Your Brain Needs Sunshine

ThePowerfulConnectionBetweenSun, Mood & Mental Health

RESEARCH continues toshow positive associations between increased lifetime sunshine exposure, higher vitamin D levels, and improved cognitive health and mental-emotional wellbeing. While getting enough vitamin D itself is key to maintaining mental health, research continues to show us that there are several other ways through which exposure to sunlight and following natural light and dark cycles can boost our mood and benefit our mind.

SUNSHINE INITIATES THE RELEASE OF "FEEL-GOOD" CHEMICALS & IMPORTANT BIOLOGICAL PROCESSES

While exposure to UVB from sunlight produces vitamin D, aka the "Sunshine Vitamin," it also results in the release of several other mood-enhancing chemicals and initiates multiple biological processes in the body to support a healthy brain.

Beta-endorphins are naturally occurring opioids produced upon sun exposure that promote mood enhancement, relaxation, and pain relief. Interestingly, studies such as that by Kemeny et al. have demonstrated how avoidance of sunshine and vitamin D deficiency could be a contributing factor to decreased pain relief and even increase the risk of opioid addiction.

Nitric oxide, which is produced upon exposure to UVA and UVB from sunlight, has been shown to reduce inflammation and oxidative stress, resulting in decreased anxiety and depression.

The release of *melatonin* and *serotonin* are also prompted by sun exposure, both of which are associated with sleep regulation, improved mood, and easing anxiety. A study by Kent et al. discussed how a lack of sunlight can result in altered serotonin levels, neurodegeneration, depression, and other cognitive deficits. The study showed *how sunlight and light therapy can help with the regulation of both the melatonin and serotonin systems among patients with seasonal affective disorder (SAD), bipolar disorder, and schizophrenia*, which may also be one of the mechanisms by which sunlight can affect Alzheimer's disease, Parkinson's disease, and sleep disorders.

Dopamine is another chemical in the body that is released upon exposure to sunshine. Dopamine, AKA the "feel-good" neurotransmitter, is known to boost mood and motivation, and is also linked to reduced depression and anxiety. A study conducting PET scans to visualize dopamine and sunshine by Tsai et al. found that dopamine receptor availability was significantly greater among participants with the highest amount of sunshine exposure compared to the lowest, indicating a *sensitivity of the dopamine system to variations in*

Lightexposurealsoinfluencesmood indirectly through *circadian rhythm regulation* and also through *direct neurological pathways*. The eyes contain specialized light-sensitive retinal cells containing melanopsin to communicate directly with brain regions involved in mood and emotional regulation, including the amygdala and lateral habenula. Research such as that by Burns et al. suggests that modern indoor lifestyles may deprive many individuals of the bright daytime light needed for optimal circadian and neurological signaling while simultaneously exposing individuals to excessive artificial light at night. This mismatch may contribute to disrupted sleep, lower mood, and poorer mental wellbeing.

SUNSHINE EXPOSURE & RISK OF DEPRESSION & SUICIDE

A 2025 study by Tanaka and Matsubayashi examined the relationship between sunlight exposure and suicide rates using U.S. county-level data collected between 1979 and 2004. Rather than simply looking at seasons or geographic regions, the researchers analyzed month-to-month changes in solar insolation, a detailed measure of the amount of sunlight energy reaching the Earth's surface after accounting for factors such as cloud cover, weather, atmospheric conditions, and day length. After adjusting for temperature, precipitation, geographic differences, and seasonal patterns, the researchers found that *lower sunlight exposure was consistently associated with higher suicide rates. Specifically, a one standard deviation decrease in sunlight over the current and previous month was associated with a 6.76% increase in suicide rates.*

RELATIONSHIP BETWEEN LIGHT, CIRCADIAN RHYTHM & MOOD

A 2023 study by Burns et al. examined objective light exposure patterns in 86,772 adults and found that people exposed to brighter light during the day and lower light at night had significantly better mental health outcomes. In contrast, individuals with higher exposure to light at night had increased risk of *major depressive disorder, anxiety, PTSD, psychosis, bipolar disorder, and self-harm behaviors.* Those in the brightest nighttime light exposure group had approximately 30% higher risk of depression and self-harm, while *those with the brightest daytime light exposure had roughly 20% lower risk of depression and self-harm compared to those with the lowest daytime light exposure.*

Visit GrassrootsHealth.com/blog to learn additional ways sunshine and UVB exposure have been shown to affect mental health, along with hundreds of other articles on related subjects.

GrassrootsHealth
Moving Research into Practice

GrassrootsHealth is a nonprofit public health research organization dedicated to moving public health messages regarding vitamin D from research into practice. It has a panel of 48 senior vitamin D researchers from around the world contributing to its operations.

SmartTan.com news articles regularly report medical and scientific information to keep you abreast of current events related to UV light. This information is not intended to be used by any party to make unwarranted health claims to promote sunbed usage. Contact your Smart Tan representative to find out more about what you can and can't say in your tanning salon business.