

Scientists achieve first rewire of genetic switches

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Researchers in Manchester have successfully carried out the first rewire of genetic switches, creating what could be a vital tool for the development of new drugs and even future gene therapies.

A team of scientists from the School of Chemistry and the Manchester Interdisciplinary Biocentre (MIB) at The University of Manchester have found a way of hijacking so-called 'riboswitches' and directing [gene activity](#).

Working within [cells](#) of bacteria, chemical biologist Professor Jason Micklefield and his team have rewired these genetic switches so they are no longer activated by small naturally occurring molecules found in cells - but through the addition of a synthetic molecule.

The work builds on the recent discovery that these naturally occurring molecules can turn genes on and off by triggering riboswitches found within a large molecule called 'messenger RNA'.

The research was funded by the Biotechnology and Biological Sciences Research Council and Selective Chemical Intervention in Biological Systems Initiative.

In the latest research, when Manchester researchers added [synthetic molecules](#), they bound to the riboswitches and caused the genes to spark into life.

The findings are reported in the latest edition of [Proceedings of the National Academy of Sciences](#) (*PNAS*).

The Manchester team monitored how successfully they had re-wired the cells by observing the creation of a gene product that makes the cells glow green.

Dr Neil Dixon, a senior researcher in the team, said: "Being able to selectively activate and regulate genes could have tremendous impact in [drug discovery](#) and the emerging field of synthetic biology.

"This technology could be used to turn on and off important biological pathways and processes, leading to a deeper understanding of how cells function.

"The next big challenge is to apply this technology to study biological processes within human cells. This could allow us to discover more about our hugely complex biological selves."

The Manchester team is now working on ways to simultaneously activate and control multiple [genes](#) using these re-wired riboswitches.

More information: "Reengineering orthogonally selective riboswitches" will be published online in Proceedings of the National Academy of Sciences (PNAS) during the week beginning 25 January 2010.

Provided by University of Manchester

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