

Light at night linked to symptoms of depression in mice

October 21 2009, by Jeff Grabmeier

Too much light at night can lead to symptoms of depression, according to a new study in mice. Researchers found that mice housed in a lighted room 24 hours a day exhibited more depressive symptoms than did similar mice that had a normal light-dark cycle.

However, mice that lived in constant light, but could escape into a dark, opaque tube when they wanted showed less evidence of depressive symptoms than did mice that had 24-hour light, but only a clear tube in their housing.

"The ability to escape light seemed to quell the depressive effects," said Laura Fonken, lead author of the study and a graduate student in psychology at Ohio State University.

"But constant light with no chance of escape increased [depressive symptoms](#)."

The results suggest that more attention needs to be focused on how artificial lighting affects [emotional health](#) in humans, according to study co-author Randy Nelson, a professor of neuroscience and [psychology](#) at Ohio State.

"The increasing rate of depressive disorders in humans corresponds with the increasing use of light at night in modern society," he said.

"Many people are now exposed to unnatural light cycles, and that may

have real consequences for our health."

The researchers presented the work Oct. 21 in Chicago at the annual meeting of the Society for Neuroscience. The study will also appear in the December 28, 2009 issue of the journal *Behavioural Brain Research*.

The study involved 24 male laboratory mice. Half were housed in light for 16 hours a day and [darkness](#) for 8 hours, while the other half had 24 hours of light. Half of each group had opaque tubes in their units that let them escape the light when they chose. The other half had similar tubes that were clear and let the light in.

After three weeks, the mice began a series of tests that are used to measure depression and anxiety in animals. Several of these tests are the same ones used by pharmaceutical companies to test anti-depressive and anti-anxiety drugs in animals before they are used in humans.

One depression test, for example, measured how much sugar water the mice drank. Mice generally like the drink, but those with depressive-like symptoms will not drink as much, presumably because they don't get as much pleasure from activities they usually enjoy.

In all the tests, mice housed in constant light with no chance to escape showed more depressive-like symptoms than those mice with normal light-dark cycles.

In some tests, mice that had tubes where they could escape the constant light showed no more depressive-like symptoms than did mice housed in normal light-dark cycles.

Unexpectedly, the results showed that, compared to the other mice, those that were housed in constant light actually showed lower levels of anxiety and lower levels of corticosterone, a stress hormone linked to

symptoms of anxiety.

That was unexpected because anxiety and symptoms of depression often go together in humans. However, there are several possible reasons why the link wasn't found in this study.

For one, the mice were first tested for corticosterone after two weeks in constant light.

"That means they had been exposed to a possibly stressful environment for two weeks, and they may have simply adapted to the conditions and had a lowered stress response by that time," Nelson said.

Also, corticosterone concentrations generally vary as a result of the light-dark cycle, he said, and the mice no longer had those cues while living in constant light.

Moreover, these [mice](#) are nocturnal and they were being tested when they normally would have been asleep, a time when corticosterone levels are generally at their lowest.

The researchers are now testing animals that are diurnal - awake during the daylight - to see if the results are different.

Overall, the results provide additional evidence that the use of artificial light at night may have harmful effects on health.

"This is important for people who work night shifts, and for children and others who watch TV late into the night, disrupting their usual light-dark cycle," Fonken said.

There are many other practical implications. Nelson noted that most intensive care units are brightly lit all night long, which may add to the

problems of their patients.

Source: The Ohio State University ([news](#) : [web](#))

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