Melatonin supplementation may help offset DNA damage linked to night shift work

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Melatonin supplementation may help offset the DNA damage associated with night shift work by boosting the body's ability to repair it, suggest the findings of a small clinical trial published online in the journal

Occupational & Environmental Medicine.

Larger studies looking at varying doses and the potential long-term effects of melatonin supplementation are now warranted, conclude the researchers.

Normal night-time production of the body clock hormone, melatonin, is suppressed in night shift workers. This compromises the body's ability to repair oxidative DNA damage, the by-product of normal cellular processes, heightening the risk of certain cancer in these workers, explain the researchers.

They therefore wanted to find out if melatonin supplementation might help offset this damage by enhancing DNA repair in 40 night shift workers.

Half the participants were randomly assigned to a daily 3 mg melatonin pill taken with food and an hour before going to sleep during the day for four consecutive weeks. And half were randomly assigned to a 3 mg dummy pill following the same schedule.

All the participants worked a minimum of two consecutive night shifts every week, lasting at least seven hours a night, for at least six months. None had any sleep disorders or long-term conditions.

Urine specimens were collected during the second of two subsequent day sleep and night shift periods—once before starting the trial and once near the end of the four weeks.

Participants wore activity trackers to measure how long they slept during the day. Levels of 8-OHdG, which is an indicator of DNA damage repair capacity, were measured in all urine passed during periods of daytime sleep and the subsequent night shift.

Urinary levels of 8-OHdG were 80% higher during daytime sleep—indicating better repair— among those taking the melatonin supplement than those taking the dummy pill. But there was no significant difference in urinary 8-OHdG levels during the subsequent night shift.

This is a small study, and most of the participants worked in health care, so the results may not be applicable to other types of night shift worker, acknowledge the researchers. Nor were they able to account for natural light exposure, which affects circulating melatonin levels.

But they point out, "Increased oxidative DNA damage due to diminished DNA repair capacity is a compelling mechanism that may contribute to the carcinogenicity of night shift work. Our randomized placebo-controlled trial suggested melatonin supplementation may improve oxidative DNA damage repair capacity among night shift workers."

And they conclude, "Our findings warrant future larger-scale studies that examine varying doses of melatonin supplements and longer-term impacts of melatonin use. Pending the outcome of such studies, melatonin supplementation may prove to be a viable intervention strategy to reduce the burden of cancer among night shift workers."

They add, "Assessing long-term efficacy is critical since those who work night shifts for many years would need to consistently consume melatonin supplements over that timeframe to maximize the potential cancer prevention benefits."

More information: Melatonin supplementation and oxidative DNA damage repair capacity among night shift workers: a randomised placebo-controlled trial, *Occupational and Environmental Medicine* (2025). DOI: 10.1136/oemed-2024-109824

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