# Medical discovery first step on path to new painkillers

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A major medical discovery by scientists at The University of Nottingham could lead to the development of an entirely new type of painkiller.

A drug resulting from the research, published in the journal *Neurobiology of Disease*, would offer new hope to sufferers of chronic pain conditions such as traumatic nerve injury, for which few effective painkillers are currently available.

The work, led by Dr Lucy Donaldson in the University's School of Life Sciences, in collaboration with David Bates, Professor of Oncology in the University'sCancer Biology Unit, focuses on a signal protein called vascular endothelial growth factor (VEGF).

VEGF controls the re-growth of blood vessels in tissues which have been

damaged by injury. It is a widely targeted compound for cancer, eye disease and other illnesses in which abnormal blood vessel growth occurs.

Drugs are used to inhibit the VEGF in cancer, which can otherwise lead to the formation of new blood vessels that provide oxygen and nutrients to tumours.

Professor Bates and colleagues had previously discovered in 2002 that VEGF comes in two forms and acts like a switch—one which turns on the growth of blood vessels and another that blocks growth.

## Pain prevention

However, this latest research has shown for the first time that these two forms of VEGF not only act on blood vessels but also differently affect the sensory nerves that control pain.

The academics discovered that the VEGF that promotes blood vessel growth causes pain, while the other, which inhibits blood vessel growth, prevents pain.

The study has centred on understanding how these two types of VEGF work and why the body makes one form rather than the other.

The academics have been able to switch from the pain stimulating form to the pain inhibiting VEGF in animal models in the laboratory and are now investigating compounds to replicate this in humans. It is thought these compounds could form the basis for new drugs to be tested in humans in clinical trials.

**More information:** R.P. Hulse, N. Beazley-Long, J. Hua, H. Kennedy, J. Prager, H. Bevan, Y. Qiu, E.S. Fernandes, M.V. Gammons, K.

Ballmer-Hofer, A.C. Gittenberger de Groot, A.J. Churchill, S.J. Harper, S.D. Brain, D.O. Bates, L.F. Donaldson, "Regulation of alternative VEGF-A mRNA splicing is a therapeutic target for analgesia," *Neurobiology of Disease*, Volume 71, November 2014, Pages 245-259, ISSN 0969-9961, dx.doi.org/10.1016/j.nbd.2014.08.012.