

# Are fluorescent lamps really killing us?

Photobiology expert Alexander Wunsch thinks that many forms of artificial light are bad for our health – and may even be fatal. Is this just bad science, or should we be worried? *Lighting* investigates



**In the wrong light? We are all exposed to artificial light for much of our working lives**

Alexander Wunsch isn't one to pull his punches. He is an expert on the effect of light on cells in the body and runs a private medical practice in Heidelberg where he has developed 'chromotherapy' treatments for various conditions.

And at the recent KAM Congress in Norway he presented a paper titled *indoor lighting and health* that, if true, should make lighting professionals sit up and take notice.

If he's right, we may have to re-evaluate our collective enthusiasm for fluorescent light sources – and even for up-and-coming technologies like LEDs – because they may be doing us serious harm – leading to stress, cancers and even death.

His thesis is simply this: sunlight is good for us, artificial light is not. "In holistic photobiology," he says, "we would rather go back to what the ancient religions thought... that

sunlight is helpful for us in maintaining our health."

If our exposure to sunlight is limited, production of vitamin D – or the sun hormone, as Wunsch calls it – in the body falls. He says there is a link between this and conditions such as diabetes, immune system disorders, hypertension, and cancer of the colon, breast, ovary and prostate.

## Hypertension deaths

Wunsch says this is significant "when you consider that 50 per cent of people in modern society die from the effects of hypertension, another 30 per cent die from cancer".

This situation has been worsening since the beginning of the industrial revolution, with its sun-blocking smog that reduced people's exposure to sunlight. The result? Plagues of rickets, tuberculosis and other diseases. It was only early last century that the benefits of heliotherapy – exposure to sunlight – were appreciated, he says.

But why should this worry us? Industrial smog is a thing of the past in most cities and we work in ever-brighter environments thanks to artificial lighting.

Wunsch is concerned about the quality of that lighting. Specifically the quality of light from fluorescent and solid state sources.

The spectrum of light from a fluorescent lamp shows distinct peaks at frequencies corresponding to the energy emitted by electrons in mercury atoms when they fall from a high orbit around the nucleus to a lower one after they have been stimulated.

But, says Wunsch, these frequencies are simply absent from daylight – they correspond to the dark regions in

"We could find an increase in health problems with mercury that goes along with the increase in mercury lamp use in our society"  
Alexander Wunsch



▶ the spectrum spotted in 1814 by Joseph von Fraunhofer – Fraunhofer lines.

Wunsch believes that the light from fluorescent sources is so fundamentally different from sunlight – or even light from incandescent sources – that it has harmful effects on humans.

The reason? The mercury that is already in our bodies. According to Wunsch, from the day you get your first vaccination to the day you die, you absorb mercury from the environment. Mercury is toxic, so the body moves it away from your vital organs into the fatty tissues under the skin.

Here, says Wunsch, the mercury can be “activated” by what he calls ‘mercury lighting’, regaining its toxicity. “I think we could find an increase in problems with mercury that goes along with the increase in mercury lamp use in our society,” he says.

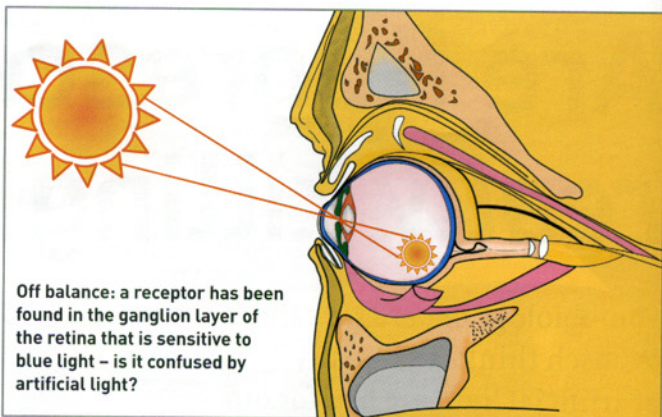
## Hormonal imbalance

Another of his concerns is an imbalance of hormones in the body as a result of continual exposure to bright light. In 2001, George Brainard famously discovered a region of the human retina that was sensitive to light with a wavelength of about 460nm.

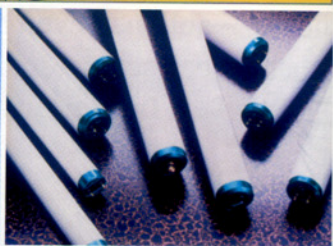
Wunsch says this region – the ganglion cells – helps to regulate hormone levels through its links to the pituitary and pineal glands, but is fooled by exposure to artificial light rather than sunlight. In sunlight, sun hormone builds up in the skin, and stress hormones, among others, are destroyed.

Under artificial light, the pituitary gland is activated but there is no destruction of stress hormones in the skin. Simply put, the two “pathways for light” into the body – through the eye and through the skin – get out of sync. Production of melatonin is thought to be suppressed in these circumstances.

He cites research to back this up, including work by Dr



**Off balance:** a receptor has been found in the ganglion layer of the retina that is sensitive to blue light – is it confused by artificial light?



**Mixed signals:** fluorescent light may cause hormonal imbalance because the skin and the eyes respond differently than they do to sunlight

## Wunsch's prescription

Okay, here's the good news...

Wunsch has set out his criteria for healthy artificial light:

- The colour temperature of light sources should be established using 'black body' measurement techniques rather than CIE 1931 methods

- Colour temperature should be below 3000K with a continuous spectrum, and without modulation frequencies and "electromagnetic disturbances"

- A good example of something that meets these criteria would be a 12V DC reflector lamp, which he recommends for applications such as desk lamps



**Safer choice:** Wunsch gives lamps like this the thumbs-up

Evva Schernhammer at the Harvard University Medical School. She studied nurses who had worked at night under fluorescent light for 15 years. They suffered a 35 per cent increase in breast cancer – and suppressed melatonin production is a chief suspect.

Wunsch is particularly concerned about the new generation of lamps with high colour temperatures, which are marketed as 'efficiency-boosting' products. "What we find is an increase in light intensity over the past decades, the motto would be more light, more productivity," he says.

These lights, with their discontinuous spectra skewed towards the blue, he says, "make the body chronobiologically active – but that's not the same as healthy".

LEDs come in for criticism too: "The colour temperature is 7000K... this is even worse, it's not like sunlight, it's just whiter."

Although Wunsch's diagnosis is a depressing one, he has some ideas how society can tackle this danger (see box).

But for a lighting industry about to embark, in the name of efficiency, on a politically mandated transfer from incandescent to fluorescent light sources, his ideas may be a bitter pill to swallow. ■

● *What do you think of Wunsch's ideas? Let us know at [lighting@emap.com](mailto:lighting@emap.com)*