

Neuroscientist steers research into neurological disorders

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Scientists at the Queensland Brain Institute have uncovered a vital clue into how the brain is wired, which could eventually steer research into nervous system disorders such as Parkinson's disease and cognitive disorders including autism.

It's long been known that growing nerve fibres, also known as axons, must make connections in the brain for it to function properly.

"During the brain's development, billions of [nerve cells](#) send out nerve fibres which have to find the appropriate targets to form the right connections," lead researcher Professor Geoffrey Goodhill explained.

"There's increasing evidence that defects in the genes coding for molecules that control neural wiring are correlated to a number of cognitive disorders, such as autism and Parkinson's disease."

Professor Goodhill said that steering decisions for nerve fibres are made by structures at the tips of axons, known as growth cones, which can detect signals such as gradients of guidance cues in their environment.

There have long been questions about how the growth cones behave if the gradients are shallow, which makes the guidance signals weak.

"Previously it wasn't clear what was happening when the gradient was very shallow because often the axons didn't seem to turn. It wasn't clear what they were doing.

"We have now shown that they are in fact detecting the gradient, it's just they are not responding to that by turning - they are responding by changing their speed of growth," Professor Goodhill said.

He described the discovery of this alternative form of growth cone steering as at the basic science level, but said it might eventually lead to a better understanding of [nervous system](#) development, and cognitive disorders such as [autism](#).

"Wiring defects seem to underlie a lot of cognitive disorders and therefore we need to understand what the basic rules are. We need to know how these nerve fibres find their way to the right locations, and this new discovery is helping us do to that," he said.

Professor Goodhill's research is published this week in the leading multidisciplinary journal *PNAS*.

Provided by Research Australia

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