

Mathematical model unlocks key to brain wiring

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(Medical Xpress) -- A new mathematical model predicting how nerve fibres make connections during brain development could aid understanding of how some cognitive disorders occur.

The model, constructed by scientists at the Queensland [Brain](#) Institute (QBI) and School of Mathematics and Physics at the University of Queensland (UQ), gives new insight into how changing chemical levels in [nerve](#) fibres can modify nerve wiring underpinning connections in the brain.

Professor Geoff Goodhill says that while scientists have long known that changing these chemical levels can change where nerve fibres grow, only now are they understanding why this is the case.

"Our [mathematical model](#) allows us to predict precisely how these chemical levels control the direction in which nerve fibres grow, during both neural development and regeneration after injury," he said.

Correct brain wiring is fundamental for normal brain function.

Recent discoveries suggest that wiring problems may underpin a number of nervous system disorders including autism, dyslexia, Down syndrome, Tourette's syndrome and Parkinson's disease.

The new model, published in the prestigious cell journal *Neuron* demonstrates the important role mathematics can play in understanding

how the brain develops, and perhaps ultimately preventing such disorders.

Provided by University of Queensland

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