Genetic overlap of severe psychiatric disorders with lung function and asthma suggests shared biological mechanisms

EPP018

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Introduction:

Severe psychiatric disorders are frequently comorbid with lung function decline and asthma. Despite their considerable heritability, the genetic relationships between them are unclear.

Methods:

The GWAS summary statistics for severe psychiatric disorders (SCZ, BIP and AN) were obtained from the Psychiatric Genomic Consortium (PGC). Those for asthma and lung function were from the UK Biobank (UKB) and a meta-analysis of 47 cohorts for LF, respectively

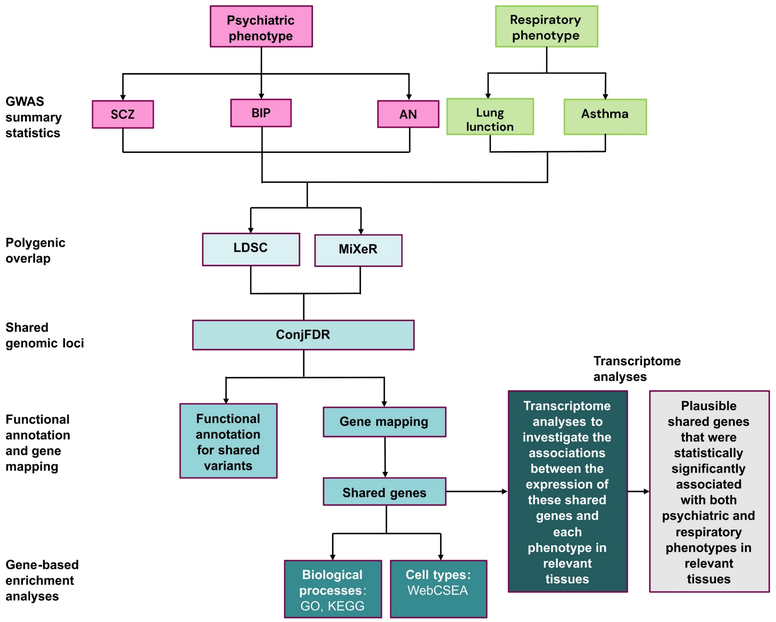

Fig. 1: Flow chart.

Results:

(1) Consistently moderate polygenic overlap

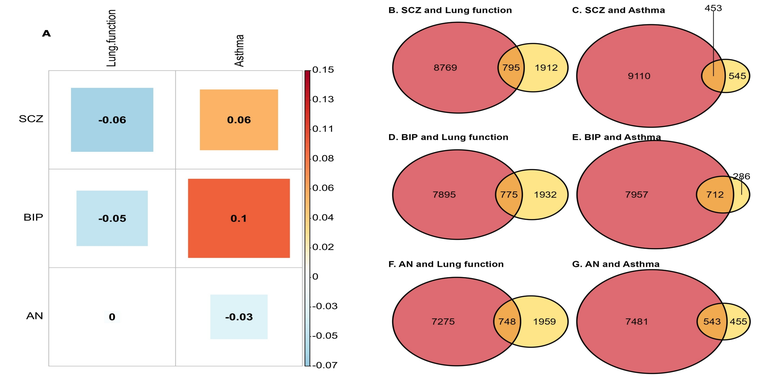

Fig. 2: (A) Genetic correlations between phenotypes from LDSC; (B-G) Polygenic overlap from bivariate MiXeR

(2) 378 unique shared genomic loci

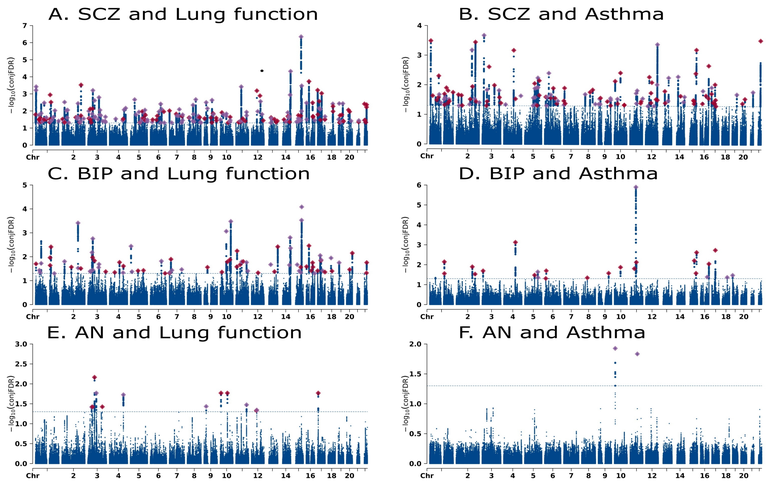

Fig. 3: The Manhattan plots for the shared genomic variants. The lead variant in each shared locus is represented by a diamond-shaped point in larger size. Red: concordant effect ; Purple: antagonistic effect.

(3) Less specific and non-immune mechanisms for genes shared with lung function, but immunity-related mechanisms for genes shared with asthma

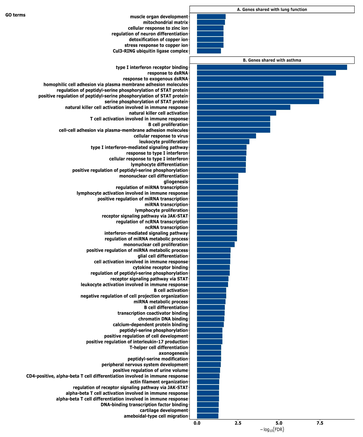

Fig. 4: GO terms associated with genes shared with (A) lung function and (B) asthma

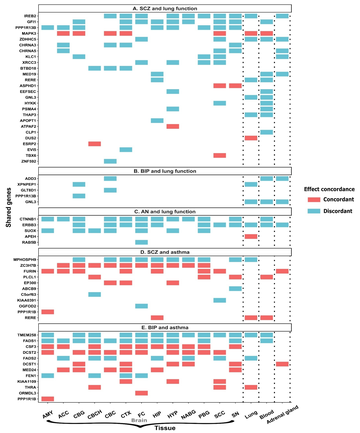

Fig. 5: 55 genes were prioritized as biologically plausible shared genes across 16 relevant tissues

Conclusions:

- We found **consistently moderate polygenic overlap** and a total of **378 unique shared loci** with mixed effect directions
- Enrichment analyses highlighted **less specific and non-immune** shared mechanisms for psychiatric disorders with **lung function**, but biological processes related to the **immune and neuronal system** shared with **asthma**, suggesting divergent shared genetic etiologies

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