

Why you're stiff in the morning: Your body suppresses inflammation when you sleep at night

August 5 2016

New research published online in *The FASEB Journal*, describes a protein created by the body's "biological clock" that actively represses inflammatory pathways within the affected limbs during the night. This protein, called CRYPTOCHROME, has proven anti-inflammatory effects in cultured cells and presents new opportunities for the development of drugs that may be used to treat inflammatory diseases and conditions, such as arthritis.

"By understanding how the [biological clock](#) regulates inflammation, we can begin to develop new treatments, which might exploit this knowledge," said Julie Gibbs, Ph.D., a researcher involved in the work and arthritis research UK career development fellow at the Centre for Endocrinology and Diabetes at the Institute of Human Development at the University of Manchester, United Kingdom. "Furthermore, by adapting the time of day at which current drug therapies are administered, we may be able to make them more effective."

To make this discovery, Gibbs and colleagues harvested cells from joint tissue of healthy mice and/or humans. These cells, called "fibroblast-like synoviocytes," are important in the pathology that underlies [inflammatory arthritis](#). Each of these cells keeps a 24-hour rhythm, and when this rhythm was disrupted by knocking out the cryptochrome gene there was an increased inflammatory response. This suggests that the cryptochrome gene product, the CRYPTOCHROME protein, has

significant anti-inflammatory effects. To test this hypothesis, researchers administered drugs designed to activate the protein to determine if protection against inflammation could be achieved—and it was.

"This study reminds us that inflammation, typically thought of as chronic and brittle, can, in fact, be nuanced—In this case, under the influence of the brain's suprachiasmatic nucleus, which controls the body's circadian physiology," said Thoru Pederson, Ph.D., Editor-in-Chief of *The FASEB Journal*. "The clinical implications are far-reaching."

More information: L. E. Hand et al, The circadian clock regulates inflammatory arthritis, *The FASEB Journal* (2016). [DOI: 10.1096/fj.201600353R](https://doi.org/10.1096/fj.201600353R)

Provided by Federation of American Societies for Experimental Biology

Citation: Why you're stiff in the morning: Your body suppresses inflammation when you sleep at night (2016, August 5) retrieved 7 April 2023 from <https://medicalxpress.com/news/2016-08-youre-stiff-morning-body-suppresses.html>

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