MB	0.01	TG AUI response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.811603	SKAT	0.05	TG uptake response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.811603	SKAT	0.01	TG uptake response to FFB
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.414244, 0.269892	0.823182	Burden	0.05	TG clearance
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.414244, 0.269892	0.823182	Burden	0.01	TG clearance
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.414244, 0.269892	0.823504	MB	0.05	TG clearance

Gene		Variants				Test		Phenotype
APOC3	2	11:116703561:G:C; 11:116703575:G:C	0.00122399, 0.00122549	0.414244, 0.269892	0.823504	MB	0.01	TG clearance
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.835549	SKAT	0.05	LDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000565611, 0.00167785, 0.00111982	0.599513, 0.591086, 0.604023	0.835549	SKAT	0.01	LDL baseline
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.330222, 0.613145, 0.800372	0.872221	MB	0.05	LDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.330222, 0.613145, 0.800372	0.872221	MB	0.01	LDL fasting level response to FFB
APOC3	2	11:116701353:C:T; 11:116703575:G:C	0.000640205, 0.000632911	0.330222, 0.800372	0.887423	VT	0.01	LDL fasting level response to FFB
APOA5	2	11:116660983:T:A; 11:116661001:G:A	0.000707214, 0.00070922	0.814984, 0.546985	0.941536	VT	0.01	TG uptake response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.330222, 0.613145, 0.800372	0.965708	Burden	0.05	LDL fasting level response to FFB
APOC3	3	11:116701353:C:T; 11:116703561:G:C; 11:116703575:G:C	0.000640205, 0.00126422, 0.000632911	0.330222, 0.613145, 0.800372	0.965708	Burden	0.01	LDL fasting level response to FFB

Supplemental Table S5 Single variant association results for SIPA1L2 with GOLDN and HAPI Heart Study for the trait of triglyceride postprandial area under increase.

gene	chr	variant position	reference allele	alternative allele	number of samples analyzed	minor allele frequency	P value	cohort	mutation effect	direction of effect
SIPA1L2	1	232534919	C	T	803	0.00996	0.117317	GOLDN	Missense	+
SIPA1L2	1	232538214	C	T	799	0.00313	0.815151	GOLDN	Missense	+
SIPA1L2	1	232539219	C	T	728	0.0158	0.738418	HAPI	Missense	+
SIPA1L2	1	232539219	C	T	812	0.00554	0.999854	GOLDN	Missense	-
SIPA1L2	1	232539246	G	T	813	0.00062	0.434327	GOLDN	Missense	+
SIPA1L2	1	232539255	C	A	815	0.00184	0.216915	GOLDN	Missense	+
SIPA1L2	1	232561520	G	A	797	0.00565	0.199456	GOLDN	Missense	+
SIPA1L2	1	232564162	T	C	728	0.02198	0.101433	HAPI	Missense	+
SIPA1L2	1	232564162	T	C	817	0.0202	0.885149	GOLDN	Missense	+
SIPA1L2	1	232564197	A	G	817	0.00245	0.069999	GOLDN	Missense	+
SIPA1L2	1	232564288	T	G	728	0.00137	0.800378	HAPI	Missense	-
SIPA1L2	1	232564288	T	G	817	0.00734	0.262417	GOLDN	Missense	+
SIPA1L2	1	232564297	T	A	728	0.23764	0.83474	HAPI	Missense	+
SIPA1L2	1	232564297	T	A	817	0.19584	0.444758	GOLDN	Missense	+
SIPA1L2	1	232568041	G	A	728	0.11607	0.703457	HAPI	Missense	+
SIPA1L2	1	232568041	G	A	815	0.1092	0.091871	GOLDN	Missense	-
SIPA1L2	1	232568146	A	C	817	0.00122	0.117251	GOLDN	Missense	+
SIPA1L2	1	232574921	T	C	728	0.25962	0.966404	HAPI	Missense	+
SIPA1L2	1	232574968	G	C	780	0.00128	0.593174	GOLDN	Missense	+
SIPA1L2	1	232575166	T	C	816	0.00061	0.425115	GOLDN	Missense	-
SIPA1L2	1	232581366	C	T	811	0.00247	0.097609	GOLDN	Missense	+
SIPA1L2	1	232600762	T	C	797	0.00063	0.217873	GOLDN	Missense	+
SIPA1L2	1	232600796	A	C	793	0.00063	0.243738	GOLDN	Missense	+

SIPA1L2	1	232615429	C	T	817	0.00122	0.583783	GOLDN	Missense	+
SIPA1L2	1	232626760	C	T	816	0.00245	0.068269	GOLDN	Missense	+
SIPA1L2	1	232649974	G	A	728	0.00069	0.844218	HAPI	Missense	+
SIPA1L2	1	232650253	A	C	805	0.00062	0.879694	GOLDN	Missense	+
SIPA1L2	1	232650307	C	G	815	0.00184	0.042398	GOLDN	Missense	+
SIPA1L2	1	232650454	A	G	817	0.00245	0.647498	GOLDN	Missense	+
SIPA1L2	1	232650624	G	T	814	0.00061	0.376787	GOLDN	Missense	+
SIPA1L2	1	232650662	C	T	814	0.00123	0.884476	GOLDN	Missense	-
SIPA1L2	1	232650941	T	C	811	0.00062	0.004215	GOLDN	Missense	+

Supplemental Table S6 Gene-based association results for SIPA1L2 with GOLDN and HAPI Heart Study for the trait of triglyceride postprandial area under increase.

Joint meta-analysis of HAPI and GOLDN				GOLDN				HAPI			
Burden	MB	SKAT	VT	Burden	MB	SKAT	VT	Burden	MB	SKAT	VT
6.31E-06	1.73E-06	0.0739029	2.86E-05	6.38E-06	2.31E-06	0.0713718	1.79E-04	0.925908	0.968225	1	0.970485