

# New treatment strategies for chronic kidney disease from the animal kingdom

February 16 2018

---



Biomimetics offers an innovative approach to solving human problems by imitating strategies of for example hibernators like bears found in nature. Credit: Georg Rauer

The field of biomimetics offers an innovative approach to solving human problems by imitating strategies found in nature. Medical

research could also benefit from biomimetics, as a group of international experts from various fields, including a wildlife veterinarian and wildlife ecologists from Vetmeduni Vienna, point out using the example of chronic kidney disease. In future research, they intend to study the mechanisms that protect the muscles, organs and bones of certain animals during extreme conditions such as hibernation. The possibilities were published in *Nature Reviews Nephrology*.

Through certain genetic modifications, the process of evolution has resulted in a great variety of adaptations to different environments in the animal kingdom. Many species have developed fascinating mechanisms that provide resistance to [disease](#) or help protect their cells against ageing and oxidative stress in extreme conditions. It would therefore make sense to investigate these mechanisms in other species and adapt the insights gained to develop new strategies in the field of human medicine.

An increased focus on [biomimetics](#), the field of research that studies this approach, could lead to a medical breakthrough in the treatment of chronic [kidney](#) disease. An international, interdisciplinary research collaboration, including scientists from the Research Institute of Wildlife Ecology, has now provided an initial overview of which animal mechanisms could be useful for the development of new [therapeutic approaches](#) to this globally spreading disease.

## **Solutions sought for chronic kidney disease**

Physical adaptations that are of interest to biomimetics include the outstanding longevity of naked mole rats, for example, or the ability to survive [extreme conditions](#) like hibernation. "Biomimetics attempts to copy strategies that have already been tried and perfected by nature over thousands of years," explains Johanna Painer from the Department of Integrative Biology and Evolution. Painer, in an international

collaboration with experts from various different fields, researches which of these elements from the animal kingdom could be applied to [human health](#). "We are comparing examples from human and veterinary medicine as well as from the field of biology to more quickly learn about the development of certain problems and then minimise them in the future," the researcher says.

One of these problems for which solutions may be found in the animal kingdom is chronic kidney disease. This disease, which is becoming increasingly prevalent worldwide, is associated with many complications, such as cardiovascular disease, osteoporosis, muscle wasting and premature ageing. But kidney disease is also a problem in the [animal kingdom](#). Domestic felines and wild cats are quite frequently affected by chronic kidney disease. "A possible cause is the high meat consumption and the resulting changes of the bacteria in the intestine," says Painer. Other animals, like the common vampire bat or hibernators like the bear, have developed mechanisms that project them against the disease.

Future studies should investigate the mechanisms which, on the one hand, cause the disease in animals and, on the other hand, are responsible for certain protective effects. "Studies of felids may provide information on links between red meat consumption, gut microbiota and kidney disease. Studies of hibernating bears could help identify new strategies to treat and prevent complications such as [muscle wasting](#), pressure ulcers, thrombosis and osteoporosis during longer periods of bedriddenness," concludes Painer. New possibilities of organ preservation may also be found.

The advantage offered by biomimetics lies in its interdisciplinary nature. The collaboration between nephrologists – these are specialists in kidney disease and high blood pressure – and experts from other fields, such as [veterinary medicine](#), zoology, molecular biology, anthropology and ecology, could introduce a novel approach for improving human health

and help to find new treatment strategies for [chronic kidney disease](#). "Collaboration between various disciplines creates a synergetic effect that may result in the discovery of many novel therapeutic approaches. We should make increased use of such collaboration in the future," says Painer.

**More information:** Peter Stenvinkel et al. Novel treatment strategies for chronic kidney disease: insights from the animal kingdom, *Nature Reviews Nephrology* (2018). [DOI: 10.1038/nrneph.2017.169](https://doi.org/10.1038/nrneph.2017.169)

Provided by University of Veterinary Medicine—Vienna

Citation: New treatment strategies for chronic kidney disease from the animal kingdom (2018, February 16) retrieved 3 May 2024 from <https://medicalxpress.com/news/2018-02-treatment-strategies-chronic-kidney-disease.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.