TOOLBOX

Network tool highlights links between genes and disorders

BY **JESSICA WRIGHT**

19 DECEMBER 2012

Autworks, a new online tool, has data on almost 20,000 human genes linked to nearly 3,000 disorders[1]. The tool, published 28 November in *BMC Medical Genomics*, creates gene-network maps for each disorder and highlights the overlap between them.

For complex genetic disorders, creating a map of associations between candidate genes can help researchers **pinpoint central 'hub' genes**. These hubs can point the way to pathways that underlie the disorders.

Autworks is easy to use and, unlike other network analysis tools, is focused on autism and neurological disorders, the researchers say.

The database includes information about 19,191 human genes linked to 2,711 disorders. The disorders are categorized as related to cancer, the immune system or to mental health in the **Medical Subject Headings** of the National Library of Medicine. For example, the autism network includes 206 genes.

Autworks contains 660,090 associations between the listed genes and disorders, derived from a literature search using PubMed. Using the Search Tool for Retrieval of Interacting Genes/Proteins (STRING), the tool also has data on 367,308 interactions between the listed genes.

These associations are based on direct interactions between the proteins encoded by the genes, and on whether the genes are expressed at the same time or in the same pathway. The tool provides a gene map for each of the disorders, and highlights genes that overlap with another disorder. For example, genes linked to intellectual disability may be indicated in yellow on the autism map.

For each disorder, the tool also provides a diagram of closely related disorders and the probability that they are linked based on chance alone. Using this system, autism is highly likely to be linked to

schizophrenia, the researchers say.

Researchers can also import a set of genes into the database to discover which disorders the genes are involved in.

The tool may be particularly useful for studying autism, which is linked to hundreds of genes implicated in other neurological disorders, the researchers say.

References:

1: Nelson T.H. *et al. BMC Med. Genomics* **5**, 56 (2012) **PubMed**