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WKU professor's study: Light pollution could affect immunity

By CAROLINE EGGERS ceggers@bgdailynews.com Nov 8, 2019

Mammoth Cave National Park provides visitors with an opportunity to glimpse astronomical beauty during dark, clear nights.

Mammoth Cave National Park.

Light pollution has been well documented to affect sleep, mood and even our waistlines.

Now, scientists believe light pollution could be impacting our immune systems, according to research published in *Scientific Reports* earlier this month.

“We need to be cognizant that light pollution can have broad effects, not just effects on behavior and sleep, but also the ability to respond to disease and potentially infections,” said Dr. Noah Ashley, associate professor of biology at Western Kentucky University and an author of the study.

For the study, scientists measured immunity biomarkers in brain and peripheral tissues of zebra finches – a well-studied species favored in laboratories – in three scenarios: a regular light and dark cycle, a single night light with 3 lux during the dark period and constant bright light.

Following 10 days of exposure to the dim night light, the birds’ daily rhythms of cytokines, the signaling molecules that regulate immunity and inflammation, changed.

“We were surprised by how many rhythms were impacted by just a single night light,” Ashley said.

Zebra finches, like most birds, mammals and people, are sensitive to light cycles. The study shows how light pollution is having “a dramatic effect not only on the behavior of the birds but their physiology,” Ashley said.

In addition to facing diminished sleep, disrupted migration paths and reduced cognition and survival, birds adapting to urban or suburban environments might be more susceptible to diseases like West Nile virus or avian flu, which could consequently lead to “an epidemiological impact that we’re not quite aware of until it happens,” Ashley said.

About 80 percent of the world, and more than 99 percent of U.S. and European populations, live under light-polluted skies. And the majority of North Americans can’t peer upon the Milky Way with naked eyes, according to research published in *Science Advances* in 2016.

“We’re addicted to having lights on at night,” said Ashley, who grew up on an Ohio farm isolated from urban lights. “It’s getting harder and harder to find a spot where you can see the stars. If I want to take my kids to see the stars, I have to go to Mammoth Cave and camp.”

The U.S. spends billions of dollars annually on inefficient outdoor lighting, including lights that point in the wrong direction, according to the National Conference of State Legislatures.

And with the exception of full blackout curtains and turned-off electronics, it can be challenging to escape light pollution even inside the home.

“The darker the environment, the better people are able to sleep,” Ashley said. “Even just having a night light can introduce light pollution into our house.”

This growing body of evidence of light pollution’s harmful impacts to human and wildlife health underscores the importance of reducing our light footprints, according to Ashley, who recommends that people take the first step by using lower-lux lights, angling and shielding lights, adding motion detector lights to home hallways, using night lights with timers for children and changing the temperature settings on electronics in the evening.

Ashley and the co-authors initiated this new research, which was funded by the National Science Foundation and the National Institutes of Health, in response to the dearth of evidence documenting the effects of artificial light on immunity.

“We need more studies to show us it could potentially affect our ability to respond to a disease outbreak,” Ashley said.

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