# Sussing out sensitivity to light: how evening light impacts individuals' circadian systems

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CITATION

Curtis, Annie (2021): Sussing out sensitivity to light: how evening light impacts individuals' circadian systems. Royal College of Surgeons in Ireland. Journal contribution. https://hdl.handle.net/10779/rcsi.14565966.v1

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**Sci TM Editor's Choice Summary Master Template**

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**Overline:** Circadian Biology

**Title:** Light in your eyes, how individuals circadian system varies in response the evening light

**One-sentence summary:** An individuals response to evening light is highly variable, and may present a new component of circadian disruption.

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**Text of summary**
[300-350 words]

Before the invention of electic lighting, humans were exposed to either intense light (>300 lux) during the daytime or dim light (<30 lux) during the evening and night. Nowadays, humans spend the majority of their time in intermediate light intensities (30-300 lux), and exposure to artificial light after dusk is pervasive in modern societies. Light is the dominant synchronizer of our body clock and circadian rhythms. Specialized retinal cells sense the brightness of light and signal to the master clock in the brain, the suprachiasmatic nucleus. The onset of melatonin secretion, which signals sleep onset, under dim light (1 Lux), is used to assess the circadian pacemaker. Suppression of melatonin, by evening light, provides a measure of an individuals sensitivity to light. Previous studies determined that the effective dose for 50% suppression of melatonin ($ED_{50}$) was approximately 100 lux. However, interindividual differences in light sensitivity was not fully known.

Fifty-six healthy young individuals were recruited to this study where they assessed the impact of evening white light exposures in the range of 10–2000 lux on suppression of melatonin. As a group, the $ED_{50}$ was 30 lux. Thus typical indoor light (~50 lux) during the evenings will suppress melatonin in the majority of individuals and delay the onset of sleep. Remarkably, they observed >50 fold differences in sensitivity to evening light across individuals. Some individuals had very high or very low sensitivity to light, in which it took 10 lux (dim reading light) or 400 lux (bright indoor light) to cause the same amount of melatonin suppression. Therefore, these individuals would respond very differently to the same home lighting environment in the evening.

That circadian rhythm disruption and sleep deprivation is a causative factor in many conditions, particularly chronic disease, is gathering acceptance. This study identifies the large interindividual variation in response to light across intensities that we currently expose ourselves to in the evening. Individuals with very high sensitivity (low $ED_{50}$ values) may be particularly at risk to circadian rhythm disruption and possible susceptibility to disease, especially in later life.

**Highlighted Article**
Andrew J. K. Phillips, Parisa Vidafar, Angus C. Burns, Elise M. McGlashan, Clare Anderson, Shantha M. W. Rajaratnam, Steven W. Lockley, and Sean W. Cain
PNAS June 11, 2019 116 (24) 12019-12024; first published May 28, 2019
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