Nature Reviews Nephrology **11**, 127 (2015); published online 3 February 2015; doi:10.1038/nrneph.2015.10

ACUTE KIDNEY INJURY

Protective role of gut microbial SCFAs

New data suggest that short chain fatty acids (SCFAs) produced by the intestinal microbiota might protect against renal injury. "As SCFAs have anti-inflammatory properties, and germ-free mice show increased susceptibility to acute kidney injury (AKI), we decided to investigate whether SCFAs could be beneficial in AKI," explains study author Niels Câmara.

Using a mouse model, Câmara and colleagues demonstrated that intraperitoneal injection of the SCFAs acetate, propionate or butyrate reduced kidney damage caused by ischaemia–reperfusion, with the greatest level of protection conferred by acetate. Further analyses showed that acetate treatment was associated with reductions in the levels of reactive oxygen species, inflammation, infiltrating immune cells and apoptotic cells in the injured kidneys, an increase in proliferation of kidney epithelial cells, and modulation of DNA methylation status. Moreover, mice treated with acetate-producing bacteria had increased levels of acetate in their plasma and faeces and were less susceptible to renal ischaemia–reperfusion injury than were untreated controls.

"Acetate reduces inflammation systemically and in renal tissue, regulates immune cell activation and reduces hypoxia in kidney epithelial cells, most likely via epigenetic mechanisms," says Câmara. "Our ongoing experiments have shown promising results with SCFAs in sepsis and chronic injury models. As well as promising tools for the management of AKI, we believe that SCFAs might be beneficial in patients with sepsis and in preservation solutions used during deceased donor kidney transplantation to reduce the risk of delayed graft function."

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Original article Andrade-Oliveira, V. *et al*. Gut bacteria products prevent AKI induced by ischemia–reperfusion. *J. Am. Soc. Nephrol.* doi:10.1681/ASN.2014030288