

OPTIMAL HEALTH UNIVERSITY™

Presented by Dr. Joseph Baker

Fluorescent Lighting

You'll find fluorescent lighting in homes, schools, offices, department stores and a plethora of other locations. But have you ever stopped to consider exactly what's inside a fluorescent light tube?

For one thing, mercury. In addition to endangering human health, discarded mercury products add to the pollution of landfills (J Air Waste Manag Assoc 2005;55:859-69).

Dr. Baker encourages patients to consider how environmental factors affect their health — both in the short term and the long term. This is particularly true in the case of fluorescent lighting: often overlooked as a potential instigator of health problems.

Since this type of lighting is so prevalent, Dr. Baker wants patients to understand its pros and cons.

How It All Works

When electricity transforms the mercury vapor inside a fluorescent tube to argon or neon gas, it produces a plasma substance that generates short-wave ultraviolet (UV) light. The UV light, in turn, causes the phosphorous coating of the tube to fluoresce and produce light.

Studies suggest that fluorescent lights, especially older models, emit several types of potentially harmful radiation, at least one of which may up the risk of leukemia (K.R. Fehrman and C. Fehrman, "Color: The Secret Influence," Prentice Hall, 2004).

Ballasts

Ballasts — located on both ends of the tube, regulate the electric current flowing through the gaseous cylinder. And, like fluorescent tubes, they also have a toxic component: PCBs (polychlorinated biphenyls). Most PCBs are absorbed through the skin and are linked to cancer and liver disease.

The Fluorescent Fallout

Studies show that fluorescent lighting can affect your body and mind in a host of ways you probably never even considered. Read on for details.

The Emotional Effect

Interior-design experts stress that lighting is essential to the emotions a space provokes. Inadequate or poor-quality lighting fuels stress; it also diminishes creativity and productivity.

One study revealed that fluorescent light hastens fatigue and boredom significantly sooner than full-spectrum light. It also triggers irritability (*J Appl Psychol* 1974;59:524-6).

Many interior and architectural designers encourage the use of artificial light sources that produce as pure, natural a light as possible, such as full-spectrum light bulbs.

Eye Fatigue

When German researchers reviewed the responses of 3,000 patients who used fluorescent lighting on a regular basis, a whopping 58 percent reported suffering from weak/tired eyes. They also complained of reduced concentra-



tion (*Ophthalmologe* 1994;91:201-11).

Scientists in England say it's the varying frequency and intensity of fluorescent light, known as modulation, that causes eyestrain. But, because this modulation is greater at certain wavelengths than at others, eyestrain can be reduced by wearing tinted glasses (*Ophthalmic Physiol Opt* 1991;11:172-5).

Back & Neck Pain

Reflective glare from improper lighting and straining to see in inadequate illumination can lead to postures that "may cause pain in the neck and back." (*Acta Ophthalmol Suppl* 1984;161.)

When spinal movement is restricted or spinal bones (vertebrae) become misaligned, the result is a common condition known as **vertebral subluxation**. A number of health concerns are linked to vertebral subluxations, such as carpal tunnel syndrome, headaches, backaches, infantile colic and ear infections. Dr. Baker corrects vertebral subluxations with safe and gentle maneuvers called **chiropractic adjustments**.

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UV Exposure

The dangers associated with ultra violet UV exposure from the sun are well established. But did you know that chronic exposure to indoor lighting can deliver unexpected cumulative UV exposure to the skin and eyes? This is particularly true for patients with a history of UV-sensitive skin. That's why researchers from the University of Tennessee's Center for the Health Sciences urge doctors to alert patients — particularly those with UV-sensitive skin — to the potential UV danger associated with indoor lighting (*Photochem Photobiol* 2004;80:47-51).

Potential Seizure Trigger

The erratic flashing of a malfunctioning fluorescent light is more than just annoying. It can actually spark epileptic seizures in susceptible people (*Epilepsia* 2004;45:2-6).

Lighting Options

Fluorescent tubes aren't the only illuminating option on the market. Choices include the following:

Incandescent

Incandescent (also known as tungsten) bulbs have changed very little since their invention by Thomas Edison. Rather than relying on mercury vapors, incandescent bulbs contain a wire filament that — when heated by electricity — glows and gives off light.

Solid State

Unlike its incandescent or fluorescent counterparts, solid-state lighting produces illumination with virtually no heat. Light-emitting diodes (LEDs), used in everything from exit signs to traffic signals, are a good example of this type of lighting.

The high efficiency of solid-state lighting sources “provides energy savings and environmental benefits in a

number of applications,” according to researchers from New York's Polytechnic Institute. The lights can even adjust to specific environments and requirements (*Science* 2005;308:1274-8).

Halogen



This white light is produced by using an incandescent filament lamp inside a quartz capsule containing halogen gas. The good news is that this unique combination offers clear, crisp and bright light. The bad news is that it generates a lot of energy-wasting heat and, in the case of halogen torchiere floor lamps, highly inefficient and dangerous light that can be a fire hazard.

Sodium Vapor

High-pressure sodium vapor lights rely on sodium and even mercury to brighten things up. Low-pressure sodium vapor lights, on the other hand, don't use mercury. In both cases, sodium vapor lights are predominately used outdoors. Examples include streetlights and security lighting.

Sometimes, however, they are used indoors: particularly in manufacturing and warehousing facilities. In Poland, researchers studied 20 women to determine the effects of light-related eye fatigue in the workplace. Light sources included fluorescent lamps, incandescent lamps and high-pressure sodium lamps. In the end, it was the high-pressure sodium lights that produced the highest visual fatigue, espe-

cially in those who wore glasses (*Pol J Occup Med Environ Health* 1993;6:287-92).

Disposing of Fluorescent Tubes and Ballasts

Instead of throwing fluorescent bulbs away in the trash, store used bulbs in a sturdy container where they won't get broken. Then recycle or dispose of them at your community's hazardous waste facility. This is not only smart safety-wise and environmentally friendly, but it also adheres to government regulations.

If you break a fluorescent bulb, take care to remove everybody from the area, especially children, and call your local toxic chemical information hotline or your hazardous waste facility.

Prior to replacing a bad ballast, turn the fluorescent light off and leave it off for at least 30 minutes. Make sure the room is well-ventilated and that all exposed skin is covered: long pants, long-sleeved shirt, rubber (or other nonporous) gloves and safety goggles or face shield. Before disposing of the ballast, double-bag it in plastic, secure the top and take the toxic package to a hazardous waste collection facility.

Chiropractic Cares for the Whole Person

This chiropractic office is committed to caring for the whole person, rather than treating symptoms in isolation. We strive to teach patients how to prevent the chemical, physical and emotional causes of spinal dysfunction. To this end, we teach patients about topics they may not have realized might be affecting their well-being, such as their physical environment and their lighting.

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