- Seasonal Affective Disorder (SAD) / Seasonal depression / Brain

SCIENCE

HOW SEASONS CAN CHANGE YOUR MOOD

The science behind seasonal affective disorder and how the brain responds to daylight

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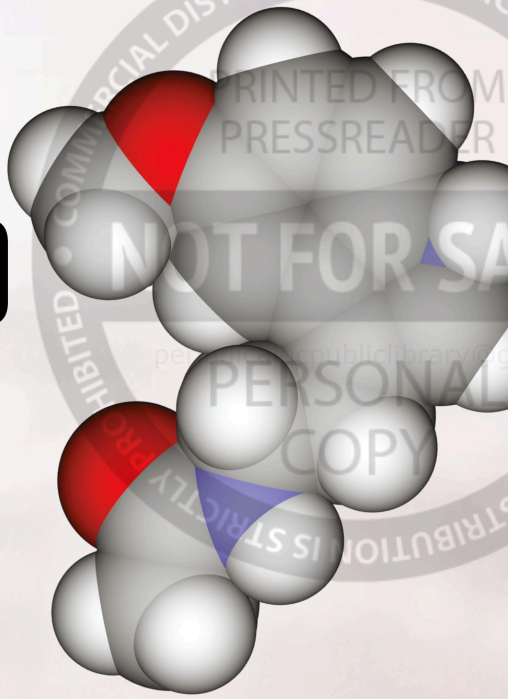
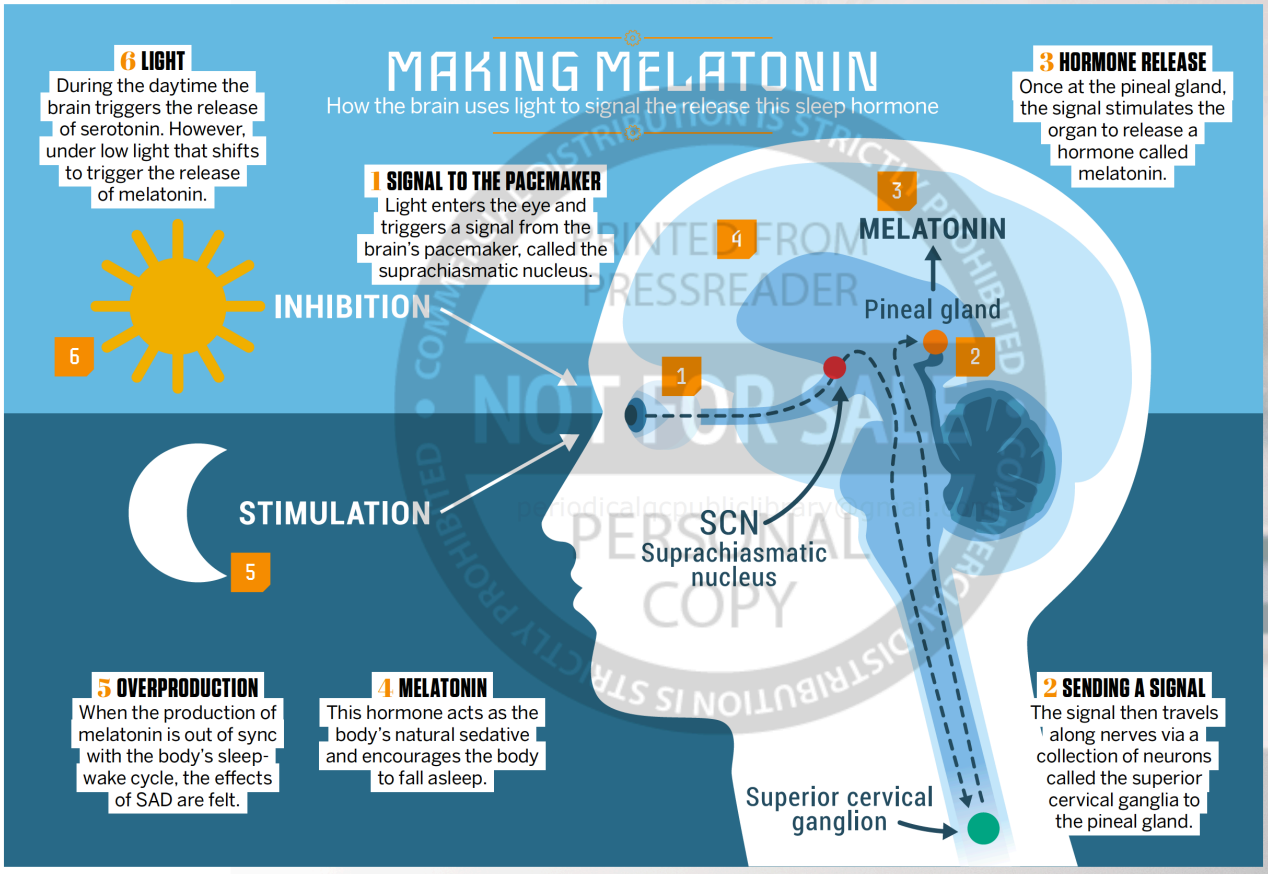
Often known as winter depression, seasonal affective disorder (SAD) is a form of depression brought about by the changing pattern of the seasons. Typically starting in autumn and lasting throughout winter, many people who suffer from SAD experience symptoms such as feeling lethargic, despair and a general loss of interest in everyday activities. Why some people experience SAD and others don't remains largely a mystery. However, there are many theories, including the seasons throwing your body clock out of sync. Known as circadian rhythm, the body generally follows a sleep-wake cycle across 24 hours that's attuned to the body's exposure to natural sunlight. Increasing light levels at dawn fire up the brain's production of the feel-good hormone serotonin, while decreased light levels at dusk slow serotonin production, and in its place starts the production of the sleepy hormone melatonin.



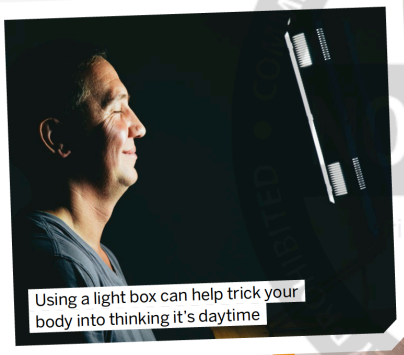
An illustration of a molecule of melatonin, the hormone that contributes to SAD



DID YOU KNOW? The UK's shortest day lasts 7 hours, 49 minutes and 42 seconds

LIGHT THERAPY

Since the 1980s, one of the most widely used treatments to tackle SAD is light therapy. Using a device called a light box, sufferers of SAD sit in front of artificial light, typically in the morning, to stimulate the production of serotonin and reduce the production of melatonin. Unlike other lamps, like those used for tanning, these light boxes come with filters to remove harmful ultraviolet light that can damage the skin and eyes. Some studies have shown that between 30 and 45 minutes of regular exposure to a light box at around 10,000 lux, which is around the intensity of light the Sun provides in the morning, is effective in treating SAD. Sufferers may experience some side effects, such as headaches or skin irritation during use, so it's advised to always seek medical advice before using a light box.



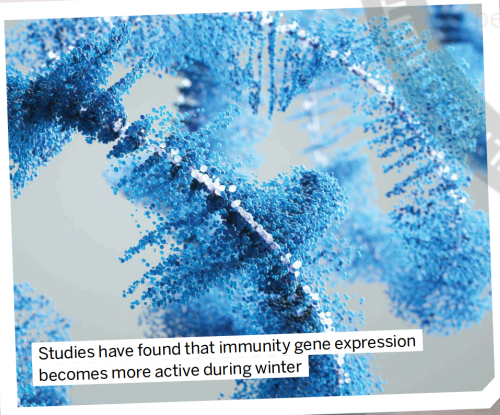
Using a light box can help trick your body into thinking it's daytime

During winter, when light levels during the daytime are lowest, serotonin production is also at its lowest, while melatonin continues to be released. For some, this can leave them longing for summer and feeling symptoms of SAD. However, SAD isn't strictly associated with the darker winter months. During the bright warm weather of summer and spring, excessive daylight can lead to the reduction of melatonin production to the point where normal sleep is impacted, which can also lead to symptoms of SAD.

Studies of families and twins have found that there may be a hereditary explanation for the expression of SAD. From the differences in genes involved in the transport of serotonin to those keeping circadian rhythm in check, scientists have suggested that SAD may be caused by changes in our DNA. One study by the University of South Wales found that people with blue eyes were less likely to experience SAD compared to those with brown eyes. While the scientists say more research is needed to explain their findings, it's possible that blue eyes are more sensitive to light and have a different threshold to brown eyes for the release of melatonin during the daytime.

"Decreased light levels at dusk slow serotonin production"

Did you know?
0.5 to 3.0 per cent of people experience SAD



Studies have found that immunity gene expression becomes more active during winter

SEASONAL GENES

SAD isn't the only way the seasons can alter the way our bodies work. In 2015, a team of international scientists discovered that the seasons could change human genes, especially those involved with immunity and inflammation. Having taken samples of blood and tissue from 16,000 people from around the globe, the researchers found that during December to February for those living north of the equator and June to August for those south of the equator, genes associated with the body's immune system were more active compared to other seasons. However, among those that live in warm climates near the equator, which experience little seasonal change, the same genes were more active during rainy seasons.

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