1. BACKGROUND

The Genetics Core of the Alzheimer’s Disease Neuroimaging Initiative (ADNI) aims to provide genetic resources and facilitate research opportunities in qualitative and quantitative genetics using ADNI multimodal phenotypes. Genotyping and sequencing data have been generated for ADNI-1/GO/2 participants and are available to the scientific community. Here we review the ADNI genetic publications as of 12/31/2016.

2. MATERIALS & METHODS

A PubMed search was performed to identify papers published between 2008 and 2016, where ADNI APOE, genome wide association study (GWAS), or sequencing data were used. These studies were reviewed, grouped by assessed phenotypes, and major findings were assembled. Genomic pathway enrichment analyses were performed on genetic findings to get a high-level understanding of relevant biological pathways and processes. Information visualization was employed to track the evolution of where these papers were published and which genes were reported in 2015-2016 compared with 2008-2014.

3. RESULTS

There were 78 and 81 ADNI genetics papers published in 2015 and 2016, respectively. Figure 1 shows the distribution of ADNI genetics publications grouped by assessed phenotype(s) from 2008 to 2016. Figure 2 illustrates the change of common journals and top common genes reported by ADNI genetics papers of 2015-2016 with those published between 2008-2014, respectively [1]. Compared with 174 findings collected from 2008 to 2014 [2,3], ADNI papers from 2015-2016 identified 25 previously reported genes and 96 new genes that individually or jointly associated with different types of AD-related traits including clinical status, structural and functional neuroimaging, fluid biomarkers, and neuropsychological assessments. These major findings were significantly enriched in several pathways and biological processes, including Alzheimer’s Disease (p<0.005), cell adhesion molecules (p<0.05), regulation of beta-amyloid formation (p=1.8e-4), regulation of neuron death (p=2e-4); see Table 1 for details.

4. CONCLUSIONS

Genetic studies of multidimensional ADNI phenotypes continue to confirm known AD genetic risk factors and discover novel susceptibility loci. With the recent release of ADNI whole genome sequencing data, gene expression data and metabolomics profiling data, we expect to see future studies exploring the power of next generation sequencing and multi-omics integration.

References:

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