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"Life in all its fullness is Mother Nature obeyed" Weston A. Price, DDS

Change Your Light, Change Your Life!

The Importance of Full Spectrum Lighting

by LoRayne Haye, MS, CN

with David J. Getoff, CTN, CCN, FAAIM

Each spring, millions of Americans turn their attention towards detox programs for the body and mind. A largely overlooked aspect of virtually all cleansing regimens, no matter how well intended, is the indoor light in which we live, work, and attend school. Researchers have long known the health ramifications that standard-fare fluorescent lighting can cause, which include impaired immunity, reduced life expectancy, cancer, eye strain, and low productivity, to name just a few. High-quality full spectrum fluorescent tubes, powered by high efficiency (high power factor) ballast transformers, eliminate these problems and produce healthy light.

A BIT OF HISTORY TO LIGHT THE WAY

"When people ask me who was responsible for the initial research on full spectrum lighting, I reply that the unquestionable pioneer in the field was Dr. John Nash Ott [ScD Hon]," David Getoff told me, during a recent discussion on the subject. "Ott's novel research on plants, animals, and humans has yielded remarkable results, which have added to our overall understanding of how indispensable this full spectrum, sun-approximating light is to the health of almost all living organisms." It was while Ott, a photobiologist, had been working as a consultant on the 1956 Walt Disney documentary *The Secrets of Life* that he discovered just how important natural light is. He observed that when plants were deprived of natural, unfiltered sunlight or particular portions of the light spectrum, they succumbed to mutation, shortened life span, and inability to bloom or to ripen their fruit. Ott found he was unable to successfully grow plants under artificial lighting conditions. However, when he changed the commonly used substandard lighting to full spectrum light or unfiltered sunlight, his plants thrived and produced vibrant,

healthy flowers and fruit—the signs of an optimal life cycle.¹

SHEDDING LIGHT ON MICE AND HUMANS

Ott knew he was onto something and expanded his research efforts to include mice and, sometimes, rats. He divided his subjects into various groups, with the only variable being the type of lighting to which each group was exposed. His findings were fascinating, since he was basically using different light sources as "drugs" with which he "treated" the animals.

In one such experiment, the initial group of animals was kept in natural, unfiltered sunlight; the second under pink fluorescent tubes; the third in sunlight shining through ultraviolet-transmitting plastic; and the fourth under daylite white fluorescent lights. The mice living in unfiltered sunlight were by far the healthiest, as evidenced by shiny coats, and exhibited normal behavior. They also had the longest life expectancy, averaging 16.1 months. Those living under the pink fluorescent tubes developed cancerous tumors and skin lesions, and died in only 7.5 months, after having lost their tails due to necrosis. Interestingly, if these animals were transferred back to full unfiltered sunlight when their tails first became diseased, the tails quickly healed. The mice living under daylite white fluorescents lived an average of 8.2 months. Those living in natural sunlight shining through a special plastic that allowed most of the ultraviolet (UV) rays to come through (regular plastics block UV transmission) lived 15.6 months, almost as long as the unfiltered sunlight group. Ott discounted any suggestion that the pink light frequencies somehow caused illness and early death in the group raised under the pink fluorescent tubes, because these same frequencies were also part of the full spectrum sunlight,

which did not cause these problems. He concluded that it was a deficiency of the other frequencies, rather than the presence of those in the pink range of the spectrum, that impaired health.¹ Based on the results of his studies, Ott coined the term *mal-illumination*, which describes the condition of sun starvation, just as *malnutrition* describes nutritional starvation.

Today, most of us do not even consider the quality of our illumination when addressing our health. David discussed this sad fact with Dr. Ott a few times, shortly before Ott's death in 2000. Luckily for us, Ott's research is still available and has been replicated by other scientists. In 1971, the Harvard School of Dentistry and the College of the Pacific did a similar study with golden hamsters. One group was illuminated by cool white fluorescent tubes, while another was exposed to full spectrum light. After 15 weeks, the mice housed under the cool white tubes had developed five times as many dental caries as the other group, although both groups were given identical diets, enclosures, and exercise regimens. Furthermore, the mice exposed to cool white light had significantly smaller bodies, hearts, and sex organs, and the males had no sperm production.²

Ott was beginning to understand the significance of these findings to the human population who were spending much of their time under fluorescent lights. In 1963, health officials discovered that the St. John Brebeuf Catholic School, in Niles, Illinois, had the highest rate of leukemia in the U.S. Of prime interest to Ott was the fact that the school had no history of cancers prior to the rapid onset of the leukemia. His attention was directed towards the lighting system used in the classrooms, where he discovered that pink fluorescent lights had been recently installed, coinciding with the onset of the cancer diagnoses. In addition, the teachers were closing the window shades—thus blocking the sunlight out—and keeping the pink fluorescent lights on all day. When full spectrum lighting was installed and the shades kept open throughout the day, the leukemia rates dropped dramatically.¹

LIGHT AND CIRCADIAN RHYTHMS

When viewing sunlight, humans perceive only white light, but this light actually contains the full spectrum of colors. The spectacular red, orange, yellow, blue, green, indigo, and violet colors of the

rainbow are visible manifestations of wavelengths that provide the health benefits living beings need. Subvisual wavelengths include the three forms of UV rays: ultraviolet A (UVA), ultraviolet B (UVB), and ultraviolet C (UVC). These UV rays have sparked heated debates for years, resulting in a gross misinterpretation of the research, which clearly states the need for unfiltered sunlight. Most of the disagreements appear to be related to the fact that sun exposure does not necessarily equate to overexposure.³⁻⁵

When light is reflected onto the retina of the eye, the retina produces chemical and electrical signals that are carried by the optic nerve both to the brain's vision center and to the hypothalamus, from which information descends into the spinal column.³⁻⁶ Within the hypothalamus is found the suprachiasmatic nucleus (SCN), which acts like a super clock, synchronizing cells in the eye, brain, heart, gastrointestinal tract, liver, and kidney, as well as fibroblasts, to the 24-hour day/night cycle.^{3,4,6} We know this cycle as the *circadian rhythm* (from the Latin *circa dies*, meaning "approximating a day"). A dire problem for people who are chronically exposed to substandard fluorescent lighting is that the brain registers this as darkness, resulting in interrupted circadian rhythms. A prime example is seen in office environments, where substandard fluorescents can lead to low productivity and set the stage for a host of health problems, including seasonal affective disorder (SAD) and other mood disorders, headaches, low immunity, eye strain, and other conditions.⁷⁻⁹ During this interrupted circadian cycle, the body's production of melatonin begins to falter. Richard J. Wurtman, MD, a professor of endocrinology and metabolism at the Massachusetts Institute of Technology, has contributed the leading body of research on melatonin secretion cycles and has studied the biological effects of light for nearly two decades.^{8,10,11} He believes that "we are all unwitting subjects of a long-term experiment on the effects of artificial lighting on health. Until much more is known, we should design indoor lighting to resemble, as closely as possible, what the sun provides."¹²

SUN AS FOOD

Often we don't think of light as a food, but it is. It feeds our skin, and it nourishes our bodies. The latest studies conducted by the Environmental Protection Agency (EPA) estimate that Americans spend

90 percent of their time indoors,¹³ resulting in widespread mal-illumination. David states, "If people stopped avoiding the sun, and only avoided getting a sunburn, we would have a healthier population." These are certainly words of wisdom, considering the litany of credible current research on the vitamin D deficiency among Americans. Full spectrum lighting is the closest we can come to emulating sunlight indoors.

The sun has the capacity to support the growth of healthy food and healthy people—but only if exposure is sufficient. David adds that "in order for a plant to produce all of the antioxidant nutrients our bodies require, it must receive an adequate amount of UV light while growing, rather than being 'ripened' with gasses or other chemicals after being picked. The plants are not afraid of sunlight. If more of the public would take the time to read the published research, which has shown less melanoma in those occupations that receive a greater amount of sun exposure, perhaps people would be less fearful. If all the research and traditional tribal dietary habits are examined, it appears that one of the biggest problems today is a combination of a low-fat diet and insufficient antioxidants. When these two factors are remedied, the sun becomes our friend. Fats are needed to protect our epidermal cells, and antioxidants are required to protect the fats."

SELECTING THE RIGHT LIGHT

According to David, there is another detrimental aspect to traditional fluorescent lighting—the "flicker rate" of 60 cycles per second (60 Hz) that is produced by many older-style ballasts. This flicker rate not only results in eye strain but can also be a potential trigger for epileptic seizures, hyperactivity, SAD, suppressed immune function, and even cancer.^{3,5,14-18}

Full spectrum fluorescent lighting, when it includes electronic ballasts, eliminates the 60 Hz flicker rate, and this issue is now being addressed in other fluorescent lighting systems, as well. Due to state and federal energy efficiency regulations, many fluorescent fixtures, especially those rated for commercial use, now come with electronic ballast transformers, instead of the older-style, less energy-efficient, magnetic ones. The better commercial ones operate at 15,000-25,000 Hz, and this eliminates the flicker. In addition, the newer, thinner T8 tubes can put out

more light while using less electricity. The older "watt saver" tubes also used less power but put out less light. The full spectrum tubes David uses in his office and home, and recommends to his clients and students, are those made by the U.S. company Full Spectrum Solutions (www.fullspectrum.com; see ad on inside front cover).

Although there are companies that claim to manufacture full spectrum incandescent bulbs, these are energy hogs when compared to fluorescent tubes. In addition, David has never seen any proof that they are at all equal to the full spectrum fluorescents used in the research studies.

CONCLUSION

Humans need unfiltered sunlight, as do most other creatures great and small, to attain optimal life expectancy and the best possible health. David recommends assessing the type of light in your home, workplace, or school and, whenever possible, replacing mal-nutritional lights with full spectrum fluorescents. He also suggests exposing the skin, without sunscreen, to unfiltered sunlight. Fair-skinned people should start conservatively, so as to not burn, increasing exposure time in small increments until they reach a level that is tolerable but still meets their individual needs for vitamin D. People who have a higher amount of melanin in their skin don't require such strict precautionary measures, but still need to take a slow and steady approach in the sun. Most vitamin D experts appear to agree that optimal exposure can be achieved between 11:00 AM and 1:00 PM, depending on the time of year and the latitude; otherwise, adequate levels of vitamin D may not be produced.¹⁹ According to David, if sunscreens are going to be used (which block the manufacture of any vitamin D), the type of sunscreen does make a difference: "If people feel the need to use sunscreen, the nontoxic brands I recommend are Lavera, UVNatural, and Graham's SunClear. These are available at natural foods markets and on-line."

David believes that the need for further research or full spectrum lighting, combined with accurate consumer education, should be considered tantamount. He observes, "When my students gain the knowledge of how full spectrum lighting can positively impact their health, they often call me months later to let me know how much better they feel."

He adds that he is looking forward to future research on the newest form of energy-efficient lighting, which uses light-emitting diodes (LEDs). If LED lighting can be made in a real full spectrum sunlight-approximating product, it will be the least expensive healthy lighting we have ever had available. ☺

ABOUT THE AUTHORS



LoRayne Haye is the founder and director of Eating-4-Energy, a nutrition research and consulting company based in Encinitas, California. Her writings have been featured in a number of nationally circulated health and fitness magazines. Her website is: www.eating-4-energy.com.



David J. Getoff is a board-certified clinical nutritionist, traditional naturopath, and Vice President of PPNF. He includes the subject of full spectrum lighting in the classes he teaches at the Foundation, under the sponsorship of the Grossmont/Cuyamaca College District in San Diego County, California. David has contributed numer-

ous articles in past issues of the *Price-Pottenger Journal of Health & Healing*. His website is: www.naturopath4you.com.

For more information on sunlight, see *The Sunlight Solution*, by Laurie Winn Carlson (ad on page 40).

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