

## **Age-dependent non-visual effects of a moderately bright light exposure during 40-h of extended wakefulness**

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**Objectives:** Here we examined the role of extended light exposure as a countermeasure for sleep-loss related decrements in sleepiness and cognitive performance as well as on melatonin and cortisol profiles in young and older volunteers.

**Methods:** Twenty-six young and twelve older participants underwent 2 or 3 times 40-h of extended wakefulness under dim light (DL: 8 lux), and either white light (WL: 250 lux) or blue enriched white light (BL: 250 lux) exposure. Questionnaires were administered hourly to assess subjective sleepiness, along with saliva collections for melatonin and cortisol assays. Cognitive tests were completed every 2 h.

**Results:** Moderately bright light during sustained wakefulness induced a significant alerting response in the older and the young participants (light condition  $P < 0.0001$ ). In contrast, melatonin suppression was only significant in the young participants during both non- and blue enriched light (light x time of day  $P < 0.0001$ ). Contrariwise, no differences were found under WL exposure, but under BL, cortisol levels were significantly increased in the older while decreased in the young. Furthermore, no significant differences were observed in both age groups under BL exposure in the visual 3- Back test. Whereas, under WL, performance in the young was reduced after 22 h of extended wakefulness. **Conclusion:** Our data indicate an age-related modulation of the nonvisual response to light at 250 lux under extended wakefulness. Thus, the use of moderately bright light in night work and shift work settings, where constant light levels are very common, may have differential effects on young and older workers.