

Treatment could offer protective effect against kidney damage

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Treating patients with a hormone or administering a simple medical procedure pre-operatively could help to prevent irreversible kidney damage commonly sustained during surgery, Nottingham researchers have found.

The team of academics from The University of Nottingham and clinicians at Nottingham University Hospitals NHS Trust have published evidence that the hormone erythropoietin (EPO) and the technique remote ischaemic preconditioning (RIPC) may offer a protective effect on the kidneys in a paper published in the journal *American Journal of Physiology—Renal Physiology*.

Dr David Gardner, in the University's School of Veterinary Medicine and Science, led the research along with Dr Mark Devonald, a consultant in the hospital's Renal and Transplant Unit.

Dr Gardner said: "To date, animal models exploring the mechanisms of protection against [kidney damage](#) have largely been in laboratory rodents. To our knowledge, this is the first published research to investigate the potential effectiveness of EPO and RIPC in a large animal model—in this case a pig. This is important because the kidneys of a pig are very similar to those of a human and demonstrate similar responses, reducing the barrier to the translation of important research findings."

Acute kidney injury (AKI)—previously known as acute renal failure—affects around 10 per cent of patients admitted to hospital and costs the NHS around £1 billion every year. Currently there is no effective treatment and only around 50 per cent of patients survive. Those who do survive often require long-term, regular kidney dialysis and in the most serious cases may be placed on the list for a kidney transplant.

One of the most common causes of [kidney injury](#) is ischaemia reperfusion (IR) where organ tissue is damaged when blood supply returns after a temporary lack of oxygen, for example during heart, vascular and other surgery or a trauma.

Reducing damage

Previous research has suggested there could be protective benefits by administering the hormone EPO which controls the production of red blood cells—but is better known as a performance enhancing drug—and the procedure RIPC, in which a blood pressure cuff is repeatedly inflated and deflated around an arm or leg to stimulate blood flow prior to surgery. However, scientists have previously been unable to uncover the mechanism by which these two protective methods appeared to work.

The Nottingham study has showed that both methods appeared to offer a [protective effect](#), while EPO was the more effective out of the two in the short-term. Crucially, they have now outlined a mechanism by which the techniques may reduce the cellular damage which causes [acute kidney injury](#).

More information: "Remote conditioning or erythropoietin before surgery primes kidneys to clear ischemia-reperfusion-damaged cells: a renoprotective mechanism?" Gardner DS, et al. *Am J Physiol Renal Physiol*. 2014 Apr;306(8):F873-84. [DOI: 10.1152/ajprenal.00576.2013](#). Epub 2014 Feb 12.

Provided by University of Nottingham

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