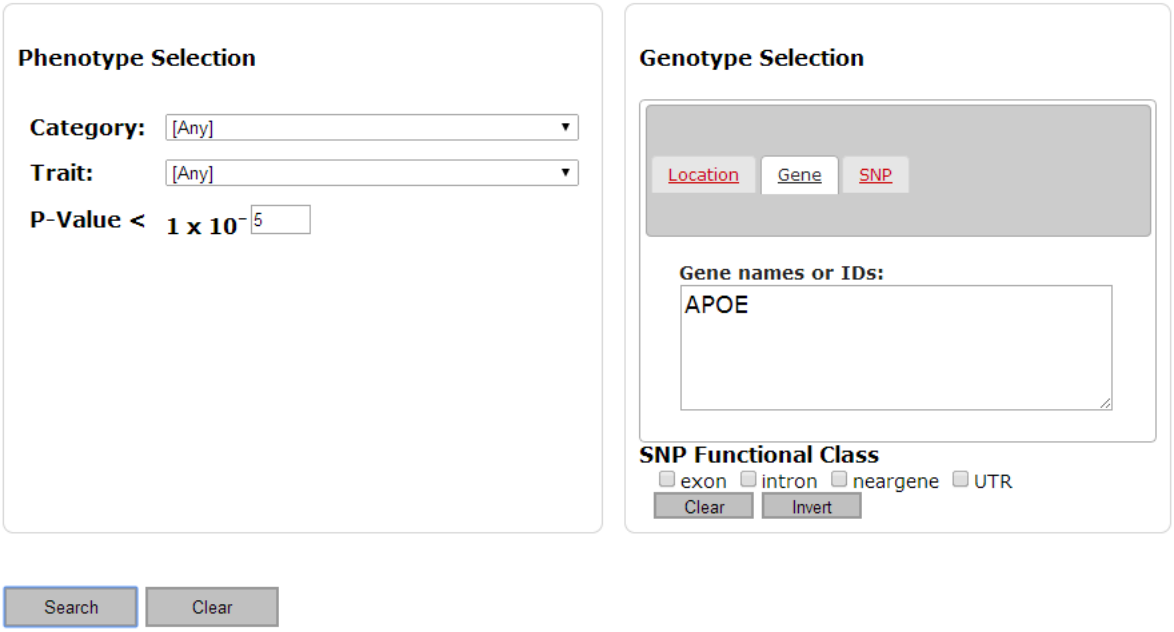
Guide to web-based search on GRASP v2.0

In addition to making the entire GRASP database available for download, users may search the GRASP database using this web interface.

There are multiple search options within GRASP. These include searching by chromosomal location (chromosome and base pair), gene name or ID, phenotypic category and trait, and SNP ID (rsID). Various optional filters can be imposed on the querying results: (1) a p-value threshold (default=0.05) and (2) SNP functional class (exon, intron, neargene, and UTR) (default=none).

Below is an example of a GRASP search for the *APOE* gene with a p-value threshold of $p<1.0x10^{-5}$. This will search the entire GRASP database for SNP associations within the *APOE* gene (as defined by current NCBI boundary definitions) with all phenotypes that has a p-value less than or equal to $1.0x10^{-5}$.

A general note is that users conducting multiple searches will generally want to select the "Clear" buttons between searches.



A screenshot of the results of the above *APOE* search with a p-value filter of $p<1.0x10^{-5}$ are below. Results are sorted in ascending p-value order (i.e. associations with the lowest p-values are presented first).

For each SNP-trait association, the following information is presented: (1) NHLBI Key, a unique identifier for each SNP association result in the database; (2) SNP ID, the dbSNP ID identifier in the current dbSNP Build; (3) P-value, the reported p-value for this particular SNP association; (4) PMID, the pubmed ID for the publication where this SNP association was reported with hyperlink to the abstract; (5) Location, where in the publication the result is reported; (6) Phenotype, the trait the reported SNP is associated with; (7) Phenotype Category, general category(ies) where the trait and all other traits in that

publication fall into; (8) Chr, chromosomal location of the SNP; (9) Position, base pair position of the SNP (automatically updated by NCBI as genomic builds are updated); (10) InGene, the gene the SNP is within if located in a gene region (based on current NCBI definitions); (11)Total Samples, the total number of subjects (both discovery and replication, if completed) in the analyses [Note: this sample size may or may not correspond exactly to the p-value and trait association displayed within a given paper]; and (12) Platform, the genotyping platform with the number of markers (or estimation if exact number not presented in paper) used in association analyses.

Display 100 records

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Showing 1 to 100 of 127 entries

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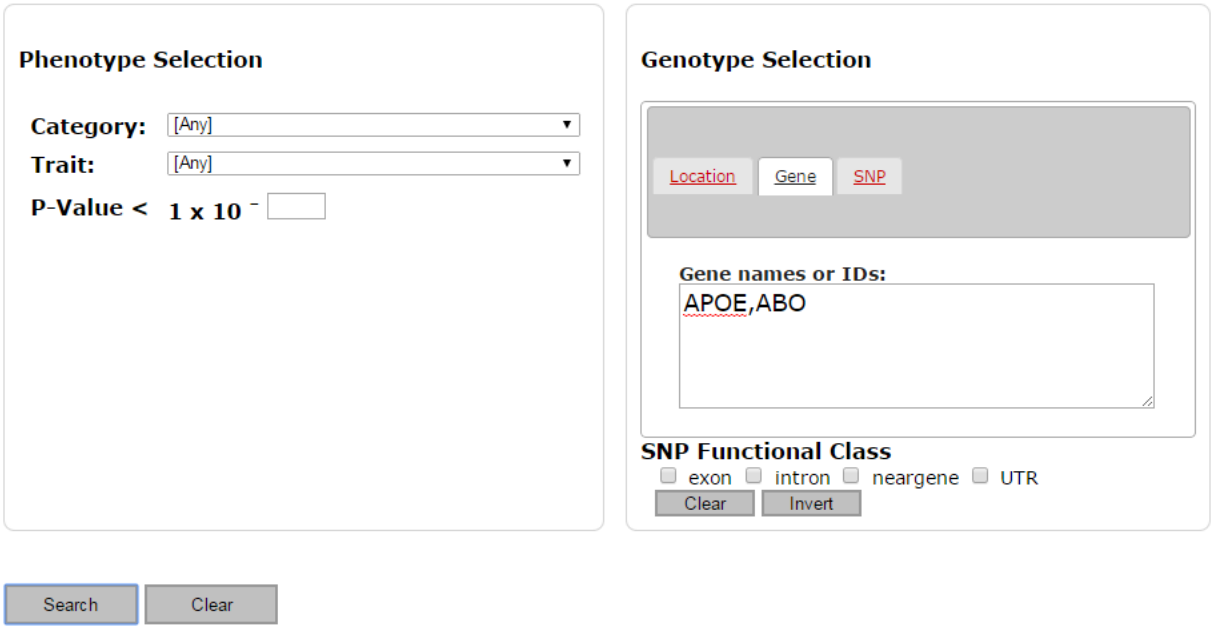
NHLBI key	Snp Id	Pvalue	PMID	Location	Phenotype	Phenotype Category	chr	pos	InGene	Total Samples	Platfor
231002826282...	rs7412	2.1E-215	231002...	TableS3	LDL cholesterol	Drug response,Quantitat... trait(s),CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	18705	Illumina [546,2...
231002826282...	rs7412	5.9E-154	231002...	TableS4	APOB (apolipoprot... B)	Drug response,Quantitat... trait(s),CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	18705	Illumina [546,2...
231183026282...	rs7412	4.3E-81	231183...	TableS2	Lipoprotein-associated phospholipase A2 activity (Lp-PLA2)	Drug response,Quantitat... trait(s),Blood-related,CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	20515	Illumina [796,1...
21460841297614	rs439401	1.1E-78	214608...	Table S5	Late onset Alzheimer's disease	Neuro,Alzheimer's disease	19	44911194		54429	Affyme... & Illumina [23248... (imput...
21390209292315	rs429358	2.7E-78	213902...	Table S1	Late onset Alzheimer's disease	Neuro,Alzheimer's disease	19	44908684	(APOE)	5097	Affyme... & Illumina [450001] (imput... unspeci...
230636226282...	rs7412	1.5E-71	230636...	TableS8	LDL cholesterol	CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	91522	Illumina [49,227]
21460841279742	rs405509	1.8E-67	214608...	Table S5	Late onset Alzheimer's disease	Neuro,Alzheimer's disease	19	44905579		54429	Affyme... & Illumina [23248... (imput...
20885792292314	rs429358	5.5E-58	208857...	Text	Late onset Alzheimer's disease	Neuro,Alzheimer's disease	19	44908684	(APOE)	5376	Illumina [483399]
2088579212096	rs7412	5.5E-58	208857...	Text	Late onset Alzheimer's disease	Neuro,Alzheimer's disease	19	44908822	(APOE)	5376	Illumina [483399]
21460840279741	rs405509	6.4E-53	214608...	TableS2	Alzheimer's disease	Neuro,Alzheimer's disease	19	44905579		59716	Affyme... & Illumina [496763]
21627779297618	rs439401	1.8E-48	216277...	Table S3	Alzheimer's disease	Neuro,Alzheimer's disease	19	44911194		24522	Affyme... & Illumina [696707] (imput...
223318296282...	rs7412	1.6E-47	223318...	Table 1	LDL cholesterol response to statins (baseline LDL	Drug response,Quantitat... trait(s),CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	6989	Illumina [814,4...

The results of searches from the web-based interface are available to copy and paste or for export in .csv or Excel formats. The exported results ***contain deeper annotations*** than those presented on the web-interface. These annotations include journal of publication, discovery/replication sample size, minor allele frequency in dbSNP, PolyPhen/SIFT predictions for coding SNPs, among various other

functional and study-level annotations. Deeper annotations are continuously being added to the GRASP database and will be announced as they are added to the database.

In addition to searching for single genes or SNPs, users can also search for multiple genes or SNPs in a single query. An example using two genes, *APOE* and *ABO*, is presented below. Gene/SNP IDs should be ***separated by a comma*** (please see example below).



The same filters (p-value threshold, exonic/intronic/neargene/UTR) can be imposed on the multiple gene/SNP queries.

All search results are available for export as indicated above.

The resulting output will return all SNP entries within the APOE or ABO genes in order by p-value.

Display 100 records

Download Options:

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Showing 1 to 100 of 2,074 entries

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NHLBI key	Snp Id	Pvalue	PMID	Location	Phenotype	Phenotype Category	chr	pos	InGene	Total Samples	Platfor
226115956423...	rs505922	1.0E-300	226115...	Table1	ABO system O blood type	Blood-related,Gender,Fe...	9	133273813	(ABO)	2203	Illumina [521,7...
21534939445632	rs657152	9.7E-223	215349...	Table 2	von Willebrand factor (vWF)	Quantitative trait(s),Blood-related,Plasma	9	133263862	(ABO)	24513	Illumina [36087]
231002826282...	rs7412	2.1E-215	231002...	TableS3	LDL cholesterol	Drug response,Quantitat... trait(s),CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	18705	Illumina [546,2...
21534939441299	rs651007	1.3E-161	215349...	Table 2	von Willebrand factor (vWF)	Quantitative trait(s),Blood-related,Plasma	9	133278431		24513	Illumina [36087]
231002826282...	rs7412	5.9E-154	231002...	TableS4	APOB (apolipoprot... B)	Drug response,Quantitat... trait(s),CVD risk factor (CVD RF),Lipids	19	44908822	(APOE)	18705	Illumina [546,2...
232671036476...	rs687289	1.3E-128	232671...	Table 2	von Willebrand factor (vWF)	Quantitative trait(s),Blood-related,Plasma	9	133261703	(ABO)	3462	Illumina [723,7...
22001757390929	rs579459	2.6E-123	220017...	Table 1	Alkaline phosphatase (ALP) in plasma	Quantitative trait(s),Hepatic,Pla...	9	133278724		61089	Affyme... Illumina, and Perlegen [~2.6 million] (imput...
233001387911...	rs8176749	7.2E-105	233001...	Table1	Plasma carcinoembr... antigen (CEA) levels	Quantitative trait(s),Blood-related,Cancer-related	9	133255801	(ABO)	13777	Illumina & Affyme... [~2 million] (imput...
227038816476...	rs687621	9.0E-100	227038...	Table S2	Activated partial thromboplas... time	Quantitative trait(s),Blood-related,Thrombosis	9	133261662	(ABO)	11851	Affyme... & Illumina [~2.5 million] (imput...
227038816476...	rs687289	9.1E-100	227038...	Table S2	Activated partial thromboplas... time	Quantitative trait(s),Blood-related,Thrombosis	9	133261703	(ABO)	11851	Affyme... & Illumina [~2.5 million] (imput...
227038816423...	rs505922	1.0E-99	227038...	Table S2	Activated partial thromboplas... time	Quantitative trait(s),Blood-related,Thrombosis	9	133273813	(ABO)	11851	Affyme... & Illumina [~2.5 million] (imput...

Questions about the use and details of the GRASP data may be referred to Andrew Johnson (johnsonad2 at nhlbi dot nih.gov).