Junior Secondary Guidance Officer – Anna Willis

Let there be light – but make sure it's the natural, healthy kind

"This is just the beginning," says Associate Professor Sean Cain. He's talking about a small light sensor device – in prototype – that he believes could revolutionise the mysterious science of sleep, and its effect on the human mind and body.

The Monash University "circadian biologist" specifically examines how different kinds of light affect our 24-hour "circadian" rhythms and sleep quality, and how this affects our physical and mental health.

There's healthy light and unhealthy light, his suite of research shows. Healthy light tends to be from the natural world, a place where darkness falls at night, as it's done since the beginning of human life on Earth, and the sunlight begins again in the morning. Unhealthy light is artificial, especially at night, and particularly the blue light in the LEDs that increasingly illuminate our homes.

"We no longer have strong signals for day and night," Associate Professor Cain, of Monash's School of Psychological Sciences, says. "Our bright days and dark nights that helped our bodies organise the rhythms of activity and repair throughout our bodies have been replaced with an irregular twilight that affects our internal clocks, contributing to chronic disease.

"We're not aware of the damage we're doing to ourselves with our light choices. The negative effects of poor light exposure aren't conscious, so we don't realise what we're doing. "We do, however, seem to love consuming light. We can now have light whenever we want, at the push of a button. Modern light has become another junk food for the body." The worst light we ingest is before bed, whether it's bright home lights or screens.

A fast-moving field of research

But the field of research is moving fast. Associate Professor Cain calls this "the beginning of the age of circadian medicine" where sleep and light and the nexus between is taken seriously as a health and wellbeing intervention. His team has just been awarded a $50,000 seed funding top-up from the Monash Institute of Medical Engineering (MIME) to further refine a wearable light sensor that they hope will be mass-produced for use by scientists and clinicians next year.

The device is about as big as a 20-cent piece, and just a little thicker. It records the impact of different lights on the body – fluoro light, overhead LED, natural sunsets, phone light and device light – and sends feedback to a smartphone app, which then calculates the impact of ambient light on our body clock.

Dr Andrew Phillips leads the team's biomathematical modelling. "Knowing light exposure patterns allows us to give individuals feedback on what they could be doing better," he says. "Light is such a powerful input to the body that getting it right will improve sleep and health."

One of the curious things about the way the body clock receives light is that it's unconscious. We know nothing of it as it's happening. Therefore, says Associate Professor Cain, these days "we're not aware of how confusing our light signals are … Our device essentially makes the unconscious conscious. We can now see the effect through technology."

The detrimental effects of 'unhealthy' light

Medical research shows that "unhealthy light behaviour" can result in chronic conditions such as liver disease, depression, hypertension and cardiovascular problems, impaired muscle function, poor sleep, and insulin resistance or type 2 diabetes. Associate Professor Cain says "the worst light we ingest is before bed, whether it's bright home lights or screens".

Bringing healthy light into the home

Associate Professor Cain says he wants to be able to link the sensor to home smart lighting systems, to allow these systems to deliver individualised control of light delivery. The team's already created a bedside lamp with a healthy warm light that's also a wireless phone charger and a wireless sensor charger.

"The lamp portion is also removable for late-night bathroom visits," says Associate Professor Cain.

"It doesn't take long for people to see the benefits of healthy light cycles. The technologies our team is developing will make it easier for people to experience the benefits.

"The body craves regularity, and rewards us for it. Getting our lights right is the most important first step."

Read the original article: https://lens.monash.edu/@medicine-health/2021/06/15/1383357/let-there-be-light-but-make-sure-its-the-right-kind