

# BWH Bulletin

For and about the people of Brigham and Women's Hospital

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## Researchers Find Blue Light Fights Fatigue Around the Clock

Researchers from BWH have found that exposure to short wavelength, or blue light, during the day directly and immediately improves alertness and performance.



"Our previous research has shown that blue light is able to improve alertness during the night, but our new data demonstrates that these effects also extend to daytime light exposure," said Shadab Rahman, PhD, a researcher in BWH's Division of Sleep and Circadian Disorders and lead author of the study. "These findings demonstrate that prolonged blue light exposure during the day has an alerting effect."

In order to determine which wavelengths of light were most effective in warding off fatigue, researchers teamed up with George Brainard, PhD, a professor of neurology at Thomas Jefferson University, who developed the specialized light equipment used in the study.

Rahman and colleagues compared the effects of blue light with exposure to an equal amount of green light on alertness and performance in 16 study participants for six and a half hours over a day. During the exposure, participants rated how sleepy they felt, had their reaction times measured and wore electrodes to assess changes in brain activity patterns.

They found that participants exposed to blue light consistently rated themselves as less sleepy, had quicker reaction times and fewer lapses of attention during the performance tests compared to those who were exposed to green light. They also showed changes in brain activity patterns that indicated a more alert state.

"These results contribute to our understanding of how light impacts the brain and open up a new range of possibilities for using light to improve human alertness, productivity and safety," said Steven Lockley, PhD, a neuroscientist at BWH and senior investigator of the study. "While helping to improve alertness in night workers has obvious safety benefits, dayshift workers may also benefit from better quality lighting that would not only help them see better but also make them more alert."

Researchers note that the next big challenge is figuring out how to deliver better lighting. While natural light is ideal, many people do not have access to daylight in their schools, homes or workplaces. In addition to improvements in daylight access, the advent of new, more controllable lighting technologies may help enable researchers to develop 'smart' lighting systems designed to maximize the beneficial effects of light for human health, productivity and safety. Rahman, Lockley and colleagues are testing such a lighting system for NASA. It will feature preset light wavelength and intensity to improve alertness during work and help calm the brain before sleep. The lights are scheduled for installation on the International Space Station in 2015-2016.