

ENIGMA-Vis: A Web Portal to Browse, Navigate & Visualize Brain Genome-Wide Association Studies (GWAS)

Natalia Shatokhina¹, Katrina L. Grasby², Neda Jahanshad¹, Jason L. Stein³, Sarah E. Medland², Paul M. Thompson¹



¹Imaging Genetics Center, Stevens Institute for Neuroimaging & Informatics, Keck School of Medicine, University of Southern California, Los Angeles, USA,

²Queensland Institute of Medical Research, Brisbane, Queensland, Australia,

³Department of Genetics & Neuroscience Center, University of North Carolina, Chapel Hill, North Carolina, USA



Background

Recent GWAS of brain measures have led to the discovery of hundreds of genetic loci that are associated with measures of brain structure and function; the results are enriched in susceptibility loci for psychiatric and neurological disorders, offering insight into brain systems affected. The high volume and continual updating of brain-related GWAS data calls for tools that map the effects of specific variants onto the brain, and survey associated regions of the genome.

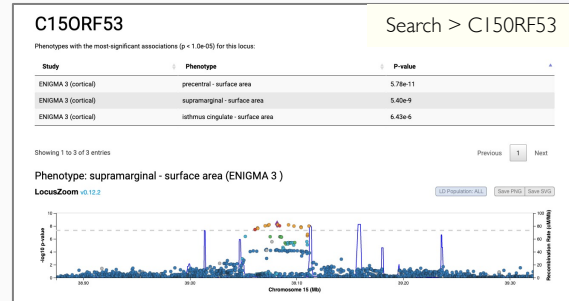
Methods

We present a recent update to ENIGMA-Vis - a portal that offers visual insight into 3D patterns of genetic effects on the brain, and allows a user to query, visualize, and navigate the GWAS studies performed by the ENIGMA Consortium. The portal has many functions:

- (1) zooming into loci of interest and displaying linkage disequilibrium (LD) data for top hits using embedded LocusZoom plots,
- (2) identifying brain traits associated with variation at a specific genetic locus (PheWAS analysis),
- (3) interactive query and simultaneous display of multiple GWAS overlaid, and
- (4) texturing of P values and Z scores onto the brain.

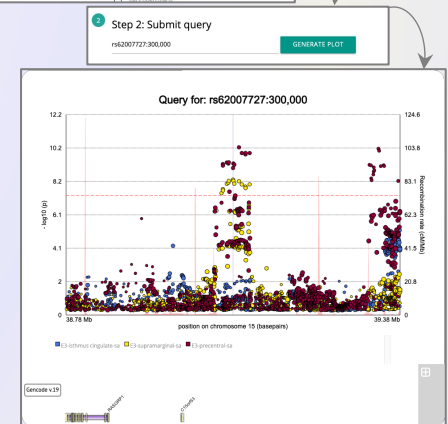
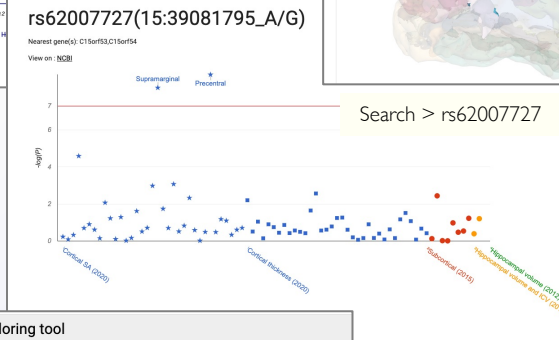
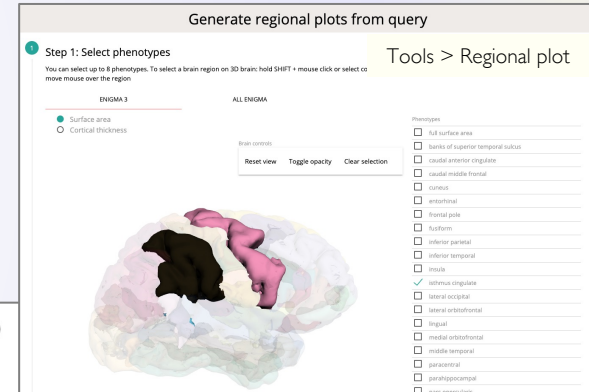
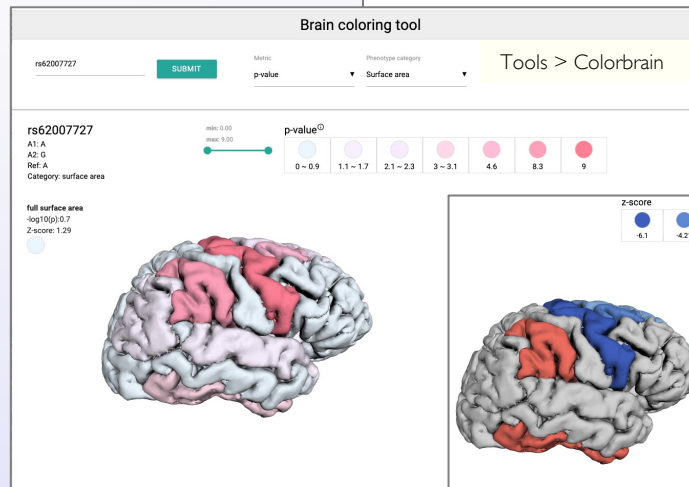
Results

The portal was recently updated with the most recent data from the ENIGMA Consortium cortical GWAS, which includes hundreds of newly discovered genetic loci that are associated with global and regional cortical surface area and thickness.



Visualization of a genetic region around rs62007727 with ENIGMA-Vis tools

<https://enigma-brain.org/enigmavis>



Conclusions

The portal provides a set of tools to navigate, visualize and compare brain imaging GWAS. ENIGMA-Vis can be accessed at this URL: <https://enigma-brain.org/enigmavis> and is complementary to other brain GWAS browsers such as the Oxford Brain Imaging Genetics Server (<http://big.stats.ox.ac.uk>).

Funding Source NIH grant U54 EB020403