Fatal Conveniences™: LED Lights: Keeping You Awake

[00:00:00] Fatal Convenience Intro

Darin: It's that time of the week for another fatal convenience. This is a bite-size segment that addresses some of society's fatal conveniences and the steps you can take to avoid becoming a victim of them. I define fatal conveniences as the things we may be doing because the world we live in makes us believe we have to. Tap water, shampoo, sunglasses, food... I dive into the hidden truths behind some of our everyday choices that could not only be harming us but even killing us, so let's dive in.

[00:00:41] Fatal Convenience

Darin: Hey, everybody, welcome to the show. This is Darin Olien. This is another installment of fatal conveniences, yes, to liberate you from the businesses, the products, the people behind the businesses that are creating things that are not necessarily good for you. We need to uncover, be aware of so that we can transition into healthier things that we can do for ourselves and our lives so we can thrive so that we can live our lives, live our super life, live with the energy, the power, the awareness. This next fatal convenience is part two of artificial lights. If you haven't listened to part one, check that out because we talked about artificial lights directly linked to changes in the circadian rhythm, which then have a lot of drawdown on your life, on your physiology, on your sleeping patterns, on your energy levels, and goes on and on, so check out part one. Part two now is the dangers of LED lights. That's right. You've heard it so many times about the environmental importance to do your part as an individual, and there's nothing wrong with that, and we need to do that. We say, listen, less energy, use LED lights, but there's a negative side to this whole thing, and we need to know that, and we need to work better at the future of lighting. In the future of lighting is, of course, using lower energy, using better full-spectrum lights because we are doing an experiment that is not going so well in our race to have convenience with not having the full picture in mind. LED light is a part of these artificial lights, and these have consequences. From our ancestors, we're living in over 91%, 92%, 93% more of our life living indoors. Imagine out of the sun, not in the sun, not in the full spectrum light under fluorescent lights, LED lights, candescent lights. All of these things do have a tremendous impact on ourselves in our life, especially as we are in those light as we are exposed to those lights later during the day when our bodies are shifting and the sun is going down.

[00:03:18] What are LED lights?

Darin: LED light stands for light-emitting diode. It is an electric component, obviously, that emits light when connected to a direct current. Electroluminescence is the nonthermal conversion of electricity into light and LEDs work on the principle to emit light in the full spectrum, as well as the infrared and ultraviolet. They have characteristically low energy consumption, small size, longer lifetimes, and faster switching on than normal artificial lights giving them a wide palette of use. Obviously, if you just continue to look at those kinds of benefits, they seem to be great, but we're going to dive into it. But before we do, we're going

to get into the history a bit. In 1907, British experimenter, Henry Joseph Round, noticed when a potential of 10 volts applied to a basically silicon carbide crystal emits a yellowish light. Though too faint for any use, that was one of the first understandings when there's voltage hitting in this case, silicone. Then jumping to 1961, Gary Pittman and Bob Biard, working at Texas Instruments found that a gallium-arsenide diode emitted infrared light every time it's connected to a current and received a patent for infrared LED. In 1962, Nick Hello Nick Holonyak Jr at General Electric developed the first light-emitting diode that emitted light in the visible range in the color red. In 1972, George Crawford, a graduate student at Holonyak invented the first yellow LED and a brighter red. In 1976, Thomas Pearsall developed a high brightness led to use with fiber optics and telecommunication. As of 2019, LED lights are the main source of lighting phasing out both halogen and fluorescent bulbs. LEDs are now found in just about everything, everywhere you look literally, from neon signs, calculators, watches, flashlights, smartphones, TVs, lamps, even remote controls, they're all over.

[00:06:00] The push to switch to LED

Darin: More and more towns and cities are making the switch of LED lights for street lighting. Since about a quarter of the electricity consumption is for lighting in these towns, more LEDs will have a tremendous impact on global energy conservation. Now, keep in mind, just remember that for a moment, putting these into our environment outside has an environmental impact, which I'll get into in a little bit. LED lighting is very different from other lightning typically such as incandescent and CFL. LEDs are the size of a fleck of pepper and can emit light in a range of colors. A mix of red, green, blue LEDs is sometimes used to make white light. LEDs emit light in a specific direction reducing the need for reflectors and diffusers that can trap light. LEDs emit very little heat. In comparison, incandescent bulbs release 90% of the energy of heat, and CFLs release about 80% of that energy, and of course LEDs last three to five times longer than these other ones. LED lights are much quicker when it comes on turning on and off. It doesn't have to warm up. Like I said before, the convenience is they last longer. The convenience is there's no heat. There's more light per watt which saves energy than the incandescent bulbs. They're smaller. Their lifetimes are lasting longer, etc. That's great. LED lighting is available in a wide variety in homes, industrial uses, cities, towns. A rapid development of LED technology has resulted in increased product availability all over the place. Converting conventional street lamps to energy using LEDs is a cost in energy savings. So why should we care? Well, we learn in the first episode of artificial lights, too many man made lights can confuse our circadian rhythms, which is our internal clock. It turns out Dr. Huberman, I also talked about this in the latest podcast of his that he did a month ago when this was airing, that every single cell in the body has its own circadian rhythm connected to everything else. So the circadian rhythm is so deeply intertwined.

[00:08:32] Blue light dominance

Darin: Now we're going to dive into a little bit of the blue light dominance that shows up in the LED lights. This blue light comes up a lot. Now we're all aware our screens, our computers, our watches, our phones have this dominance of blue light coming from the LED. Your body sends out this chemical. Let me just cut to it. The most important thing with the blue lights is not that it's necessarily bad. If you want to wake up and you look at your screen and turn on

LED lights, it's going to help you wake up. If the sun hasn't risen and you haven't received your natural light that way, the blue light dominant LED lights are going to help you wake up. The problem is that if you have LED lights on and you're looking at your screens at night, this is where it slows down the release of melatonin. You need that melatonin for your body, for your pineal to be released so that your body clock can now shift because it is the light that is triggering the melatonin. If this light is artificially stimulating you with the blue light at night, then this is going to change your chemistry and not allow you to sleep well and then not sleeping well is connected to a lot of downstream degenerative issues from moods to metabolic issues, diabetes, overweight, high blood pressure, depression, heart disease, and even some forms of cancer. Again, screens in our modern world are relying on LED technologies. Typical screens have individual controls, the red, green, and blue so you can actually hack into your phone without much of a problem and put it on night mode and shift the blue light dominance in your phones, your laptops, your tablets, all of that stuff.

[00:10:25] The light flicker effect

Darin: On the top have more exposure to this blue light, LEDs also pose another threat known as light flicker, the rapid or quick and repeated changes in the brightness of light over time, light that appears to flutter and to be unsteady. This is caused when the voltage supplied to the light changes and the power lines change and there are slight fluctuations. Studies show that the human eye can perceive the flicker of LEDs at a rate of up to 90 Hertz. Generic lighting tends to operate in the frequencies of 50 to 90 hertz designed to light an environment and give the impression of stability and consistent light source even though the LEDs are constantly switching on and off hundreds of times per minute. Further studies show that the flicker rates of up to 500 hertz can result in unintentional hazards and stroboscopic effects, while the perceived flicker of up to 70 hertz can result in seizures, headaches, fatigue, blurred vision, eye strain, reduced visual task performance, all of which is happening by flickering of these LED lights. Most people cannot even notice the flicker in fluorescent lights by the way, that has flicker rates of 120 cycles per second or 120 hertz. Flicker is the constant fluctuation of light output, and it has two types: visible and invisible. Visible flicker which is in the frequency range of 100 hertz can be seen by your naked eye. However, any flicker above 100 hertz is termed invisible. Your human eye can't see it, but it's still flickering, it's still affecting the light coming into your eye whether you can perceive it or not. Children, especially those under the age of three or more are vulnerable to this flicker induced effects. As adults, we have a little more resiliency with it. They can suffer from the same issues such as headaches, eyestrain, blurred vision, and agitation of even autism-like symptoms. That is scary. Blue light also affects children differently from adults, so it's crucial to monitor screen time with your children. Ophthalmologist, Rishi Singh, MD, notes that child's eyes do not filter blue light as well as adults. Child myopia, which is near-sightedness, digital eye strain, dry itchy eyes, blurred vision and headaches, and poor sleep. These are detrimental to children. LED lights, why are they harmful? We have learned in the first episode of artificial lights, we know that it suppresses the secretion of melatonin especially at night when your body is shifting from the circadian rhythm and ready to go to bed and your body has to turn on the melatonin for your body to switch into that hormone dominance for your body to drift off to sleep. In an experiment conducted by Harvard researchers, they compared exposure of 6.5 hours of blue light reverses green light of comparable brightness. The bright blue light suppresses melatonin and shifts the circadian rhythm twice as long as

the green light. Meaning, blue light suppresses these functions in the body more and more powerfully. Additional studies found links to diabetes, heart disease, obesity, shortening and disrupting sleep, increased risk of depression, and cardiovascular problems. This is all by the light, people. Harvard researchers believe the link to diabetes and possibly obesity and blue light involved the circadian rhythm. They put 10 people on a schedule and gradually shifted the timing of their circadian rhythm as their blood sugar levels increased, throwing them into a pre-diabetic state. Their levels of leptin went down which is the hormone that tells you when you're done eating and it makes you feel full. So that is huge. Moving over to the effects of blue light on eye health, our eyes are not good at blocking out blue light. So nearly all blue light we are exposed to passes from the eyes to our cornea and lenses and reaches our retina. The retina converts light for the brain to process into images. Continued exposure to blue light over time can result in damaged retina vision problems, contribution to cataract eye cancer, and other growths. Digital eye strain results in less blinking which is necessary. Your eyes need blinking all the time or your eyes don't work properly and it can lead to headaches, blurred vision, and etc.

[00:15:45] How to wean yourself off LED lighting

Darin: So small changes to wean off LED lights in your environment. Lots of flat-screen TVs, backlit by all this stuff, and many of the new TVs you can actually find the blue light filter. All your TVs if you can go right now and go find the blue light filter, you can switch that on and convert that screen so it's not blue light dominant from these LED lights. And on your phones and your tablets, switch it to night shift. The 20/20 rule as recommended by the American ophthalmologist association to help prevent eye strain and headaches, take your eyes off of the computer every 20 minutes for 20 seconds. This is very doable. In that 20 seconds, turn your gaze to something 20 feet or more away. So I'm sitting here right now looking at the mountains outside of my window. Every 20 minutes, if I then look out at the horizon or look towards the mountain for 20 seconds, I give my eyes a break and that's a great, great exercise for the eyes. And you might want to invest in some blue-blocking light glasses. I've talked about them before and use those later in the day when you need them. Some types of ballasts can reduce light flicker considerably. Energy-efficient electronic ballasts take 60 hertz supplied power and convert it to much higher frequencies 20,000 to 60,000 hertz and result the flicker frequency twice as supplied, so it's so high the human eye can not detect any more of these fluctuations, so that is a great option. To correct flicker, replace bulbs on a scheduled basis. Old bulbs tend to flicker more. Ensure all parts of the light fixtures especially the ballasts are functioning properly. Upgrade to fluorescent lighting that uses electronic ballasts. When you buy compact fluorescent bulbs, CFLs or LED light-emitting diodes, light for your home, opt for the kind that is coded to put out warmer light. Consider using red bulbs in your bedroom. This is a great idea. Even if you're working at night, switch to red bulbs so they don't have the intensity and they don't interfere with the melanin. For kids, the American Academy of Pediatrics suggests keep kids away from screens until they're two years old. limit screen time to one hour a day for kids, two to five years old. Good luck with that, but I have to say it. LED bulbs are available in a range of colors and can provide warm light, warmer than normal. A common myth states that LED lights do not work with dimmers. That is not true. A variety of dimmable LED lights are available at both Lowe's and Home Depot and other sources. If and when you can start to replace existing LED lights in your homes with ones that are dimmable and pull down the flicker and control the intensity

and using different colors, that's a really good idea to minimize the types of blue light that's hitting you. So there you go, everybody, another installment, part two, artificial lights, LED lights, understanding the spectrum of light, the intensity of light, and that you can do something about it. Again, all of this stuff and all of the studies and everything I said is in the show notes. It is not me making this up. This is real stuff to be aware of, especially with the kids, and especially work with your circadian rhythm. As you wake up, it's okay to be exposed to some of this light, dim it down a little bit, that kind of thing. But as the day goes, and at night, dim these things down, use different colored lights so that it doesn't mess with your circadian rhythm, and then mess with your melatonin, which then messes up your sleep patterns. Keep in mind, everybody, I love you. This is why I do this so that you can live a greater life than you can ever imagine. Peace.

[00:20:26] Podcast Outro

Darin: Thanks for tuning in everyone. I hope that left you feeling inspired to take a closer look at the everyday choices you're making and how they could be impacting your health and even the planet. If you want to learn more about life's fatal conveniences, head over to fatalconveniences.com. You can sign up for the exclusive access to Fatal Conveniences episodes, news, insights, and more. And all this great stuff gets sent each week straight to your inbox, making it really easy. Now, that's a convenience without the negative side effects. It only takes a few seconds to join. Just fill in the form and take that amazing step towards making better choices. Remember, small changes can have a big impact. So, keep diving my friends, keep diving. And if you haven't had a chance to check out the interview, I released earlier on the week, here's what you missed:

[00:21:33] Snippet - From Overweight to Badass Vegan on a Mission

John: A lot of people don't realize that, I always say happiness is a practiced art like anything else. Happiness is not a right, it's a skill. You didn't earn the right to be happy. That's a skill. You got to practice that every day. You got to wake up, what am I thankful for? Okay, cool. Yeah, that was fucked up yesterday. All right, but I'm not gonna dwell on it. It's a skill. People think they were born happy. No, you're born crying. You're born fucking cry. Literally, you come out crying. You came into a fucked up situation and you got to work every day to be happy, but happiness is achievable. I think that's what people mess up. They think that the happiness is wrapped up in the money and it is wrapped up in the light. I was sleeping in my car. That was the happiest person I've ever met. A lot of people didn't even know I was sleeping out of my car. I still kept my gym membership. I was taking my showers every day. I was going to class. I was going to work. Nobody knew, but you have to be happy.