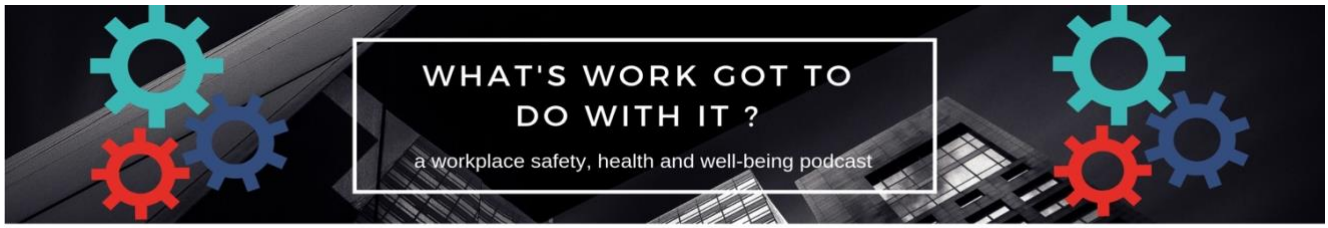

What's Work Got To Do With Toxicology?

Guest: Dr. Fred Berman, D.V.M., P.H.D
Host: Sam Greenspan, M.P.H.

Dr. Fred Berman: People always thought that the solution to pollution was pollution, but that's not true if what you're putting into the ground is not going break down for tens, hundreds, or thousands of years.

Helen Schuckers: Have you ever thought about all the elements that can impact your health when you walk outside on your way to work? If it's hot, maybe you wear shorts. If it's cool, maybe you bundle up with multiple layers of clothes, but what about elements you can't easily observe in the air, in the water, or even in your food? Think about your work. Do you know what risks you can be exposed to when you go to work each day and also what unhealthy exposures or toxic substances you can go back home with? Some exposures can be prevented altogether and for others we can reduce the risks that come with them. We'll discuss all this on today's podcast.

Sam Greenspan: Our guest today is Dr. Fred Berman. Dr. Berman is a doctor of veterinary medicine and received a PHD in toxicology from Oregon State University. Dr. Berman served as a consultant to the Oregon Department of Agriculture's Pesticide Analytical and Response Center (PARC), which addresses pesticide related incidences that could have health or environmental effects is also a co-investigator with the National Pesticide Information Center (NPIC) the United States Environmental Protection Agency sponsored project in collaboration with Oregon State University. NPIC provides objective science-based information about pesticides and pesticide related topics to enable people to make informed decisions about pesticides and their use. For the past 18 years, Dr. Berman has served as the director of the Toxicology and Occupational Health Information Center here at the institute.

Sam Greenspan: Thanks Fred for joining us today. We're happy to have you here to help our listeners learn more about the impact of working with toxic substances on the job, and how reducing risks can help workers live safer and healthier lives at work and at home. So let's get started. As a career toxicologists, how does your work contribute to safety in the workplace?

Dr. Fred Berman: Well, what I'm interested in are the toxic effects of chemical or physical agents in the workplace and in the home or other environments as well. And to understand what the hazards are and then you can prevent those hazards from

becoming reality. In other words, you be reducing the risk from exposure to those chemical agents.

Sam Greenspan: Okay. And what are some of these hazards that maybe employers and also employees can keep in mind to reduce the risk of exposure?

Dr. Fred Berman: Well, it's important to keep in mind that you know, all substances are toxic, but at different dosages.

Sam Greenspan: Right? That's true.

Dr. Fred Berman: But many of the compounds we work with in the workplace are more toxic than the average compound that you might see in your home. It's important to understand the chemicals you're working with, from the standpoint of the potential for toxicity and how they might adversely affect you, such as getting as your body through the skin or through berating it in if it stays, if it creates the vapor.

Sam Greenspan: Even something like water that's like a healthy for you. It can be toxic if you have too much of it. Right?

Dr. Fred Berman: Yeah. Maybe one thing I didn't mention was substitution of less hazardous chemicals for the ones that might be used, you know, in a workplace process.

Sam Greenspan: Right. Ideally that's where the research is going. If there's something that can't be eliminated, then hopefully it can be substituted for something that's less toxic. Our podcast often concerns total worker health, that holistically addresses all these interactions between work and home that can impact health. For example, farm workers who are often exposed to pesticides as part of their daily work, there's times where they live on the farms that they work at as well. One of our researchers at the institute is led a total worker health research study with farm workers that's funded by the Pacific Northwest Agricultural Safety and Health Center (PNASH), which examines how we can help farm workers reduce their stress, have fewer accidents and injuries, and improve their overall health and wellbeing at work and off-work. As it is also possible that farm workers may unintentionally increase the risk of exposing their families to some of these exposures, what are some other interactions that might impact the risk of exposure and how can workers reduce them?

Dr. Fred Berman: You bring up a really important point and that is with regard to farm workers is oftentimes they live at their place of work because they go on the farm as do

seasonal farm workers who also may live in housing that is in the actual farm area where for instance pesticides or other chemicals are being used. So, it's very easy for farm workers and their families to be exposed because they can track those chemicals into the home that in with them. So it's important in those situations to understand those risks, and to reduce them by taking specific measures to prevent the introduction of those chemicals into their home and you know, potentially exposing their children. But, also another point to make is that, let's say you work in a workplace where you're working with solvents and then you'd go home later and say you have, you are a hobbyist and you work with those same solvents at home, you're increasing your risk for exposure there. It's important to keep that all in perspective that even over the counter products that you can buy for use in the home can contribute to your overall toxic exposures.

Sam Greenspan: Right. So it's important for employers to make sure that their employees are taking the necessary precautions to reduce their risk. And this could be done through certain safety practices, like whether farmers cleaned their clothes or the precautions that they take before they go home or sort of tracking your exposures over time, which should kind of culminate it. Is that right?

Dr. Fred Berman: That's right. You know, you can have a chronic low level exposures that might result in adverse effects, some somewhere down the line or you can have acute high level exposures where you might become ill.

Sam Greenspan: The type of work that you've done over the course of your entire career, as well as, a lot of the researchers here at the institute, is identifying the links between the dose of these types of exposures and the health outcomes that are associated with them. And ideally this might inform public policy changes.

Dr. Fred Berman: Yeah, that's exactly right. And that's how the system is supposed to work. That through a rigorous scientific study of the kind of chemicals and other agents that we come in contact with. We understand the hazard very well, then we can reduce the risk.

Sam Greenspan: Can you speak to some of the landmark research findings in that might've informed such types of public policies?

Dr. Fred Berman: A really obvious one is smoking and for many, many years it was controversial, but the research was unequivocal that smoking increases very greatly your risk for lung cancer. Another good example is, for instance, the legacy chemicals, those that persists for long periods of time in the environment, PCBs for example, or some of insecticides like DDT.

Sam Greenspan: Oh, right, yeah,

Dr. Fred Berman: And those we learned through in part experience, but also through scientific inquiry that we could not continue to use those without eventually creating a very serious problem and I think superfund sites are a good example of that because those legacy kinds of compounds just persist for many, many decades, if not hundreds of years.

Sam Greenspan: Yeah. Well, what is a superfund site?

Dr. Fred Berman: Well, superfund site is a cite that has been determined by the Environmental Protection Agency to be highly contaminated, primarily through industrial uses of that land. For instance, Portland, Oregon has the Portland Harbor Superfund site, which for many years, substances like PCBS, heavy metals, PDT and other compounds were dumped in the soil inadvertently or through our naivety about the adverse effects. And now we've got them there and we have to decide how to clean them up or how to cap them in place so that people are not exposed to them and we can use the land in a productive way.

Sam Greenspan: I know that a famous account that happened here in the U.S. was the love canal.

Dr. Fred Berman: And if I remember right, I believe people were becoming sick - because the residential area was built on an old industrial cite and people had chemicals oozing into their basements, and they've been complaining for years over at the high level of illnesses and then finally was revealed, that this was a big chemical waste site. Finally, eventually they just had to buy everyone out of their homes. So no one lives in that area anymore.

Sam Greenspan: Yeah, and I imagine it'll take generations and generations for those chemicals to break down to a level that might be safe.

Dr. Fred Berman: Oh yes, or just a huge expense to try and remediate and remove those chemicals from the ground. But there are just thousands of examples of contaminated groundwater or contaminated soil and have occurred because we didn't know better back in the day.

Sam Greenspan: Right. Yeah.

Dr. Fred Berman: People always thought that the solution to pollution was pollution -

Sam Greenspan: [laughing]

Dr. Fred Berman: - but that's not true, if what you're putting into the ground is not going to break down for thousands, well, for tens, hundreds or thousands of years.

Sam Greenspan: Yeah, and I think it's a similar store with lead paint too, right?

Dr. Fred Berman: Yeah, we didn't, they didn't really consider the hazards of lead and lead was ... it was white lead. I think what went into white paint. They didn't consider that the lead might turn into dust. You know, the paint my turn into dust and people would be exposed to it.

Sam Greenspan: Yeah.

Dr. Fred Berman: Asbestos is another great example of a situation where they just did not foresee or know about the hazards of inhaling asbestos particles.

Dr. Fred Berman: I mean, it gives a great fire retardant, a good insulator, but terrible if you breathe in the particles.

Sam Greenspan: Right, and that's especially bad for the vulnerable populations like youth or the elderly. I imagine there's the possibility that those types of chemicals can interact with all the new things that they're using now. I mean, every year there's more and more things that they're being used to be able to try to have higher yields like the pesticides and herbicides and whatnot. Is that true?

Dr. Fred Berman: Well, it's true that there are a lot of chemicals out there in industry that we don't know a lot about, and so we have to be vigilant about, what those hazards might be. As we introduced those compounds into commerce without fully investigating what the impacts of those chemicals might be on the pesticide side of things, we've done a lot of positive things to reduce the hazard from pesticides, by either eliminating some of the most toxic or persistent, or at least restricting their use to only highly trained individuals who know how to use them in a way that minimizes the risk of exposure to non-target organisms like human beings. Somewhat less hazardous pesticides in large part. So, it's incumbent upon us to understand just how hazardous they are and how to avoid adverse effects, even though they are not quite as hazardous or as chemicals that they used in the past.

Sam Greenspan: Okay, cool. Well, especially in light of the fact, the recycling here in Portland has been changing and cross the whole nation. It's really important that we

understand the effects of what this means long-term for not just the workplace, but for everybody.

Dr. Fred Berman: And our natural environment as well.

Sam Greenspan: Yeah, that's true the Earth in general. All right, so lastly, Fred, can you share with our listeners some helpful resources on toxicology and how they can reduce risks?

Dr. Fred Berman: Yeah, certainly. You know, a lot of people use pesticides around their home and oftentimes they misuse them because they fail to read the label. So, very good resources is the National Pesticide Information Center. They have specialists who can help you understand the least risky way to use pesticides should you choose to use them. And also they advocate for integrated pest management systems to where you can avoid use as of pesticides. So until it becomes the last resort. Another good resource are the toxicology resources from the National Library of Medicine, and you can Google toxmet, t-o-x-m-e-t it leads you to have a large variety of databases, so resources with information on chemicals, also tutorials and educational materials that are quite frankly enjoyable to review and to use.

Sam Greenspan: Awesome. That's great. So, that's all the best information, but it's also very accessible so that so that anyone can understand it.

Dr. Fred Berman: Yeah. Yeah. For the most part, you know, some of them before technical it's peer reviewed. It's highly reliable information, very credible.

Sam Greenspan: Cool. Awesome. Well, thank you so much, Fred for joining us today and sharing with our listeners all the important work that you do, and for providing a wealth of information on toxicology and reducing risks both on and off the job.

Dr. Fred Berman: Oh, thank you. It's been my pleasure.

Helen Schuckers: Subscribe to our blog, Oregon in the workplace or tune in into our social media channels at facebook.com/occhealthsci.ohsu or follow us on Twitter at OHSUocchealth to stay updated on current research resources, news and community events.