The Out of Site Dust Mite With Carl Grimes

CG
Carl Grimes
0:00
When the labs do dust characterization of house dust, skin cells are by far the predominant particle in house dust—and that's what mites eat.
KS
Kendra Seymour
0:16
Hello everyone, and welcome back to another Change the Foundation interview. My name is Kendra Seymour, and I'm joined today by our repeat guest, Carl Grimes. Thanks Carl so much for being here.
CG
Carl Grimes
0:26
You're very welcome.
KS
Kendra Seymour
0:28
So, some of you may recognize Carl's been with us before, and in our last conversation he gave us some really insightful background on humidity, and what we can do to prevent it, and common causes and situations. And he and I got to talking after we recorded an interview, and he said, “Wow! You know what would make a great presentation is I've got this really great talk I gave on dust mites, and it's going to change the way you look at your home—and maybe even gross you out a little bit.” So, I'm giving you fair warning now, if you are in the middle of eating your lunch, or dinner, or whatever, you may want to wait and come back and watch this one, because I know it's going to be eye opening in a good way.
CG
Carl Grimes
1:13
The first question is, you know, what are house dust mites? Now, what…what do…What's your understanding of house dust mites? I'm going to put you on the spot.
KS
Kendra Seymour
1:26
Well, I know that they can cause allergies. I feel like I know that, because, admittedly, I don't know a lot about it. I know that they're probably around my mattress and maybe my pillow. And I know it makes my skin crawl when I think about them, so I am super excited for you

to maybe either hopefully make me feel better and have a better understanding of what this is, and maybe give me some solutions, because it's not something I think about too much.

CG

Carl Grimes

1:57

Yeah, and that's the typical answer. You heard about it, and I heard about it a lot more 10-15 years ago. But so, let's just kind of start with what are mites? So, there's about 40…48,000 species of mites that have been described, and as many as a million species that are thought to be undescribed. In other words, there's just a lot of them. So, in one sense, it's like mold. There's millions of species of mold, and we're concerned with a couple of 100 of them related to damp indoor environments. And some of our testing is limited to only 36. Okay, so what do we need to focus on? Which of all these different kinds of mites (that's on the picture here) right now do we need to focus on? Fortunately, for the house, dust mites. Out of all the other mites, and dust mites, and every other cabinet mites and other kinds, there's just two. Two species of dust mite that we need to focus on for house dust mites. And again, unlike mold, which there's hundreds of them, if not 1000s that can be involved in the indoor environment. So, there's a North American house dust mite, which is the Dermatophagoides farina. Say that three times real fast. And then there's the European house dust mite, which is the Dermatophagoides pteronyssinus dust mite. They look pretty much alike, but there's some very specific differences. They are different species, which means that they cannot interbreed, okay, so they are distinct. They're similar to ticks and fleas, but the difference is that fleas are insects with six legs, okay, and the mites and ticks are arachnids, meaning that the adults have eight legs…but the larva only has six legs…so there's a little bit of complexity in there. We wont get into it. And it was just until recently, that the DNA analysis was able to show that mites and ticks are not from a different lineage. In other words, mites and ticks are different, but they had a common ancestor.

The main difference between mites and ticks is that mites are tiny, like point four to three millimeters, not three inches, but three millimeters. That's a little…very small—and usually too small to see. Okay, ticks are larger, like about three to 29 or 30 millimeters, which you can usually see those. And those are the ones associated with all the different kinds of fever…Rocky Mountain fever, and all the other kind of tick related things. And, of course, fleas, you know, that's pretty much with pets and so forth. All blood suckers. Ticks are associated with a number of diseases, but very few by mites. Okay, so we aren't concerned so much by disease, with any of the mites. However, there's a couple (this is where this is the fun part.) Okay, it may gross you out at the end. So, the Demodex folliculorum and the Demodex brevis, these are face mites. These are not house dust mites. These are dust mites on your face, okay. But then the reason I bring them in, just not so I can have the fun of grossing you out, but there's some key points to appreciate mites in general, and then house dust mites specifically on how they're different. Okay, so according to Michelle Trautwein, she's an epidemiologist at California Academy of Sciences in San Francisco, and I'm quoting her, so you can't blame me if this repulses you. And the picture isn't exactly appetizing up there. It's not a little friendly thing.

KS

Kendra Seymour

6:29

No, but see, this is where we warned people before we started. That if you're eating you know probably best to wait.

CG

Carl Grimes

6:34

Yeah, that was a good…yes, that was a good warning. So, face mites spend their days face down inside our hair follicles nestled up (I like the words nestled up) against the hair shaft where we can't see them. Then they come out at night to eat and to mate. Everybody tested has them. Okay, there's no exception so far in the hair, eyebrows, pubic hair, even the fuzzy vellus hair—that's the light-colored hair like on your arms and legs, that you don't really see, but the hair is there. Any or all of those can have, and some of a lot of them will have these face mites. Now, because their abdomen enlarges until ruptures, it was previously thought that they didn't have an anus. Therefore, fecal material accumulated until the body forcefully exploded.

KS

Kendra Seymour

7:38

Wow! Carl…

CG

Carl Grimes

7:43

Think of that during your next dream. Only recently, has it been disproved, they do have an anus. It's just too small.

KS

Kendra Seymour

7:55

Alright, so, Carl, I mean, this is, I know you're laying the framework here. This is incredibly gross. Um, so these things are all around us. Are these like the only little critters in our house, or are there other ones we need to be worried about?

CG

Carl Grimes

8:10

Oh, there's dozens and hundreds of them. Even…first of all, like I mentioned, there's 48,000 known species of mites. But as far as the house goes and house dust mites, there's a there's a bunch of others that Rob Dunn wrote a book, 'Never Home Alone.' I know you've got a copy of it.

KS

Kendra Seymour

8:32

I did. It was my Mother's Day gift, per your recommendation last…well, you didn't tell them, my family, to give it to me for Mother's Day. I asked for it for Mother's Day.

CG

Carl Grimes

8:39

Right, so he's a professor at the Department of Applied Ecology at North Carolina State University and in the Natural History Museum of Denmark at the University of Copenhagen. So, he's an academic, but he also understands the real world. And again, I'm quoting from him because he's got some dramatic language, and I don't want to be blamed or sued for it. You can go after him. He describes this—why it's never home alone. He says, "a natural history of the wilderness in our homes, from the microbes in our showers ('like Legionella') to the crickets in our basement, even when the floors are sparkling clean and the house seems silent, our domestic domain is wild beyond imagination." I don't know what's more gross the face dust mites or a house full of these critters. "(With)…the nearly 200,000 species living with us in our own homes" and he's got the documentation. Every home he's checked anywhere in the world has dozens of these. Okay, no exception, "from the Egyptian meal moths in our cupboards, camel crickets in our basements, to the lactobacillus lounging on our kitchen counters" okay, "you are not alone. Yet, as we obsess over sterilizing our homes and separating in our spaces from nature, we are unwittingly cultivating an entirely new playground for evolution." Now this is critically important, not just in general…and with climate change…but also for mold, because we want to get rid of it. We want to sterilize it. We want to kill it. We want super clean. And we are unwittingly creating some of the superbugs.

Okay, so the super antibiotics and that sort of thing, and a new playground for evolution. If you… evolution is the adaptation to the environment, and as the environment changes, what can survive and what can't, will shift and change accordingly. So, if you shift that environment significantly, then things that are there you can get rid of, but things that aren't there yet can start to thrive. And with all these 48,000 mites and 200,000s of other critters, there's a lot of opportunity for new ones to start thriving. And it doesn't create new ones. It takes things that's already there, and they can now survive, and the others can't. And that fits in with the microbiome that everybody's heard about—the microbiome of the gut, the microbiome of the house, the microbiome of the of the planet Earth. And it's all those subvisible critters and organisms, that have legs, and that don't have legs, and can't move. Like mold, they have to reproduce by creating spores that detach from the growth, go up into the air, and they go wherever the air takes them. Whether it's an inch away, the next room or outdoors—where most of the mold is growing anyway. And mold has been traced from…in the US, from both China and Africa, from both directions. Okay, so this whole general concept I want to get across, because we need to keep more in mind than just, "I found a spore of something." More in mind than, "I have a dust mite, or I think I do." And by the way, it's not the dust mite that bothers you as the allergy, it's the fecal pellet. It's the mite poop.

KS

Kendra Seymour

12:38

So, I'm going to just piggyback on something you said there. Because having read his book, he…that number can be overwhelming to people, but I think his message—and I like that you really clarified this. Most of these species in our home, they're either benign or even healthy

for us. They're not all problematic. And so, this desire we have sometimes to, like, just sanitize, and kill and whip out the bleach, and the strongest (I don't want to name any products) disinfectant you can find is not necessary. And you're saying, in some cases, may be harmful, right? Because we're, you know, creating resistance and then also adding those chemicals to the air. But it's complicated. I'm glad you're here to kind of take us through it a little bit more, though. I'll let you keep going.

CG

Carl Grimes

13:18

Well, to add to that. I don't want to give the impression that everything is okay and that you don't need to act. There are times you definitely need to act. And while most people don't react to these, whatever all these are, some of us do. And Some of us do in an incredibly severe, debilitating, disabling way that not much death directly occurs from any of these, but it can certainly make you feel like you're dying. And that can compromise your immune system in the way…such a way that you're more susceptible to all kinds of things. So, it's the diversity and the multiplicity…the syndromes. This is where the researchers are focusing on. They change one thing over here and it changes something else over there. I was just on a conference call this morning with Health and Wellness in Buildings, and that's one of the things…there's nine of us on the committee. All different backgrounds, and that was the one common theme.

Anyway, back to the house dust mites. They are simple. They eat, they poop, they copulate, they lay eggs. And those hatch, and then they eat, and they poop, and they copulate, and lay eggs. So, just a brief taxonomy, and I'm not going to go into all the big part of this, but there's the North American and the European…and…but lately, and this is fairly new, there weren't reports of dust mites directly in the history. But, they did finally differentiate the North American and the European, but now lately, despite that, they are now everywhere, because they naturally diversify and spread throughout the environment. But with people, and planes, and boat, and global travel—they go with us. So, as kind of I said before, they look may look like insects, but they're not closely related. And because of their differences, many insecticides designed to control insects will not always be successful on mites, and this is a theme throughout. The lack of the ability to kill dust mites—it doesn't work. So, there has to be other things that we do that we'll get into in a little bit. So, the Der p1, the Dermatophagoides, that's a technical term, cysteine proteinase. It's a technical importance, but it's from the house dust mite fecal pellets, not the mite itself. It's a major component of the allergic immune response in house dust mite. Atopic individuals, in other words, people that are sensitive to house dust mites, that's the component.

Not everybody is sensitive to house dust mites, to the Der p1. The Der F 30, the Farina, that's a major allergen that harbors a serine protease, not a cysteine proteinase. Okay, you want to get technical, but it's immunopathogenesis. The ability to create problems in the immune system remains unclear. They still don't quite know how it works. The other one, they do. They don't know this one, but that doesn't mean it doesn't hurt. House dust mites are very picky eaters. I talk about how Stachybotrys is a fussy eater. It only eats readily available cellulose. It can't eat ordinary dust. It cannot eat the wood, okay? House dust mites are even more particular. They only eat skin, mostly human skin, but also some of the pets…skin from

pets and dander. So, the average individual adult sheds about 0.5 to one gram of skin every single day. That's a lot of skin that's shedding. So what? Where does it go? A lot of it goes into the air, and a lot of them goes where you sit and where you sleep, because it rubs off. Okay, so here's just a cartoon of skin and possible dust mites with the Luan cartoon. It says, "How often do you vacuum your room?"…"Oh, I don't know, once a month. Why?"…" Well, according to this, we shed 700,000 skin cells a day."… "So…" (and then pointing to the vacuum cleaner)…"That's you in there." And that's you spread throughout the house. When the labs do dust characterization of house dust, skin cells are by far the predominant particle in house dust—and that's what mites eat.

So, just a couple of facts here. The farinae lays eggs over a 30 day period, about an egg a day, while the other one lays about 80 eggs over a 45 day period. Infestations occur in microclimates, and this is important, because the microclimates, the smaller climates within the bigger climate…the little niches and spaces in houses that's inside the whole entire house that have sufficient food accumulation, which is mattresses, upholstered chairs, and some carpets, okay? And ERHS equivalent relative humidity. Just say, think relative humidity 70 to 80%. Now that's not 70 to 80% in the air, that's the 70-80% equivalent to the 70 to 80% in mattresses and chairs. Okay, so if it's below that, they go to sleep. They become dormant below 50%, and there's no living organism that has been able to reproduce when they're asleep. So, if though asleep or dormant, you stop the reproduction of dust mites. Mattresses are very accommodating, because that's where we spend most of our time, and you gotta lay it on the bed, and the covers, and the mattress. And you think…your skin is still shedding while you're sleeping—that's the one thing we're very good at when we are asleep, is skin shedding. And the dust mites are associated with primarily respiratory complaints and as a causative of asthma.

Now, this is another important distinction here. In 2004, The Institute of Medicine published their report "Damp Indoor Spaces and Health" (it was originally 'Mold and Health."), but they came back to CDC and said, "Hey, it's not just mold. If there's enough dampness for mold, there's enough dampness for increased bacteria, chemical releases from the damp building materials, and it can attract insects and rodents." What they didn't include in that statement was that, well, is that…it supports dust mites. Okay? However, what they did do…they have a chart in there…and you can just Google 'Damp Indoor Spaces and Health', and you can download the entire book PDF for free, or just the executive summary…about 30 pages. There's a chart in there that shows the range of causation from no evidence to some evidence…to yeah, it looks like if there's an association…to strong evidence, to this causes something. It's the only thing moisture related that has causation—that dust mites cause the disease of asthma. It's not just that they trigger asthma attacks. They can cause asthma itself.

Nothing else associated with dampness, including mold, has ever reached the level of definitive causation, or strong associations, and that sort of thing. We're going to watch a short video here of dust mite. Okay, so in the video, we start out with one dust mite. You see it moving, and it's moving through a debris field of particles—skin flakes, and dust, and other particles, and dust mite poop, and everything else. And then, as it goes, moves around, then you start seeing another cluster of dust mites that is moving toward. Now, just to give an idea, this is under a high-powered microscope of what it looks like. And this was made by

Jeffrey Miller, who's…he's a medical doctor, specialist in dust mites and dust mite reactivity. His company (medical clinic) actually called Mission Allergy…and he's got a very good sense of humor. He's got his VW bug here looking like a dust mite. And in fact, about 15 years ago, at a medical conference, he had an inflatable dust mite, big thing, and I have a picture of it over my back, like It's eating me. Okay, unfortunately, I can't find that picture anymore. I don't know where it is.

KS

Kendra Seymour

22:59

That should be your new like Facebook photo cover Carl. If you do find it.

CG

Carl Grimes

23:04

Yeah, okay, there you go. So, a little bit understanding more about dampness. I've been talking a lot about dampness. Dampness before house dust mites. So the earliest recorded reference to respiratory distress called 'noisy breathing', was in China in 2600 BC. Hippocrates was the first one to use the word 'asthma' around 400 BC. So, this is really ancient stuff. Vitruvius. You know Vitruvius man, the diagram of the outstretched arms and so forth. He was a big architect, just like 10 volumes of books he wrote. He wrote about mold damage in buildings in 27 BC. Then Sir John Floyer wrote "A Treatise on the Asthma" in 1698… you can get a…I've got a copy of it. You can get a copy of it from Amazon, in which he flatly stated, "damp houses cause asthma." Now, from our point of view, like with mold, what else do we need? Okay, but this was 1698 and there was still no evidence of it. That doesn't mean it doesn't happen. It just means we can't describe it yet. And then "Our Homes, and How to Make Them Healthy" in the UK, was published in 1883. So nearly 1000 pages. It covers everything. All architecture, and everything, rising damp, etc. And then there was nothing, until about the 1970s when the clearing the air came out in the US. Nothing happened.

So, getting to the dust mites, Willem Storm van Leeuwen, the Dutch. 1924 to 1930 described a number of cases of mite related allergic asthma in farmers with contaminated wheat and or oats. It wasn't until the 40s then, that another person investigated the respiratory allergies in damp houses, and the storage mites were then also called bed mites. (Storage, meaning grain storage. He was finding similar things in beds.) Then another person investigated the biological sources, such as fungi of asthma, fungi, animal skin scales, insects, and included mites in that. But here's…this is particularly interesting. It wasn't until 1962 that the original identification of a mite of the genus Dermatophagoides, that I mentioned before in house dust, and it was by a woman. All these men do it all…it was the woman that figured it out. But…and it's documented in the Journal of Allergy in 1967. That's pretty recent. I know a lot of people were born after that, but that's really recent in the history of the world and the history of science. Her husband continued her studies, but only until 1973 when he died. And the men get most of the credit—just a little side note. So, I'm going to…there's a lengthy timeline here (that…it'll be on the screen), but I'm not going to read it all. But it's not only an interesting chronology, but I also will note there's key issues in there, and associations with other allergens, with bacteria, with virus, along with their role as powerful sensitizers (which I'll explain a little bit more in a bit.)

These are the dust mite references in various publications. There was nothing until like well, 65 or 67 was the first one, and then it accelerated. And now, after about 1995 it kind of plateaued. But you'll notice the blue line toward the end, it suddenly is spiking upwards. This is the combination of dust mites and other things. So, there's some kind of combination going on here, not just dust mites. So, again, in 1694, they were observing mites in house dust, but they didn't know what it was. 1923, they knew mites were involved in occupational asthma. 1967, as I mentioned, that's when it was identified in house dust. 1971, was the early allergy treatment of injections designed to stimulate the body's immune system. And it wasn't 72 that doctors identified the droppings, not the mite, as the cause of allergy. So, this is really new stuff. This is really newer than mold, because mold is specifically as mentioned in the as far back as the Bible. Where, with mites, it's only the dampness is mentioned back then. 1983, they had avoidance studies that demonstrated health improvements. Okay, in 1987, four years later, 35 doctors supported by the World Health Organization described the house dust mite as a major cause of allergic disease worldwide. And then the next year, the DNA analysis, the Der p1 as in common with a meat tenderizer from DNA analysis. So now we've got our first example of cross-reactivity dust mites with a food—a meat tenderizer.

Then they started getting to the specific gene. And this was interesting. In 1990, scientists warn…the don't report…hey warn that mite enzymes (the allergens) may breach long defenses by dissolving delicate tissue. Now we have not just allergy, but we have physical damage. We have a physical lesion from dust mite exposure in the lungs. Then to a further avoidance study in children demonstrates health improvements. Okay, and doctors write in unison to support allergen avoidance in disease management. But the British Thoracic Society guidelines for managing asthma did not support mite avoidance. And as a side note, and then, in 2013, the American Academy of Allergy Asthma Immunology (the medical practice parameter that I mentioned before that I participated in), it was similarly challenged then and in 2013, 20 years later, saying, “Oh, well, allergists are disputing that removing an allergen will lead to a health improvement. I don't understand that.”

CG

Carl Grimes

30:46

Another one talking about cell damage caused by mite droppings, the British Thoracic Society in 97 and they kind of admitted there's something there, but it's not proven. Does it sound like medical stuff, the medical history that we have with mold and so forth? And then, in 1998, the doctors blame the poor research on why there's no clinical…why there's no evidence. It's poor research. You aren't researching it correctly. Then, in 2000, there's medical confirmation that sensitization—there's that word again—it's not sensitive, but sensitization, an act of sensitizing to house dust mites in childhood, is dose dependent, meaning that's toxic, and that's different than sensitization. And that further exposure can make their asthma worse. This is what sensitization is. It's not just that you react, you expose, you react, you expose, you react. Is that subsequent exposures accelerate the reaction. It makes it stronger exponentially. So, that by the second, third, fourth, you're now reacting bonkers when the first one maybe you barely noticed. That's what sensitization is. And sensitization can also expand, so that you're no longer reacting to just that specific trigger, that specific exposure, but to other things. This is where the inflammation comes in—the inflammatory response.

Okay, if somebody's hitting you in the face, and your face swells up and is sore, somebody else can, you know, just touch your face and it hurts. Just talking can hurt. A breeze over the face can hurt. So that's part of the other part of sensitization, is that it spreads out and you now react to other things, and sometimes even not related anymore, because it just irritates it—inflames it further. And that's part of what happens with mold exposure, not just house dust mites. So, again, when I started out, I said there's overlap between a lot of these, this is one of those examples. In 2000, then they showed how to reduce dust mites, and that is improvement. So, number one, is removal of carpets in bedrooms particularly, covering all beds and bedding with micro-porous mite resistant material. Dust mite covers, they're called. Using high filtration vacuum cleaners to control dust. Use of mite killing sprays on soft furnishings. That was the first one, and then later they retracted that. Installing high efficiency dehumidifiers in bedrooms to keep the humidity down. So, they noted overall health improvements and less medication was needed by environmental controls.

KS

Kendra Seymour

34:14

So it sounds like Carl. Can I jump in for a second? It sounds like some of the recommendations at the time then were the same things that you recommend to, like, reduce, like, exposure, to you know, to cross contamination from mold spores, right? Like, control the humidity, reduce the dust, lots of good cleaning. These are, like, common sense things that we maybe don't do as much of as we probably should.

CG

Carl Grimes

34:39

Take away the food, take away the water, and that controls, it stops a lot of things. Okay, so there's just some studies, and here was another one in 2001. Keep humidity, relative humidity below 51% reduced mite populations by 76%, okay. And they did it with just dehumidifiers and air conditioning to control humidity. Got a 76% reduction in dust mite populations just by humidity control.

CG

Carl Grimes

35:19

The allergens can downgrade a natural lung defense against bacteria. So, this is not just a cross-reactivity or a sensitization, but it's an effect on the body to make it more susceptible to something else. And this has led to doctors to speculate this is why asthmatics suffer more lung infections than non-asthmatics. It's still not accepted by the British Thoracic Society. 2004, I mentioned this before the Institute of Medicine, Damp Indoor Spaces and Health, where dust mite allergens cause the disease of asthma. Health improvements in a reduction in drug usage has been recorded in children with asthma by covering beds. We're back to the environmental controls—covering beds and beddings with the micro porous materials. And the combination of excluding tobacco smoke indoors. 2006, then they're talking about pollens, mites and eye disease. And then, mite activity can also be found in pathogenic microorganism. What that means is that infectious bacteria, there's mite allergen, not mites, but the allergens are active in infectious bacteria. In other words, this stuff is not isolated by

itself. Not only is it everywhere in the world, but it's affecting and involved with everything else.

Defective cells and asthmatic lungs prolong viral infections. So, we talked about dust mite…here…this is a photo micrograph of material. The one on the left is a tightly woven dust mite material—preventive material. The one on the right is non-woven. And while the one on the right, that, you know, you gotta really expand that under a microscope to see the gaps in it. ,But those gaps are a lot bigger than those little mites that we saw, like, in that video. So, this shows you can't just cover it up with something, you have to cover it up with something specific in order to block the mites and block the fecal pellets. And here, I don't know if you can see my cursor or not, but this blob right here in the middle, this is a dust mite on a woven cloth. It can't…see how big it is, compared to a little openings? It can't get through.

KS

Kendra Seymour

38:12

That's incredible.

CG

Carl Grimes

38:18

Here, in 2007, all this can affect mental performance, not just physical performance, but the mental aspects. Seven US cities prove that allergen avoidance benefits asthmatics. Now, each one of these statements in the timeline, I extracted from a bigger document. They go into more detail, and every single one of these items has a citation. Okay, so if anybody is seeing this, wants some more information, contact me, and I can provide the citation for every one of these statements. Again, things in tandem. And this is one, in 2008, when I first heard about this at one of the medical conferences. They talked about diesel exhaust, and the particles from diesel exhaust, they go deep into the lungs, down into the alveoli. And some scientists believe that allergens, particularly from dust mite droppings, when they get down into the lungs, that the enzymes—they leak out and contaminate objects nearby. And this could be a mechanism for mycotoxin exposure from particles, because mycotoxins are not free floating in the air, unlike what most people, not most, but a lot of people believe. They started a tiny bit of liquid absorbed into the surface film and the mycelium (the hyphal structures of the mold growth—the colonies), and they don't go into the air, but they are in the particles, and they are absorbed into it, basically trapped. Now, if the particles, if that dries out and the particles fragment get disturbed into the air, then you are exposed to the particles, but not directly to the mycotoxin. But here's some evidence coming from dust mite studies that mycotoxin could be like oozing out or leaking out of the particle, and that's how we get directly exposed to some of the mycotoxins.

KS

Kendra Seymour

40:34

Just a point of clarification. So, for people like, “Wait, mycotoxins aren't airborne.” They can become airborne because they're attached to the particles that become airborne?

CG

Carl Grimes

40:45

Yes. So, actually absorbed into, not attached, but like piggybacking, but actually absorbed in. Think of a sponge that has a water drop on it. The moisture is inside that sponge. Okay. Here the connecting dust mites and hookworms can be said, considered equal by the immune system. Here's common dust indoors, from house dust mites, dogs, cockroach, peanuts can begin an immune cascade. Here's another new concept, the cascade towards sensitivity, allergy, and asthma. And here's another one that one of the colleagues of mine from the University of Colorado has picked up on, say, "Important cells sample the air we breathe in and decide whether or not to activate an immune response." It's like giving an intention consciousness to the cells. It's not really that, but the point is, that those are a biological sensor. And it's…what I learned from Doctor Mark Hernandez, is that the human body can be treated as a biological sensor in conjunction with the mechanical sensors of the traditional instruments like humidity meters, moisture meters, infrared, mold testing. Those are mechanical sensors and testers, but we have the human body as a biological sensors. We just don't know how to calibrate them and how to really understand what the responses are. But there are people out there working on that.

KS

Kendra Seymour

42:24

Can I ask a quick question Carl? Because you mentioned, like, testing in your body. I'm wondering, is there, like, a test for your home that specifically looks at dust mites, and if they're even helpful, I mean, because we can just assume they're everywhere, right?

CG

Carl Grimes

42:39

You can just assume they're everywhere. But there may be sometimes that you want to do it to differentiate between other kinds of things, like pet dander or even mold. And this is…that's a really good question, because first of all…well…first of all, yes, this is when you can differentiate. I keep posting on Facebook and other places that with mold tests, you need more than just the mold test, you need additional information. And one of the ways to do that is…like with mycotoxins, for example, you can do the urine test for mycotoxins, but it didn't tell you where it came from. But if you also do a house dust test for mycotoxins at the same time, anything that's in urine, but not in the dust, didn't come from your house. Okay? So, stop cleaning your house, and stop fogging your house, and stop doing all this stuff in your house if the mycotoxins aren't coming from your house. Okay? So, what if, and I'll get into this a little bit detail in a couple of minutes here, but what if your reactions are not from mold, but from dust mites? Or they're made worse because of dust mites. So, if dust mites is a part of that, and part of these combinations that this research is proving here, then that's maybe something we also need to look at, particularly when remediation fails, assuming it's really remediation and not fake remediation, just by name. Or chemical treatment and we react to the chemicals. But you can physically remove and why are you still reacting?

Well, we may be just super sensitized to the point where we're also reacting to other things, or maybe we're also reacting to dust mites to begin with. And maybe this is why…just my

own conjecture here…maybe this is why we have legitimate reports from people with who are highly sensitive, highly reactive to mold. They say you got to get rid of your mattress. Get rid of your mattress. Get rid…well, look, most mattresses are not uncovered. They have a sheet on it, and then they have bedding on top of that. There's not much way that mold is going to get into your mattress and embedded. Okay, now the common thinking is, but it's on our body, so we push it in from our body and, well, yes, that can happen, but there's more likely to be dust mite in there that we're reacting to. So, maybe we still have to get rid of the mattress, but not because of the mold. That may be important to understand. So, we don't freak out on mold, mold, mold, every time, everywhere, all the…for everything. We need to do something else, or consider something…or at least understand it, so we don't have so much uncertainty.

KS

Kendra Seymour

45:49

That's a good reminder, too, because I think obviously mold is very important. We're here, and that's one of the things we're talking about, it's overlooked and dismissed. But there are other things in your environment that can, you know, be problematic. And that's the whole point of, you know, today, we're unpacking this other thing.

CG

Carl Grimes

46:10

That's right, okay. So, there's just more scientific, specific evidence that goes on. In 2011, though, doctors for the first time describe how to kill dust mites in soft toys, okay. Soft toys like those little critter on the right, which is a dust mite stuffy, okay. A major source of house dust mite allergens, and they're strongly associated with the sensitization. And the recommendations is the effect of freezing, hot tumble drying, and washing with eucalyptus oil. But hold on, hold on. Eucalyptus and other essential oils are now increasingly associated with irritations of the respiratory system and chemical intolerance reactions. And there are excellent peer reviewed studies on that. One is a review study from about six years ago now, that went through all the detail of essential oils and the role. The quick summation is, essential oils do kill. They can kill bacteria, they can kill mold, but it's gotta be in liquid for hours to days before it can kill or denature. So, diffusing it into the air isn't a line of concentration, in direct contact for nearly long enough. Basically, it settles the particles out of the air and they're now on the surface. So, you got to clean the surface. And if you have any chemical intolerance issues with essential oils, you're now exposed to it. And by the way, some of those are pretty serious for dogs.

KS

Kendra Seymour

47:53

Yeah, I like…you always…I appreciate you always make that point, Carl, that sometimes the solution to one problem creates, like, a whole new problem. You know, that's why, sometimes you see with remediation, people will go in and they're using Lord knows what, and then the question becomes, well, are they reacting because the remediation wasn't…are they reacting to the chemicals that were used? And so, you always have to be mindful of that. I always appreciate that reminder.

CG

Carl Grimes

48:19

Yeah, it's important. And at the same time, though, we have to keep…be aware that I'm increasing the uncertainty, and the complexity, and the stress here with this information. Okay, but there's no way to avoid it, so we have to also be aware of not just the direct physical exposure to things, but how we handle the uncertainty. 'Cause that's the worst part of all this—the uncertainty. People don't believe us and we can't convince them. It's one of the reasons why I'm going through such detail on dust mites, because it's forgotten, and it's got all this stuff. We…where is it for mold? We have all the details for mold, we don't have just two molds to worry about. We've got hundreds or 1000s of them, and we just have two dust mites.

KS

Kendra Seymour

49:19

Well, before you go on that you bring up something that I've been wondering all along. God, I wish we had this for mold, there's so much evidence. There's so much anecdotal stuff out there, but you're really laying out a case. I do…I want to circle back. I'm a mom. I have kids. You brought up stuffed animals, are and we can maybe cover this in a moment. Are we? Are you going to tell us, like, how…How can we salvage certain things we talked about? Maybe sometimes you do have to get rid of the mattress. But what about your kids favorite stuffed Teddy? Are you going to give us some solutions there that might help with that?

CG

Carl Grimes

49:49

Yeah, the most effective way is to put them in the clothes dryer on hot and tumble them for 20 minutes or so. It does two things. One, is that you…it's not so much that it kills any dust mites that are in there. If they are in there, the heat will kill them, but the tumbling action and the air movement over it will release them, and blow them out of the dryer, and out to the outdoors. So, if that works, okay. Now, you may need to do it more than once, but you have to try it out by saying you do that…say once, and then see if the kids are reacting near the pets again. There's issues about that too, but right now, testing by exposure really is the only test there is out there. Now there are dust mite allergy tests, and I forgot to answer one of your questions about a dust mite test. Most of the major labs (not the boutique ERMI labs that do just ERMI and don't even do microscopy, the traditional mold analysis), they do various allergen analysis for dogs, cats, rodents, dust mite, cockroach, and it's a very…relatively inexpensive. I think it's about $30 for a sample. You send some dust in, you pull some from the mattress or wherever, and send it to the lab, and they'll tell you. Dust mite allergy testing is really sensitive. The only thing more sensitive is for cat allergy. Where they did…they took people working in a T-shirt factory, and so that the T-shirts made were put in plastic, and then they were using that as a control for testing for cat dander in houses, and so forth. Find a place where there's no cat dander. They couldn't find any that had no cat dander. No cats in the factory, but people in the house that had a cat, had it on the body, transferred to the to the T-shirts enclosed in plastic, and those tested positive for cat dander. Dust mites are almost that prevalent now, almost that sensitive.

KS

Kendra Seymour

52:17

So, you…I mean, we talked about like the mattress covers and, you know, putting this, the lovey stuffed animal that your kids, you know, are attached to, in the in the dryer. But what about things like my rug and my couch, like, can I HEPA vacuum that to try to reduce exposure? Obviously, can't cover those surfaces with surfaces with a…

CG

Carl Grimes

52:34

Absolutely, okay, yeah, absolutely. And HEPA vacuums (I think I covered this in a previous conversation with you.), they go way, way below point three microns. They go down below point one microns. They go down at 99.99, not 99.97, 99.99. There's a misconception about HEPA that will go…you can refer back to that one or something. So, in 2013 (and this is one that I was involved with), that's when the annals of Allergy, Asthma, Immunology of medical practice parameter, environmental assessment, and exposure control of dust mites. This is a practice parameter for it. This is the first medical practice parameter that involved environmental assessment and exposure control. And they got pushback from an allergist, saying, "What's your evidence that removing an allergen will stop allergy attacks?" Totally ridiculous, but it was a serious objection, and they had to answer it, and they did. So, this includes house observations to assist the clinical diagnosis and treatment.

Then we've got 'Never Home Alone'. by Rob Dunn, 2020 ASHRAE Damp Buildings, Human Health, and HVAC Design. Three subjective…this is the first time…subjective metrics for damp building sufficient for action. There's also for objective measures like moisture, humidity, moisture content, that sort of thing. But it had three subjective…I was on the work group that that wrote this and was accepted by the board of directors of ASHRAE. It's now one of their documents. And it had findings and recommendations supported by meta-analysis of dampness and childhood asthma by the premier meta-analyzer of our Mark Mendell. And then, 2023, just this past summer, Guideline 10 was revised. It's Interactions Affecting the Achievement of Acceptable Indoor Environments. That's their pseudonym for health and healthy indoors. And it specifically mentions dust mites, and we just, we just sent out for public (I'm chair of that committee), we just sent out for public review to update that Guideline 10 to include moisture, believe it or not, moisture wasn't included in that. And by including moisture, we had to add not just the definition of moisture, but twelve other definitions—like specific humidity, absolute humidity, relative humidity, moisture, equivalent humidity, all those different things that are technical, for that to be measured, and so forth. So, this moisture is even…it's so common that it's forgotten, even more than dust mites are. And some of the document…oh, I, I'm also involved in a committee…it's Moisture Management and Buildings, and they have no definition of moisture. Okay, so all this stuff is new. So, I don't mean to scare people. We don't know anything. Nobody knows any…people are working on it. And a lot of this is really, really new, and so we have to be patient. But oh my God, when you're suffering, you have no patience.

Okay, interactions with the built environment, which is what you've been pushing me toward here. Tighter houses mean less ventilation, so it's an increase of moisture, it can't escape.

Higher relative humidity…slower drying of materials…more risk of condensation. So, moisture control. Remember one of those studies. Just by dehumidifying and air conditioning to manage humidity—they reduced dust mite allergen by 76%. More people increases more moisture from breathing, and more skin cells, okay. Water restrictions for washing bedding and the accumulation of fecal particles in the bedding, and we can't remove it as much. And then you've got all the interactions: mold, bacteria, VOCs, all of which, all of those things are increased by moisture—by humidity. It's all working together as a system. It's the synergism of the organisms and their exudates…that's their poop, and their VOCs, and stuff like that…along with the environment, plus the human occupants. All of that is cascading.

Where are dust mites? Back when we wrote the dust mite parameter, National Jewish, is in Denver (where I am). I was involved in the study 20 some years ago where we tested for all those allergens. When those allergy tests that I mentioned, that the labs have now, when it first came out, we found no dust mites in Denver, Colorado. The National Jewish said, "No, there's no dust mites it's too dry." It's everywhere. It's in Denver. National Jewish even says that it's in Denver now. But look at this (the green there), that's the house. But look, outdoors (that cyan colored segment), that's outdoors. What are you talking about? Dust mites out…there are so many dust mites everywhere that it's everywhere, including outdoors. Similar to mold spores, which are mostly produced outdoors. There's so much of it that there's always spores and fragments of those colonies in the air everywhere. And where does indoor air come from? It comes from outdoors. It's not manufactured indoors. It comes from outdoors. When we build a house, we build a container, a mason jar, to enclose that air, and then we put holes in it; we call doors and windows, and so the outside air comes in. Everywhere in there, there's dust mites.

So, "house test mites are an unsurpassed cause of allergy sensitization and allergic illness throughout the world." This is from Dr David Miller, and "by contacting the epithelium ('the moisture membrane, so to speak'), of the eyes, nose, lower airway ('not upper respiratory only, but the lower two'), skin and gut, the allergen-containing particles that dust mites can induce sensitization ('and allergy symptoms in those organs, not just in your lungs, okay') in any organ in the body." This is one thing that Theron Randolph did back in the late 80s and 90s, who was just vilified for it, where he had different levels of allergic reaction. One is of the contact of the spore lands on your eye or your nose, and that's where the reaction is. More distant that happens, but you get a rash. The reaction is away from the point of contact. The other next level, is it affects the internal organs. He had no proof of that. He had clinical observations of it, and he was crucified for saying this, okay. But now they've got the evidence to show that that actually happens.

CG

Carl Grimes

1:00:30

That's just technical language there. This is the medical parameter I mentioned already, environmental assessment, cross reactivity, multiple cleaning methods, sequential, repetitive. This is really, really important—not just for dust mites, but for mold, for pet dander, for anything. You need more than just one method. You need it more than one time, and you need it sequentially. So, you do method one, method two. You may need all that. You

don't need it every time. But when you go to school and clean one way, one time, and it doesn't work, it's not that you didn't clean well enough.

Cold water for dust mites is effective. It used to be hot water. Hot water so hot that you would scald your children with it. Okay? That's you don't want…need hot water. You don't need warmer…physical…why? Physical water and detergent physically removes the house dust mite material so there's nothing to kill. You don't need to use chemicals or anything like that. And that's why the acaricides and the tannins were suggested by National Jewish previously. But, in 2009, they retracted that and said, "Look, they don't work, and you don't need them." Same with…similar with mold, you don't need the chemical treatment to kill mold. First of all, spores are not alive, and you can't kill what's not alive, and if you physically remove the growth. You know what the most effect…I just figured this out a couple of days ago. The one sure way to kill living mold? Remove it from the surface. As soon as it's removed, it's like pulling a weed. It's dead. If you want to kill mold, remove it from the surface. Physical removal, killing doesn't…the chemicals don't work that well. It fragments it. The allergen, all that stuff is still there, and now you're exposed to the chemical, and a lot of people that have cross-contamination are actually cross-reactivity. They're reacting to other things, because it's been very serious, and they're reacting to the chemicals that they use to kill and to clean with. Again, it's this multiplicity of stuff.

KS

Kendra Seymour

1:02:53

No, and that's good. It's that a lot of people are told, "Well, it's dead or dormant. It can't hurt you." And that's not the case with mold. So, it sounds like these good cleaning practices, just, not only help take care of dust mites and reduce your exposure, but mold spores, and fragments, and things like that. And these are things that, you know, basically anyone can do with enough time and elbow grease, right? A good vacuum. Some microfiber cloths. You know, regular laundering.

CG

Carl Grimes

1:03:20

It's really important, because one of the patterns that I realized early on, when I mentioned, when I was learning all this stuff, the super, super clean houses with the fragrance in it, okay, those had the worst reactions than even moldy houses, because of all the chemicals that are being used. So yes, super clean, but not with chemicals. And here is the chart showing (it's from the indoor built environment), showing sequential cleaning. You only get…you don't… when you clean once you don't get everything, you get part of it, and then you get part of that, and part of that, it's like the old story of the rabbit and the and the tortoise. If, you know, if the rabbit goes half the distance to the goal line to the end line, and then half the distance, half the…it never reaches it, because it's still half the distance. It's similar with cleaning. You don't have to go that far, but you need at least three cleanings before you can get it down to a super, super clean level. This is why, like for surgical instruments, not only did they put it in formaldehyde or phenols to kill, but they heat it up to ungodly temperatures. They do it more than once, because they never get…nothing gets you 100% absolute removal one time.

So, if you clean something and you still react—pay attention. Is it a little bit better, even a little bit better? Clean it again. And if you get past about three to four times, it may be more worthwhile to remove it, and get rid of it, than to keep cleaning, cleaning, cleaning, cleaning, cleaning, you know, OCD way.

And this is where mattresses come in again. Look for the dust mite possibility, not the mold. And this is when one lab test may be helpful to test a mattress for dust mites. And if you've got dust mites in there, such a strong sensitizer challenges so many other things, and creates that cross-reactivity. That might be your problem, rather than mold, and you still have to clean, excuse me, or get rid of the mattress, but you don't have to focus on, "Oh, it my house? It's not my house is moldy. It's not mold in the toilet tank. It's not a fruit that is getting moldier in the house." It might be, but that's not what's causing the mattress problem. At least, you can have a way now to test it out and check it to see. Now, here's my favorite intervention—humidity, skin cells, mattresses, etcetera. This is my favorite intervention for beyond allergy and dust mite…or because of dust mite. But other than allergy, don't make your bed as soon as you get up. Let it dry out.

KS

Kendra Seymour

1:06:31

So, mom was wrong when she said, "You gotta make your bed when you first wake up?"

CG

Carl Grimes

1:06:34

Absolutely. Just let it out for 15 or 20 minutes. Let it dry out, the dust mites go to sleep. They can't reproduce, they can't poop, they can't…okay…they go dormant, and you don't get a mattress infected with dust mites. And that's from Sophie Harris, again, from I can't take credit for this. Implicit very quickly…implications for mold or CIRS, etc. Dust mites are another piece of the puzzle. And this is what I presented to the CIRS conference that I thought I would get pushback, and I didn't. I got, "Oh, my god, yeah! It's another piece of the puzzle." It's the interactions with other multi-symptom, multi-system factors, bacteria, virus, other allergens, food manufacturing…remember…and flavoring. There was a one that I skipped over about… the not just the tenderizer, but flavor. Certain food flavorings cross-react with house dust mite allergens, okay. And this is consistent with table two of the Shoemaker's Medical Consensus Statemen. That table of 30 associated factors with the inflammatory response, only two of which are mold. We forget that the other 27-28 are not mold, okay. Well, I suggested to them that they need to include dust mites in that table, and I got no pushback. They haven't done it yet. I don't know if they will, but I didn't get pushback.

So, it's not just house dust mite, it's not just mold, it's not just VOCs. It's not just Rob Dunn's indoor wildlife. These are all silos—closed systems of things, okay. Perhaps, excuse me, perhaps CIRS is within a larger framework of…or inflammatory properties that includes all these kinds of things. Which makes my way of thinking, Doctor Shoemaker's focus early on, on inflammatory response (like Sir John Floyer with dampness causes asthma) and like, with the ones that said, "Hey, these things are going on here. I have no proof of it, but it's happening." This inflammatory response…and all the medical literature is full of inflammation now and how that affects the human body, and how it may be the cornerstone

for most of the chronic illnesses, you know, with people in the world. So, this to me…and I was glad to hear the people at the conference, you know, not rejected, but actually accept it and talk to me about it. And that's why I wanted to talk to you about it, and to the people that go to your website and watch your videos, because to me, this is something that should not be forgotten. We should become more aware of it.

So, there we have dust mites, the lack of controversy. The information that's newer than mold, but more definitive than mold, and perhaps more powerful than mold. But that does not mean mold is not important. We have to focus on a lot of these different things.

KS

Kendra Seymour

1:10:21

Carl, this is wonderful. I mean…after this, I'm going to go vacuum and… But, I think that that's what's important, is that, you know, your home is the system. It's hard as a…whether you rent or own, you feel like you have to keep so many plates spinning right? All these factors you have to keep in mind. And mold…and is it bacteria? Is it dust mites? Is it VOCs? It's the off gassing of my furniture and my paint. And I think what you've offered here is some really important background so we can understand and not freak out, but that a lot of these solutions that we can do are manageable. They're things that can, you know, low-cost in a sense, but a bigger return. And, you know, and never underestimate the power of regular, thorough cleaning. I know not everyone probably wants to hear that, though.

CG

Carl Grimes

1:11:15

Well, yeah, especially because I don't like to clean. You don't want to see the dust in some places of my office. But yes, it's all those things, all those things, everything, everything, all the time, everywhere! It's life. You know, driving your car, you have to pay attention to the car behind you, beside you, coming on across the street—the traffic lights. "I see a red light. No, that's a sign in the restaurant saying they're open. It's not a traffic light." All these things. Keep it clean and keep it dry. It's that simple. If it's not clean, dust…especially, it's not dirt, but dust—clean it. You can do it safely and effectively with dust cloths, microfiber, if it's a lot of…or HEPA vacuum, okay. A MERV 11 or MERV 13, in your forced air system, it reduces that dust. It's not perfect, but it keeps it down, so it's doesn't build up and cascade. To use some of the language we learned from dust mites. Keep it dry. You can spill a cup of water on the floor, and it doesn't magically sprout mold. It takes two to three days of persistent dampness for the spores to germinate and sprout, and then more dampness for a little more time to grow into a colony. So that it can then reproduce by making more spores, which detach, and you can no longer trace them back to where they grew, which is mostly outdoors. So, you look for dampness first—not spores. You look for dampness first—not dust mites. You look for dampness first—not necessarily VOCs. Because damp building materials can give it off. So, dampness is the key to all this. And the Institute of Medicine did 85% of this work in 2004. So, we've got some simple information out there. You don't need to be a scientist. You don't need to be a statistician. There's just some simple practices to keep it clean, keep it dry, and that also reduces all those critters that Rob Dunn talks about.

KS

Kendra Seymour

1:13:33

I mean, you've summed it up, folks like the whole takeaway, keep it clean, keep it dry. I'm gonna put that on a bumper sticker. I don't know, that's fantastic Carl. Thank you so much for being here. If people had any follow up questions. I see here you have your email, you can also reach out to us, and we'll make sure to get any answers from Carl that you may have. Thank you again, though, Carl, for being here.

CG

Carl Grimes

1:13:58

Oh, you're welcome, we can come up with another hot topic now.

KS

Kendra Seymour

1:14:03

If you guys are listening and you want Carl to talk about something else. He's talked about air purifiers. we've talked about relative humidity and moisture control and problems that happen there, and now dust mites. Go ahead, feel free to email me. You know, Kendra@ChangeTheAirFoudation.org, I love getting emails from people, and if you've enjoyed this presentation, do me a favor—like, follow, and share us on Facebook, Instagram or on all the social media. Definitely. Thank you. Bye, bye.