research highlights

GENETICS

Recipe for intelligence

Nat. Genet. <http://doi.org/b7gm> (2017)

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Measuring and explaining variations in human intelligence has long been a preoccupation in science. More than fifty years of twin studies have demonstrated that there is a substantial heritable component to intelligence. Genomic studies have also identified potential gene associations. However, these studies have been underpowered.

Danielle Posthuma and colleagues performed a meta-analysis of genome-wide association studies on intelligence, pooling together data from more than 78,000 individuals. The authors found significant association with intelligence in 15 new genomic loci and identified 40 new genes. Tissue expression analysis indicated that many of these genes are expressed predominantly in brain tissues, while pathway analysis demonstrated involvement in regulating cell development. The single-nucleotide variant (rs2490272, in the *FOXO3* gene) and gene (*CSE1L*) that were most strongly associated with intelligence both have a role in apoptosis (programmed cell death). The authors also investigated associations between genes and socio-economic and health outcomes. Positive genetic correlations emerged with intelligence and, amongst other things, educational attainment, smoking cessation and height, while an inverse genetic correlation was observed with neuroticism, depression, body mass index and other outcomes.

By performing the largest meta-analysis so far, this study provides tantalizing insights into the genetic underpinnings of human intelligence and its potential association with certain life outcomes.

John Carson