

## URLs

## DISEASE MODELS

## Of mice and men

For the first time, researchers have generated a mouse strain that also carries a single copy of human chromosome 21. O'Doherty *et al.* have overcome technical obstacles to create this new trans-species model of human Down syndrome, which is the result of chromosome 21 trisomy.

Previous attempts to model Down syndrome in mice have involved either introducing individual human transgenes or creating trisomies of mouse chromosomes. The one-gene-at-a-time approach does not correctly model the 3:2 gene dosage that is found in trisomy, and the mouse trisomies are only approximations to the human condition because genes that lie on human chromosome 21 lie on several mouse chromosomes.

Using injection into female mouse embryonic stem cells, the authors created an aneuploid strain that contains 92% of the gene content of human chromosome 21. The strain had several characteristics of Down syndrome such as heart defects and decreases in long-term synaptic potentiation and memory, neuronal density and T-lymphocyte activation, but only minor facial defects.

The model is a starting point for the study of the specific dosage effects of individual genes, although the precise consequences of heterologous interactions between human and mouse proteins need to be investigated.

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 [References and links](#)

### ORIGINAL RESEARCH PAPER

O'Doherty, A. *et al.* An aneuploid mouse strain carrying human chromosome 21 with Down syndrome phenotypes. *Science* **309**, 2033–2037 (2005)

### FURTHER READING

Antonarakis, S. E. *et al.* Chromosome 21 and Down syndrome: from genomics to pathophysiology. *Nature Rev. Genet.* **5**, 725–738 (2004) | Patterson, D. &

Costa, A. C. S. Down syndrome and genetics — a case of linked histories. *Nature Rev. Genet.* **6**, 137–147 (2005)

