

Kidneys have an innate clock that affects many metabolic processes in the body

April 7 2016



This image shows a cross section of a kidney. Credit: Holly Fischer/Wikipedia

An internal clock within the kidneys plays an important role in maintaining balance within the body, according to a study appearing in an upcoming issue of the *Journal of the American Society of Nephrology (JASN)*.

Many of the body's processes follow a natural daily rhythm or circadian clock that is based on regular light-dark cycles as the earth rotates. Dmitri Firsov, PhD, Natsuko Tokonami, PhD (University of Lausanne, in Switzerland) and their colleagues have now demonstrated that the kidney possesses such an intrinsic circadian clock that regulates and coordinates a variety of the organ's functions. "Since urine formation and excretion by the kidney is one of the most easily detectable rhythmic processes (we are forming and excreting much more urine during the day), we hypothesized that at least a part of this rhythmicity is dependent on the circadian clock mechanism," said Dr. Tokonami.

By blocking [kidney cells](#)' expression of a gene that is critically involved in the circadian clock system, the team found that the clock is responsible for the temporal adaptation of [kidney function](#) to the light and dark phases of the day that correspond to activity and rest. Such adaptations have an important effect on the levels of various amino acids, lipids, and other components of blood in the body. Furthermore, in individuals who take medications, the kidney's circadian clock controls the process of drug elimination from the body and therefore can influence the duration of a drug's action and the effectiveness of the therapy.

"We've shown that the [circadian clock](#) in the [kidney](#) plays an important role in different metabolic and homeostatic processes at both the intra-renal and systemic levels and is involved in drug disposition," said Dr. Firsov.

More information: The article, entitled "Nephron-Specific Deletion of Circadian Clock Gene Bmal1 Alters the Plasma and Renal Metabolome and Impairs Drug Disposition," will appear online on April 7, 2016, [DOI: 10.1681/ASN.2015091055](https://doi.org/10.1681/ASN.2015091055)

Provided by American Society of Nephrology

Citation: Kidneys have an innate clock that affects many metabolic processes in the body (2016, April 7) retrieved 8 May 2024 from <https://medicalxpress.com/news/2016-04-kidneys-innate-clock-affects-metabolic.html>

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