Why Our Lungs Need Hydration, Too | Dr. David Edwards

[00:00:00] Guest Intro - Dr. David Edwards

Darin: Hey everybody, welcome to show this is Darin Olien, and this is The Darin Olien Show. This is my podcast. I am stoked to bring you one of my favorite people I have met in a long time. I have been surrounded by great people, and there's something about this guy. Dr. David Edwards is a scientist. an inventor, a writer, and he is one of those people that I feel is one of the smartest people on the planet, and he's integrated it in his heart. He is an aerosol physicist, a professor at Harvard bioengineering, worked with MIT in Applied Science. This guy has invented one of the coolest things I have seen a long time and I use it. It's a new way of hygiene for the lungs, very easy, very effective, we dive into it. In this episode, we get into the incredible understanding of hydration, how it affects the upper respiratory system, and open up and allows more oxygen in, incredible, simple, incredible science. He has invented many things, has many startups. This product called FEND. It's the 2020 Time Magazine best invention of the year. It's not expensive, it's super easy to use, and when you hear the science of what we get into around the nose, around breathing, around hydration, around the electrolytes that he has put in this product, it's like this is the best thing ever. So full disclosure, I am jumping in on many levels with this guy because I love what he's doing, I love him, and this is something that's so important for performance as a human on the planet, for performance and thriving in your life, in air quality, in so many different aspects. We get into the olfactory system, the nose, the ability for the nose to food select. He's got this other company called Incredible Foods, I think it is. He started a restaurant called senses. He's committed to organic regenerative food, which parallels his life. He has so many awards, but he is dedicated to a better life, and taking his knowledge and applying that into the world. FEND is my favorite obsession for my hydration, for my larynx. FEND is my favorite obsession right now because I'm writing this book on fatal conveniences, yes, I am. Months and months and hundreds of hours I've spent already on research, and naturally put me into the middle of understanding indoor air quality and ventilation and how important that is. Then that's where a further discussion with Dr. Edwards came into, and I now consider him one of my favorite people. That's just straight up. I know you're going to be fascinated, and I know you're going to be informed, and I know you're going to be touched by the information you're going to be hearing here. Please share it far and wide because this is simple. I don't want to say simple, stupid. It's simple, common sense, wow information. I'm happy and grateful to bring you Dr. David Edwards, an incredible human on his path to making you a better human, and you know what? That's my tribe, man. That's why I'm happy and grateful to be sharing him, his knowledge, his wisdom, and his contributions to humanity with you today. Enjoy this episode, my new good friend, Dr. David Edwards.

[00:04:22] Podcast Intro

Darin: You are listening to The Darin Olien Show. I am Darin, and it is my life's mission to find and share healthy and sustainable ways of living. In this podcast, I talk to inspiring people and professionals from around the world to uncover ways that we as humans can improve our lifestyles, strengthen our mindsets, and take better care of this beautiful planet

we call home. If you're looking for motivation to take the next steps towards a happier, healthier life, then you're in the right place, and I'm stoked that you're here. So let's do this. This is my show, The Darin Olien Show.

[00:05:06] First Part of the Interview

Darin: I look around and the more I've looked around, the more you look you realize there are some really bad systems in place. This system of just creating plastic on everything with everything, the package of the package. It gives very little choice.

[00:05:23] The problem with being dependent on non-local food

Dr. David: Exactly. If you think about how we ate sustainably and regeneratively forever, it was all local and we took it from the vine, if you will, or from the earth, and we consumed it within a relatively short period of time, relatively short distance. Because it was all happening locally, we sort of cared about where it came from. We're kind of responsible, really like you are becoming responsible for your plot of land. The convenience, if you will, of being able to eat an orange in Alaska, or feed a starving population in a desert environment has led to a situation where we're all really dependent upon a non-local consumptive completely non-regenerative food system. The challenge is, how do you go back to what was local and regenerative and still feed everyone. It's not quite as simple as retrieving kind of a lost paradise, but science now and technology, call it simple science and simple technology, and I know that this is something you think a lot about, is at a point where we can make it work, but it is changing behavior that works for a lot of people right now. And because it is food or the air we breathe, it takes--

Darin: It's labeled as food.

Dr. David: Exactly.

Darin: Well, I look at it like the most simplest poor systems we have is the amount of food waste that is happening right now every day of every second. We have enough food to feed 10 billion people today, and you literally see food waste. It's a big, big thing but then you also have from the angle of the nutrient density. Calorie for calorie, what are you getting with that to sustain life to maybe optimize life instead of a volume producing fast food that gives the sensation of the volume in your stomach shutting off the mechanisms of hunger, as opposed to eating nutrient-dense food that is kicking in the leptin receptors, and really kicking on that thing, oh, I'm satisfied, which is since we're kind of on this food thing.

Dr. David: At the end of the day, the problem and opportunity of food is one of the environment and us. So there's this kind of relationship we have with the environment, which is very chemical and is very sensorial in the end. I talk a lot about the sensory and disequilibrium that we have leading to the fact that how we eat, how we sleep, and how we breathe, the most fundamental non-cognitive processes that have obviously kept us alive and surviving are now hurting us. It's not a cognitive issue. Breathing and eating is not a cognitive issue, it's a completely emotive disequilibrium. At the end of the day, that's what we need to solve. One of the things that fascinate me with the air, which most of my work relates to that, there are two kinds of signals that we're getting into our bodies. You can think of it

that way. One is a signal that alerts our immune system, and one's a signal that alerts our olfactory system.

[00:08:49] Our sophisticated olfactory system

Dr. David: So, our olfactory system is so incredibly sophisticated. It's the only sensory nerve that goes straight to the brain is the olfactory nerve. It's now known, Darin, that olfactory receptor is the largest subclass of the human genome, olfactory receptors. The olfactory receptors are not just in the nose, they're in the blood, they're in the gut, they're on your skin, they're throughout the body. Over the last 15 years, it's been discovered that there's this crazy dialogue that's going on between your gut, your brain, and your nose, that is guiding you to eat what you eat, and actually sleep how you sleep and ultimately, it's fundamentally related to what you breathe. Now, what's not known so well is that the sophistication of your olfactory system is probably for the human being mostly develops that we know what to eat.

Darin: You know what, and that is a big thing that no one knows about. I knew friends of mine who are in the fringe of eating and they came to me 15 years ago and say, we're the only mammal that's not using our nose for food selection, unmanipulated because they know how to manipulate us. Let's get into that a little bit. So much fascination with this. I want to understand what you just said in terms of the olfactory kind of sensory everywhere. What does that mean?

Dr. David: Some basic facts here. You have five or more, but more or less five tastes, and sweet and sour and bitter and umami, and so forth. Yet, now the latest data indicate that we can probably perceive around a trillion flavors. How could that even be possible you have 200 or so olfactory receptors? When you perceive a scent, say, lemon, it's not like a color where you're sort of merging three basic colors. Scent is triggered by a consortial phenomenon of something probably typically between 6 and 10 actives, so scent molecules acting on 6 to 10 olfactory receptors produce a scent, typically. Very rarely do you have one molecule acting on one receptor that gives you a perception of some scent. Typically, many are combining. So if you worry about the math, we've got 200 something receptors, and you've got this matrix of all the different molecules that act on these olfactors. So, why would we have that sophisticated ability? Well, obviously, before there were FDA or food guidelines, we knew what to eat, we just knew what to eat, and we kind of craved the right thing at the right moment, more or less. Obviously, we wouldn't have gotten here had we not figured it out, and we didn't. It's not like people had lessons, we sensed it. There's a lot that's been known empirically. You mentioned that the food companies have learned how to hack our olfactory system and a lot is known about the olfactory just by empiricism. Since the Nobel Prize was won in 2004 for the basic understanding of the biology of olfaction, the science of olfaction has really advanced. Just a few fun facts, you know that when you smell chocolate, you'll eat more chocolate. So if you smell chocolate, you'll actually eat more calories are chocolate. Those tests have been done. If you smell steak, you'll then eat more steak. But if you smell chocolate before you eat steak, you eat less steaks. You can hack the olfactory bulb by giving it a hedonically interesting scent, but have an opposite kind of category. Now even more interestingly, if you're walking the street in Paris, you smell a croissant, and that makes you want to go in and we all know that. So the olfactory bulb is an endocrine organ, and this is our survival thing. You've smelled something that you can eat, and you want to eat, your olfactory bulb revs up your metabolism, so you eat as much of it

as you can, actually, and that was a survival thing. We all know how that works. What we've learned in clinical trial on chocolate, young women eat 50 grams of dark chocolate and their insulin goes up, their glucose goes up. Then there's this molecule, ghrelin, in the blood, which is a hunger protein, so it goes up. So they've eaten and they're still hungry because their ghrelin is still high. Two weeks later, they just smell the aroma of dark chocolate. Initially, their ghrelin goes up, they want to eat more. After five minutes, it actually goes down. There's actually a dose-response. They actually become satiated simply by smelling chocolate long enough. One of the things that we've all seen is that chefs typically don't eat in the kitchen. They don't eat until they get home because they're eating through their nose. What we're learning is that we can dose. What I'm fascinated in is the ability to flavor educate, to help guide people's sensory system to love the right thing, which we did in the natural world. We're no longer and exactly in that world, and not enough of us are in such a beautiful environment as you are in here. So how do we help people learn sensorily to eat the right thing? I think that's a sensory opportunity.

Darin: It's almost like we have to hack around the hack.

Dr. David: Exactly.

Darin: We have to get back to the original hack.

Dr. David: That's right.

Darin: How do we then train ourselves to not take that first initial hit walking by a Dunkin Donut as they're naturally pushing that out in the street on purpose?

Dr. David: Well, I have a company now that has a product called FEND, and it's a consequence of 20 years of work, and it is coming at the end of many years of exploration with people around the air they breathe and how can we find a right that is intuitive, that is desired, and that's needed at a mass enough level so that we can have a dialogue, a sensory dialogue with people. The pandemic has created a circumstance where people are really conscious of the air they breathe, and of the risks in the air they breathe and so FEND is saltwater, and our bodies are composed of salt and water. Salt is really important in our bodies because it actually helps hydrate. It helps pull the water where it needs to go. So FEND is a right that we're bringing to people to help clean the air they breathe. What I'm really, really interested in as we build this both from a for-profit and a non-profit perspective, habit, is our ability then to bring into this daily right scent molecules that can help people eat the right thing and sleep.

Darin: Wow. Now you just cracked. It's brilliant that we just started the conversation that way because before you're done with the sentence, I was like, shit, because I've done a lot of stuff around hydrosols, cacao, all of that stuff, and it's unbelievable, food selection experiments I did 20 years ago. What you're saying, and we're going to get into the benefits of pure saltwater breathing through the nose, you're creating an onramp of olfactory health, hydration, respiration, as well as primarily or potentially one of the deepest sensory reptilian senses we have in fulfillment of taking from breath to essentially air eating of contentment. I can't get my head around it.

[00:16:34] How scent works with the brain

Dr. David: The three areas where the clinical data is strongest in the ability of scent to really impact our bodies is one is metabolism, and I've talked a little bit. one is in anxiolytics or anxiety.

Darin: Anxiolytics.

Dr. David: There's an example, linalool, it is a terpene molecule that's in lots of things, but it's in many essential oils. It's a primary component of spike lavender. The biology now of linalool has been studied carefully, and it acts on the olfactory receptor to deliver a kind of a valium signal to the brain. The drugs that we generally develop are hammers, and they could miss the nail. There's a big risk-benefit balance, which is typically pretty just beyond placebo, meaning in the direction of benefit, typically for drugs, scent is a much lighter signal, so it's not valium, but it does have that pathway, and it can lead to relaxation, and sleep and repressed anxiety. Its effectiveness, as you would know really well, is part of a holistic way of living. It's not that set alone, it's going to make you sleep well, eat well, and breathe well, but it is a critical part of our sensory adaptation for sure. So the three areas are anxiety, metabolism, and addiction. When we talk about food, there's a big craving, the addiction, a piece of that and it's the addiction being something we want to avoid. Scent turns out to be a really effective way of eliminating addiction. Just as a really quick example of that, that a lot of work has been done on smoking. If you are a smoker, and this was published in science 10 or so years ago, and you are exposed to the smell of smoke during the pre REM phase of sleep, not the REM phase, mixed with a scatological odor, something that is really negative, you'll wake up the next day and for two weeks, you'll have a reduced desire to smoke. Your brain, you process your memory at night and somebody should know that the signal of scent, it goes through two synapses to the regular brain and into the region of the hippocampus. Basically, scent his memory. Your brain organizes memory at night, and it just happens to be this pre-REM phase of sleep, you can teach the brain things. It's just really phenomenal. What I'm really interested in is how do you go from this basic science, which is so fundamental to how we live better on the planet to 8 billion people because by the next 25 years it's just really critical to survival.

Darin: Well, there's so much there. The sleep part of it, the smoke thing, you're basically layering in a negative smell on top of this associated smoke smell for the brain to rewire its need or desire. Imagine the implications of being able to do that. I mean, my brain just went to rewiring traumatic things, emotional. I mean, you smell rose, and you associate things like well, the smell of that cologne my father had when he beat me. Can you imagine then the layers, pun intended, I guess, of you're hacking a very, very primal, if not the most primal.

Dr. David: One of the really well-known studies of epigenetics basically was done on mice several years ago, where, as you know, memories are typically associated or they're always associated with some significant emotional experience that is correlated with something that's happened to you, so it's wired in your brain through that. Since scent has this direct path to the brain and is itself a kind of memory, once it arrives in the brain, scent is one of the most powerful triggers of memory. There's a study that was done with mice where the mice are exposed to have traumatic circumstances. This is associated with a certain scent. So of course, those mice whenever they smell that scent later will avoid getting near that

circumstance. The next generation does too, and the next generation does, too. There's actually a genetic change that occurs. The potential of scent to both help reshape our brain and the guidance is really profound.

Darin: I remember doing some research on dehydrated states when if you grew up dehydrated, the body doesn't know if you're just not drinking water. It's like we've got to shift to adapt to the little water that's being consumed. I do remember the actual study title, but I remember that there was a component similar to that where it's like, you're your next child is giving the same programming of the dehydrated state that you're coming out of that or that you've lived in. So I'm wondering that that's a very similar kind of. It seems to me suggesting what you're saying is that that's important information because it's basically saying, this is the environment of mom and dad, and we have to at least give you something so that your body will already be adapting.

[00:22:00] Understanding the lungs and hydration

Dr. David: For sure. Water is a great segue, and we all recognize the importance of we are mostly water. So we've been talking about breathing and the olfactory system, and what people may not know is that the largest surface we have exposed to the outside environment, it is beyond our carina, our lungs. So we have a tennis court with a surface area that's facing the outside world and it's wet.

Darin: To make it super clear, the outside world, the lungs are receiving directly this air and our lungs are so big, the surface area could fill a tennis court.

Dr. David: It's the tennis court. A single tennis court, that's what you've got and it's wet. If it were not kept wet, in other words, if the air you breathe, which is never 100% humid, when you breathe in that air, it needs to get wet. It needs to get wet by the time it gets beyond your windpipe and it needs to be perfectly wet. Because if it weren't, you'd dry out. One of the most important evolutionary developments of humanity is their nose and the nose growing out. There's this really well-known work done years and years ago showing that the reason why noses are long and thin in cold environments has to do with just humidifying the air. This is a lot and can be said about the anatomy of the nose, so you have to humidity it. What happens is that the tissue of your body that is most typically dehydrated, even when you're hydrated is the tissue between your nose and your carina. It's that tissue that's constantly giving up water. There as a consequence, you breathe out as much water as you perspire in a typical day. You're breathing out a half-liter of water a day and it's all coming from this small--

Darin: Tracheal area from your nose to the base of your neck.

Dr. David: It's what we think of as a windpipe basically. That is such a critical and underappreciated anatomical feature and that it is responsible both for-- I talked about it at carwash. It's kind of a carwash, if you think of the air as a car, it's washed and cleaned as the air goes through that windpipe so that by the time it gets into our lungs, it's as clean and wet as it can possibly be. That surface of the windpipe is constantly giving up water and taking in particles we breathe in about 100 million to 10 billion particles a day. Most of them fog that area. The hydration you point out is critical. It's critical for olfaction. It's critical for any

chemical process in our body because it captains through water. But particularly when it comes to the air we breathe when we dehydrate is we do very frequently. Just today, both the environments drying out. We're becoming obese and the larger our body mass the more dehydrated we become. We're living longer as we get age, as you mentioned aside. In air-conditioned or in cold environments, every time we take a plane, all these circumstances are putting us in really dry air environment or just drying out our bodies. That makes this windpipe which is supposed to clean and moisten the air we breathe stressed, increases inflammation, and then the particles we breathe, don't get out. So they end up getting deep into our lungs or going back.

Darin: Meaning the particles that need to be out or being cleaned or detoxification system right away as we're breathing, all of the billions of particles are taken in because they aren't as clean as they used to be, that's for sure. Then what's the accumulation look like? Just answering that part of it, what happens when you can't kind of get rid of it, you're chronically dehydrated, which by the way, most people are run around always dehydrated.

Dr. David: Well, acute and chronic respiratory illness increases. The lung cancer wasn't a thing two centuries ago. COPD, chronic respiratory disease, all mostly evolved in the 19th century as industrialization began to expose us to a lot of dirty air and fine particles, particles that are smaller than 2.5. microns are the ones that get into your lungs and go deep in your lungs and can go deep. If you're breathing in particles that are not soluble, so allergens, carcinogens, pathogens, our immune system is for sure, built to clean it by processes I'm describing and other processes. We were in caves burning fires a long time ago, and we have been faced with dirty air in our lungs are actually really good at cleaning and defending themselves. They just need to be wet. This is the thing that's not said enough is yes, it's dirty air. Nine out of 10 people right now are breathing excessively dirty air. What's not said enough is that we're breathing way to dry of air. So we have emerged, mostly humanity emerged in moist environments, salty environments, and pretty clean air environments. In that environment, our bodies are pretty good for the occasional fire in the cave. But now in these circumstances, this is massive right now. Respiratory disease is the number one killer in the developing world and it's soon becoming the number one killer in the whole world.

Darin: And you believe that the respiratory disease and at the core of it is dehydrated?

Dr. David: I think so, yeah. Lots have been learned over the last 60 years about the air we breathe. Frankly, the last two years because of the resources that have been made available to really studying some of these fundamental problems, we've just learned a lot. As people have probably heard, if we just take the COVID 19 pandemic, those who've been most susceptible are the elderly, those who are with a higher BMI, and those who are breathing dirty air. If you look at all of those circumstances and what you find is that the people with the highest propensity for illness are the people who are driest in a dehydrated area. We can talk more about it. We've done a lot of study of that. The dehydration is critical. One of the things that many scientists, Akiko Iwasaki is a Yale University immunologist, and she has been a big proponent from the beginning of the pandemic that we shouldn't be breathing 40% to 60% relative humidity air is a simple way to kind of protect ourselves during the pendency. There's a lot of data showing that dry air aggravates all of the respiratory allergies, cough, all these things. What FEND has made possible is the humidification of your upper airways in five seconds. Even if you are dehydrated, even if you're in a

non-humid environment, you can keep your airways. This right that can even though we are in the world we are in to keep your air clean today is as simple as salt and water.

[00:28:48] Bite Toothpaste Ad

Darin: Did you know every single time you brush your teeth, you swallow between 5% to 7% of your toothpaste. That's an entire blob of toothpaste, every seven days. Now that probably doesn't sound like much of a problem on the surface, but most commercial toothpastes are filled with harsh chemicals, artificial flavors, and preservatives and they don't list many of them on the product. This is not the kind of stuff you want to be putting in your mouth, let alone swallowing it. If you listen to my fatal conveniences, you already know this. But there are brands and companies that are leading the way in providing us with safer alternatives to these common freaking problems. My go-to alternative to toothpaste now is Bite Toothpaste. Why do they call it Bite? Well, they are dry toothpaste tablets. That's right. You just put them in your mouth, start chewing them, boom, they're fine. You have everything you need, and you start brushing your teeth. They're made with clean ingredients that are not only cruelty-free, but also sulfate-free, palm oil-free, and glycerin-free. They're not messing around and they're so easy to use. Literally no waste, no harmful ingredients. Here's the other great thing. They come in refillable glass jars and your refills come in compostable pouches. How cool is that? I wish everyone would follow Bite's commitment. Yes, Bite's committed to creating waste-free products. That's one of my favorite things about them, selling everything from toothpaste, and clean whitening gels, and deodorant. So now you can completely swipe out the contents of all this other toxic stuff, and transform your bathroom sink into plastic-free alternatives that are carefully created and safe for you. I've been using the Bite Toothpaste tabs, and I've fallen in love with them. I love the crunching of it. I looked at the container today, it's the same container I've got six months ago. I love it. No waste. And the deodorant has been amazing for me, and it comes in this little aluminum case. Fantastic. State of the art, again, no waste. If you are ready to support this incredible brand and get safe, effective products, they're offering you 20% off your first order of anything. Go to trybite.com/darin, or just use the code, DARIN, at the checkout that is trybite.com/darin.

[00:31:20] Second Part of the Interview

Darin: For everyone going, what is this FEND thing and how can it be that simple. Essentially you're saying, an aerosolize salt and water spray is FEND. Let's just nerd out on that. Let's get to how the hell this happened? It's a simple stupid thing when you start to realize. It's a very complex situation.

[00:31:40] What is FEND and how does it work?

Dr. David: I think that science often guides you to the simple, not always, but definitely in this case. So, what is FEND? FEND is a salt solution that is misted in droplets that have a very particular size and that's part of the secret here, not secret, but part of the discovery that these droplets need to be around 10 microns in size. Typically, when you deliver sprays to your nose, they're large droplets, much larger. most of the work that's looked at, salt in the lungs has delivered droplets that are much smaller. They get into your whole respiratory system. The narrow range of 10 microns was a discovery, and I can talk about how we

figured that out. The second thing is that it's not any salt. Your body has four basic salts that are in the ocean and in us, and one is sodium chloride, table salt, and one is potassium chloride, and they're what we call monovalent salts. They have a single charge, positive and negative ions. Then we have calcium chloride and magnesium chloride, and they're diving with salts and so they have two charges, calcium and magnesium. Those salts that are in the ocean and in us, so why is that? Well, it happens that wherever you are, for sure here, but wherever you are on the earth, you're breathing in air with sea salt. That's because a lot of the planet is covered by sea and sea spray put salt in the air, and that goes up into the stratosphere and goes around the earth. So wherever you are, you've got some salt coming out of the air. Since we merged next to the ocean, we had this much more intimate dialogue with the salt in the air. That's why we have salt in our lungs. What we found is that you need to have a composition that has a high level of either calcium or magnesium chloride. That's what's unique about it. I'll tell you how it works. So these are droplets of calcium chloride and sodium chloride, natural to your body, and about the salinity of the ocean and that's important.

Darin: Not surprised.

Dr. David: When I put a droplet of FEND when I breathe it into my nose, so this is not an object that you stick in your nose, it's an object that you kind of put in front of you and you spray it.

Darin: It's a mist.

Dr. David: It's kind of a wet dog nose sort of experience. This droplet, you breathe through your nose, it lands on your nose, and then your windpipe, your larynx, I'll talk more about, and then right after the larynx is this trachea, and so that's where it lands. Because it's has a higher salt in our body, when it lands and it pulls water, it not only does it drop water onto our airways, but it pulls more water out of the cells that are lining the airways. It gives this extra kick of water. Then it turns out the calcium or magnesium acts on-- we have in our bodies, something called lung surfactant, and it's throughout our airways. Lung surfactant is really critical on the function of our lungs, really. It turns out that lung surfactant, when it's really concentrated on the surface of our airway lining fluid, it leads to our airway lining fluid breaking up in making these little droplets that go in the air. That is as bad because once you get droplets forming in your upper airways, it carries whatever fell out of the air into the air, and it goes deep in your lungs and can infect you. So it's a breakdown of the clearance system. Calcium, magnesium, they kind of stick onto these surfactants and make them happy out of the surface. They pull them out of the surface, basically and that helps and it lasts for a long time. If, Darrin, I would take you from this environment is probably pretty human, and walk you into an air-conditioned room, if I were to measure the number of droplets coming out of your airway formed by this process I just described, let's say it'd be 10 particles per liter there. I bring you into an air-conditioned environment, it might be 100. In about 30 minutes, and suddenly you're breathing out a lot and so you're actually breaking in and what's happened is that your airways dry out that quickly and when it dries out, it increases the concentration of surfactant on the surface and you begin to shed. We've been studying a lot for the last couple of years, these respiratory droplets as a means of measuring airway hydration, basically. What we found is that if a typical group of 100 people, most people are breathing out less than 100 particles per liter, and some 20% of them are

breathing out well over 1000 and it's kind of a super spreader distribution of droplets. We did a study, I've done a few studies in India, in Bangalore where the air is really, really dirty. There, the superspreaders are breathing out five times as much as anybody else. Basically, when you breathe in really dirty air, it acts like surfactant so that those little particles stick on the surface and they then lead to really dirty airways. By the way, we did a study that we have it published in LA during the wildfires, and we found the same thing.

Darin: So there's a couple of things going on, more than a couple, but just for my understanding. So you're getting dehydrated, this surfactant is building, you're shedding more of that concentration of unwanted things. It can't get out of your body because of the dehydration. And on top of it, I am sure that the body is dehydrated, is it almost dehydrating at a faster rate at that point? So you're almost shedding more and more.

Dr. David: This tissue of our body dries out faster than any other tissue does because it can lose water on both sides, both to the air and to the body. The discovery, last spring, we were looking at this respiratory droplet generation and we were in a study in Bangalore, and the delta wave of the pandemic came through, it was a really horrible situation. The woman who leads Community Health actually in Bangalore, she has a million people, slum residents under her jurisdiction, incredible woman. She decided she was just managing death and dying, and she decided that she would start a treatment study, random control treatment study, which was heroic to even think of doing that. All of the patients who came in detected positive who volunteers, a control group that just got a nasal saline three times a day for three days or a treatment group that got FEND three times a day for three days. What happened was that in the COVID-19, in the FEND group, all the symptoms went away in all of the group and in the control group and inflammation was lower, and so forth. But what was really surprising, all of it was surprising, actually, what was shocking was that the oxygen saturation went up. In other words, normally, when your oxygen falls in COVID-19, the lower airways are ceasing, meaning they kind of broken up and they're not absorbing oxygen well. FEND only treats the upper air. So was what was happening? It led to nine months of work, which is partly why I'm here in LA right now. We all got Apple watches, our team. We began to measure our own oxygen and what was happening when we FEND it. What we found is that two typical circumstances where your oxygen saturation falls is when we exercise and one is at night. So many of us, we are obligate nose breathers at night, and often your nose gets plugged, then oxygen falls. If you FEND, in those circumstances your oxygen goes up. Then that led me to really look into the phonation literature. All of which is to say that we discovered that when you're drying out, there's the breakdown of clearance as you're talking about. It's associated with inflammation a lot, and there's a reduction in your larynx. People may not know that your larynx obviously is where your vocal cords are, your vocal folds. That's how you speak. It's this very narrow passage from your nose and mouth to your windpipe. It opens when you inhale and it closes when you exhale. It's meant to kind of be a gatekeeper. Obviously, when you speak this little larynx begins to vibrate, like 100 times a second. That's these vocal folds right inside the larynx. Anyway, you can imagine that needs to be wet. If it's not wet, it doesn't open as much. Singers know they have to hydrate. If you see a singer singing every after every song, he or she's drinking water and the reason is they're trying to keep that hydrated, and it affects the opening up of the glottis. It turns out that when we dry out, our bodies are getting less oxygen than they should.

Darin: You said that to me when I first met you. It blew my mind.

Dr. David: That has led us to become really interested in high-performance circumstances. Because that's a case where any athlete, no matter how well hydrated, once they begin to exercise, their breathing more air, their body's losing water. The first tissue that dehydrates is their upper airways, and it both affects their oxygen. Then when they finish, what we found, I don't know if I've mentioned this, but if you were to go, I mentioned let's say you breathe out 10 droplets per liter of air, and you go for a run and I measure your droplets, it might be a thousand. It's basically when you're perspiring and your body, your lungs are perspiring in a certain way. It turns out that the number one cause for reporting to a sports clinic, other than injury is upper respiratory illness. It's 30% to 65% of all cases. We've gotten involved with Alex Guerrero, who works with Tom Brady, and the TV 12, The Universe, and just been learning about what athletes go through, and in the professional football context, there are major issues of sleep and sleep apnea and congestion. These upper respiratory illness issues are highlighted there. So we're trying to help athletes and also use these circumstances to understand better how all of us here and in Bangalore, all of us can breathe air more effectively into our bodies and stay healthy.

Darin: That monologue had a lot to it but incredible. Let's step back to Bangalore because what you said is so unbelievably powerful and that is, you hydrate this area, and those people in the study, they got better, just the hydration. Now you're talking about the most fundamental level. I'm thinking about, and then what you said about the oxygen so yes, of course, it's hydrating, and we're starting to learn that but it's also opening up oxygen, high oxygen environment, it thwarts off disease, etc. I don't want to be flippant here, but it's like, help people breathe saline, saltwater in their body, and COVID got better.

Dr. David: That paper's in review right now and we're preparing another study in Bangalore as we speak. I want to come back to what we said earlier, talking about olfaction and the valium of versus lavender.

[00:43:05] Saltwater and hydration

Dr. David: By delivering saltwater, droplet size, right composition to the upper airways, we help the immune system function as it's supposed, the respiratory immune system, and the good news is that our bodies are kind of made for this battle. It's not a drug. So it's not a silver bullet, it's not the hammer. These are statistically significant effects, and they can particularly in the case of oxygen be dramatic and acute, but it's really helping the body do what it is designed to do.

Darin: It's almost like when you start to understand as you're describing the mechanisms of this olfactory, ancient endocrine changing reptilian producing memory invoking, etc, etc. Then you present this sexy little pump spray, and you're like, no, just pump it and breathe. It's kind of like, what? And you use this kind of blunt force as like these other medications and stuff like that where there are places for those things. But when you start to understand the subtleties and living into a subtlety, because as you know if small things added up over time can create some horrible results but it also can create incredibly. I hope people are starting to understand the unbelievable miracle that you're describing in the interaction between the nose and the scent, and the memory and the immune system, and the hydration levels. My point that I'm getting to is you look at this little thing, and this little thing

that is so easily used, it's literally a bridge of basics that we have to have almost. It's like I live next to the ocean, and then you probably don't need it.

Dr. David: We published a paper last year showing the benefits of living near the sea, particularly actually, on this coast, when you've got the wind blowing typically off the sea. If you were right on the edge of the sea within 500 yards if you will, and you have your windows open at night, the amount of sea salt that you're exposed to in your upper airways is similar to a single administration of FEND in 24 hours. Basically, in a completely immersed in nature breathing air that's kind of blowing off the sea, you're delivering water and salt into your airways naturally. In real circumstances, we are not Robinson Crusoe on the beach. So you do today, you want to be practicing every hydration. I want to say that even listening to you and seeing what you do in your own personal life, I think that there's a real movement right now on the planet of people who are mindfully paying attention and do the right thing. We wouldn't have survived had we not been mindfully aware of the risks of not surviving, really. In my case, it's led to this really simple and potentially very impactful idea. But one thing that's been happening in science if people take a step back and look, a lot of us are being brought to understand. Nature did it really well. Our circumstances are different right now. Whatever we do, we need to understand how nature did it first, which brings us full circle back to the food system. It's impossible to imagine a sustainable food system that doesn't have the simplicity of the apple tree, and the basic local kind of sustenance of life that we manage for literally millions of years. That's got to be where we're coming back to, and it will not be the apple tree exactly. But science, I think, is more often than not, will be pointing towards these kinds of simple solutions. I think, just if I could say, we should be cautious of sophistication for sophistication's sake. I think that there's a lot of risk in complexity.

Darin: Let's unpack that just a little bit more because that for me rings true as a fatal convenience. We get so comfortable if this is what you're saying. We get so comfortable in this stuff and yet, we've hacked our way completely away from her as nature. Then we find ourselves like, hey, expose yourself to cold, open the windows, put your feet on the ground, get out in the sun, it's pretty good for you. It's like all of these things it's just kind of funny that we're realizing the error of our ways in regeneration, all about regeneration, Paul Hawkins' work. It's all about if you divorce nature, almost in any way, there's just going to be a list of consequences that then will require babysitting of other consequences, and onward and onward. That's why this thing, it's so basic, it's like this weird paradigm that we have as humans, pretty good, could be a little better. Unless we kind of hit with "pandemic" or something that is dislodged us from our comfort or complacency of our life.

Dr. David: Yeah, just come back for a second to this sensory equilibrium. I think that this satisfaction with what is not satisfactory, I think, is a sensory equilibrium that we established, which is unhealthy. I think that the podcast like yours, and books and programs that educate and are critical, at the same time, there's a sensory conversation that we need to improve. I think we're all saying the same things. We're also working in India and really interested in the people bringing the worst air and they can do nothing about it, and typically not in any near a pharmacy or anything like that. How do you help everybody? It's got to be something that is intuitive, and is a sensory improvement in their lives so that they want it, and they crave it, and so that's the conversation.

Darin: Just to mention, you have this nonprofit extension of FEND where you're really trying to go low-income children. I mean, just throw a dart, everyone needs it. How can we scale that which is if you go to anyone who hasn't been to India, you go to India, and it's an onslaught. The first thing you realize it's an olfactory onslaught. India is its own just complete scenario, and that's the first thing. I mean, I could go back and then the smell coming off of the airplane. I'm in New Delhi going, what the hell because you have no association with it other than that's the experience. It is sad because how many billions of people just thinking about that continent? How many billions of people, they can't change their situation?

Dr. David: I will just say, we've been, and when you think about how can we all sort of participate in breathing better everywhere? Like you said, you throw the dart, where do you begin? We've felt that we should begin with our children because they'll be breathing the dirtiest air the longest on the planet. There is also learning of a new behavior and it's led us to focus on education. If you think about where could these new rights of hygiene develop all over the world anywhere, it's in learning environments where you've got an infrastructure. It may be a house, but you've got an opportunity where kids are needed to learn new things. So the non-profit is called Next Breath, and it's led by a woman who led the Explorers Club of all things for many years and is very, very deeply involved in education around the world, Lorie Karnath is her name. So what the non-profit is focused on is education and building this environment that can go anywhere in the world to help kids, not only to breathe better but sustain life on the planet. What their observation is, is that it like what we've been saying all along. Breathing saltwater is really helpful. It's one thing of many things we need to be doing and learning about. This is holistic, Darin, only in the universe conversation that needs to be happening with our children wherever they are. In that environment, bringing FEND and FEND that doesn't look like this, but would look much more like a fountain, basically, that's manual, and really easily repaired and all of that. We are starting a trial in India with children in a school in Bangalore, and not only looking at the prophylactic benefit of two months of FENDing every day for control but also looking at what does that education environment looks like. Because if you think about it, 10 years from now, when hopefully, as many of the world, this hydrogen-air as possible, in those environments where you don't have a doctor, how do you know that adoption is happening and compliance is happening. So the school environment becomes just a really exciting environment, not only for FEND kind of right, but I think many of the kinds of things that you're also doing in your building up a sustainable life here in Malibu.

Darin: It's so important. There are so many kinds of questions that come out of that too, because I know that just on a deeper level, being dehydrated lowers cognitive performance, and everything else. There's a whole thing around that and children and obviously, now with this whole other layer of immune health, and more better, however, you want to say it, dependability is certainly valuable, and like we said, the children are the key. Just to kind of bring it all the way back and people listening to this, they've gone holy cow, I had no idea about the power of this olfactory, about respiration, about hydration, about the immune system, about all of these things. If they're saying, now I want to do this, I want to get FEND, what's the top benefits that people can expect straightaway?

Dr. David: Before hammering that nail, let me just say that if anyone purchases FEND, and you can buy the product at hellofend.com, you'll receive a little note from me and giving a guarantee that if after 21 days, you don't feel the benefits of breathing better then we'll give

your money back. As part of that guarantee, there's a challenge to take part in this 21-Day Challenge, which is nothing more than receiving a text message a day with a little video that's about a minute long, one to two minutes long each day. I made a series of 21 short videos to help people understand firstly, how do your airways work? Why they need help? How do you know that it's working? How can you tell? How do you measure it? How can you measure it in your own life? Then the last week is about the benefits and the data. Simply, there's a group about 80 million Americans who have respiratory issues, so if you're in that group, you know what it is to not breathe well, and it may be congestion, allergies. It may be asthma, it may be a COPD and just being able to breathe at all. It could be a lung infection, flu season, or COVID-19, but you have risk that you're sensitive to. In your cases, the benefits, the first thing that you'll notice is that the congestion clears up. You're less congested typically finding them you would otherwise be. We have a lot of people who bought the product who say, I don't use my allergies meds anymore, I have a really significant change in my breathing and my congestion. Why is that? Well, what happens is when your airways dry out, they tend to produce mucus. It's a way to defend themselves, and that leads to congestion. So often, when we go out in a cold, dry, we suddenly get a runny nose, and we get a kind of congestion and that's becoming because of that. It's also why athletes, and that's another group of people who have a lot of respiratory issues and are sensitive to breathing, these athletes. So if you're in one of those groups, asthma, particularly if you have exercise-induced asthma, which is a laryngeal typically that you'll feel the benefit because we've been through the pandemic, and a lot of people I would say most people bought the product during the pandemic bought it kind of as an invisible mask. So we have a lot of testimonials related to not getting COVID or having not having symptoms. By the way, the study that I mentioned that looked at the coastal effect, we showed that if you look at the pandemic for the first up to the when the vaccine really started to be used, this was a study done with a well-known epidemiologist at Harvard School of Public Health. If you look at the incidence of COVID-19 and the death rate of COVID-19, all of the factors, age and economic status and voting pattern, and so forth, are subtracted out. The risk of getting COVID-19, or dying of COVID is 25% to 3% less if you live on the Pacific coast in a coastal county, right next to the Pacific coast, or on the Texas panhandle because that's another place where the wind blows off the sea. We have a lot of that kind of testimonial. If you have sleep issues, which are congestion related, so sleep apnea and things like that, we FEND in the morning, FEND in the afternoon, and FEND just before you go to bed. We have a lot of people talking about snoring less but particularly in the first several hours after you FEND, as we go forward and we will have other FEND methods for giving treatment during the night. If you're an athlete, there's a real benefit in performance in terms of oxygenation. Anybody as you mentioned, Darin, anybody who has that oxygen issue as we get older, and again, all these issues with obesity and so forth often are both combined with a dehydration problem and an oxygenation problem. So FEND is a means of keeping you oxygenated.

Darin: What was that stat? Was it a 30% increase of opening the larynx after you FEND?

Dr. David: When you breathe, the area, the aperture of your larynx, the inside of the larynx called the glottis, there's like a triangle basically, and that expands by 30% and typically in a normal hydrated larynx. When you're dehydrated, it is less than that. We're in a typical case, the oxygenation like an athlete, or something like you, honestly, your oxygen, I bet when you exercise goes from maybe 99 to 97, or something like that, but it's not a huge drop, and so

hydration helps. By the way, it's been shown also drinking water helps so it's really is a hydration issue. We can bring you up back up to 99. But for somebody who we've had people who are not in good shape, and whose oxygen can fall as far as into the below 90, which is really severe, and in their FEND seems to have a really significant impact. This issue of the glottis really depends upon how dehydrated you are.

Darin: So something very fast and that's the cool thing. You do it and it operates very fast. It opens really quickly once it gets that aerosolized particles and hydration. That's a beautiful thing. It's happening right away.

Dr. David: That's right. By the way, one of the places where we're kind of finding that we can really study that effect in real-time is voice. You can hear a dehydrated larynx. It shows up and it's funny basically. We're working now with phonation experts and beginning studies. So today, Mickey Guyton is singing the national anthem at the Super Bowl, and Mickey has been using FEND now for the last month. If people go to our website, they'll see the quote from Mickey that she used to have to chug water, so she just actually FENDs now. What we've been studying now in singers, and this is just studies and are still not near publication but we're just exploring right now is that after you FEND you see an immediate improvement in the quality of the voice, and it seems, Darin, that that hydration is like one to two-hour timeframe. So you pull water in and then it gets sucked back out. Even though FEND reduces these droplets for six hours because of this calcium effect, there's this pretty quick hydration change, which makes it really interesting to me that you tend to FEND more frequently.

Darin: Well, I feel like I could talk to you for the rest of the day.

Dr. David: Well, this is the beginning of life conversations. Thank you so much.

Darin: Thank you, this has just been enlightening and beautiful, and can't wait for people to know more about this basic powerful understanding of themselves. Thank you for putting it in a convenient way that people can just take in and improve their lives. In all the work that you've done, to all the work that you've yet to do, it's great to get to know you, both learning from you, but also who you are and what you are in the heart that clearly, to me is a heart forward passion, so thank you.

Dr. David: Lucky to meet you. Thank you.

Darin: Thanks, brother.

[01:00:26] Podcast Outro

Darin: Thanks for tuning in to this episode of The Darin Olien Show. I hope you took something valuable away from this conversation that will help improve your life in some way. If you'd like to learn more about my incredible guests, you can find all of their information in the show notes on my website. If you enjoyed this episode, or even you didn't like it, please rate this podcast. The team and I value your feedback so we can continue to give you the most value possible. We want you to get the most out of every podcast. So please rate, subscribe, share anything you feel called to do. I truly appreciate it, and I love and value your support. So, thank you, and I'll meet you in the next episode.