

# Sleep deprivation effect on the immune system mirrors physical stress

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Severe sleep loss jolts the immune system into action, reflecting the same type of immediate response shown during exposure to stress, a new study reports.

Researchers in the Netherlands and United Kingdom compared the white blood cell counts of 15 healthy young men under normal and severely sleep-deprived conditions. The greatest changes were seen in the [white blood cells](#) known as granulocytes, which showed a loss of day-night rhythmicity, along with increased numbers, particularly at night.

"Future research will reveal the molecular mechanisms behind this immediate stress response and elucidate its role in the development of diseases associated with chronic sleep loss," said Katrin Ackermann, PhD, the study's lead author. "If confirmed with more data, this will have implications for clinical practice and for professions associated with long-term sleep loss, such as rotating shift work."

Previous studies have associated sleep restriction and [sleep deprivation](#) with the development of diseases like obesity, diabetes and hypertension. Others have shown that sleep helps sustain the functioning of the [immune system](#), and that chronic sleep loss is a risk factor for immune system impairment.

For this study, white blood cells were categorized and measured from 15 young men following a strict schedule of eight hours of sleep every day for a week. The participants were exposed to at least 15 minutes of

outdoor light within the first 90 minutes of waking and prohibited from using caffeine, alcohol or medication during the final three days. All of this was designed to stabilize their circadian clocks and minimize sleep deprivation before the intensive laboratory study.

White blood cell counts in a normal sleep/wake cycle were compared to the numbers produced during the second part of the experiment, in which blood samples were collected during 29 hours of continual [wakefulness](#).

"The granulocytes reacted immediately to the physical stress of [sleep loss](#) and directly mirrored the body's stress response," said Ackermann, a postdoctoral researcher at the Erasmus MC University Medical Center Rotterdam in the Netherlands.

Provided by American Academy of Sleep Medicine

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