

Q&A with Dr. Kris Hansen

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THE ORIGIN STORY

Q: *We worked together at 3M in the late 90s and early 2000s. You were doing work then that the world is only now fully reckoning with. What was it actually like to be inside that moment — to find PFOS in human blood and not fully understand yet what it meant?*

A: The science was fascinating, some of the most interesting work I ever did, but the pressure was off the charts, especially for a very new, very young scientist in a huge corporation. I was a young researcher collecting unpopular data. No one was ever happy to see me show up with new information. I'm grateful I had such a competent team working in the lab with me doing good science; it gave me confidence in the data we were collecting. But I didn't enjoy the executive attention the work received.

Q: *When did your understanding of what you'd found start to shift — and what was that process like personally and professionally?*

A: In 1998 I had a conversation with a senior scientist who had done what I now understand was some of the original work conducted at 3M characterizing PFOS in the general population. He was confused about why our work was getting so much (primarily negative) attention in 1997–98, when he and his colleagues had discovered the same thing two decades earlier. That conversation unnerved me and I reported it immediately. At the time, I thought the scientist was referring to a small, informal effort by just a couple of scientists.

It wasn't until around 2022 that I accessed public documents from 3M's lawsuit with the State of Minnesota and really understood how much the company knew, and how involved 3M executives were in driving that work.

THE SCIENCE OF PFAS

Q: *PFAS is a class of roughly 10,000 compounds, and the scientific and regulatory community is still debating whether to treat them as a class or compound by compound. From a scientist's perspective, which approach is right — and why does it matter so much for medical devices specifically?*

A: I've seen references to the class of PFAS containing anywhere from 1,000 to 15,000 different compounds, which in my opinion makes a strong case right there for looking at these as a class: we simply can't currently characterize them all. I remember analyzing samples from effluent associated with 3M's manufacturing processes in the 1990s. We'd spend literally weeks analyzing a single sample using different methods and would still have a significant fraction of the PFAS we couldn't characterize. Even today, when we can account for 40 to 60 percent of the PFAS in an environmental sample, we're doing well. That complexity is not a reason to say: if we don't know what it is, we might as well not pretend it's not there.

The two PFAS that are most well characterized, PFOA and PFOS, have been evaluated by the International Agency for Research on Cancer. PFOA is classified as carcinogenic to humans; PFOS is possibly carcinogenic to humans. Exposure to carcinogens is a serious concern for anyone, but especially for someone managing a chronic disease. Other PFAS have been shown to have significant health effects, particularly for vulnerable populations including pregnant people, infants, and children. So I don't accept the argument that, since industry hasn't invested the effort to fully characterize the compounds they produce, we should all agree it doesn't matter.

This is especially true for the medical device industry, where you may be providing chronic care for patients with chronic diseases: vulnerable populations. We need to be very aware of anything to which we are exposing those folks. Maybe we decide it is worth it: some level of PFAS exposure to provide a life-saving implant. That can be a reasonable conclusion. But that risk assessment should be made from a place of knowledge, not denial or willful ignorance.

Q: *The persistence argument — 'forever chemicals' — is central to the public narrative. But persistence alone doesn't equal toxicity. How do you think about that distinction, and where do you think the science actually lands?*

A: First, let me be clear: I am not a toxicologist. But I am a scientist, and I can read papers and evaluate data, and there is an abundance of data on the toxicity associated with different PFAS compounds. From carcinogenicity to suppression of the immune system, cardiovascular disease, complications for both mother and fetus during pregnancy, and compromised liver function. I feel confident asserting that these chemicals are not inert, and that in many cases there are real health effects, particularly for sensitive populations. As scientists, we need to make decisions about risk from a position of knowledge. The public narrative about PFAS remains woefully incomplete.

Q: *Medical devices have long relied on PTFE, FEP, and other fluoropolymers because of their unique performance properties. How should the device industry be thinking about the difference between those materials and the PFAS compounds at the center of the contamination story?*

A: Some will argue that fluoropolymers should be exempt from regulation because the polymers are often biologically inert. There are two caveats worth considering. First, the manufacture of fluoropolymers results in the emission of smaller, more mobile PFAS that become part of our public health exposure profile. I've seen references suggesting that up to 80 percent of current PFAS emissions in the environment are associated with fluoropolymer manufacture. Second, fluoropolymers can carry residual monomers and impurities, PFOA and other compounds riding piggyback or tucked into polymer chains, to be released when conditions are right.

I do think there is a place for fluoropolymers in some critical products, and that may include the medical device industry. But those polymers should be produced in such a way that both production waste and product impurities are rigorously controlled or eliminated. There is a cost associated with that level of care. But the medical device industry is not fast fashion. If there is ever a context in which rigorous control of product residuals is warranted, this is it.

THE REGULATORY LANDSCAPE

Q: *There's a real tension in the device space between 'PFAS are harmful and should be eliminated' and 'some PFAS-based materials have no viable alternative and patients depend on them.' How do you think that tension gets resolved responsibly?*

A: I think the resolution lies in thorough, careful science used to inform genuine patient risk assessment, and I want to be specific about that phrase: patient risk assessment, not cost assessment. The questions we need to answer are not unknowable. What PFAS residuals are present in a given material? What is the toxicity profile of those specific compounds? What are the effects of long-term exposure in a population of people already managing a chronic disease? And ultimately, is the risk imposed on the patient by those chemicals acceptable when weighed against the risk of a different course of treatment, or no treatment at all? Those are hard questions, but they are answerable ones, and answering them is exactly what the science can do.

What I find is that the industry often frames the tension as a binary: eliminate PFAS or keep them, when the real work is in minimization, characterization, and honest risk-benefit analysis. That work requires investment, and it requires a willingness to act on what the data shows even when the answer is inconvenient. I think often the real tension is about profitability, not about patient risk.

WHAT INDUSTRY SHOULD DO

Q: *What does responsible PFAS stewardship look like for an industry that genuinely needs some of these materials to make life-saving devices?*

A: When I worked in the medical device industry, I worked with and met many brilliant scientists, people who were passionate about their work and their patients, who worked to follow not just the letter of regulations and guidance documents but the spirit of them. The science and engineering needed to manufacture polymers and medical devices that essentially eliminate environmental and patient risk already exist. The industry needs to prioritize implementing those solutions.

RESEARCH INTEGRITY & READING THE LITERATURE

Q: *There have been reports over the years suggesting that industry funding and influence have shaped how PFAS research has been communicated and published — a pattern that's not unique to PFAS but is particularly well-documented in this space. Having been so close to this science for so long: has that reality changed how you approach published data? Do you find yourself reading literature differently now — paying more attention to funding sources, conflicts of interest, or the questions that don't get asked? And what advice would you give to researchers and early-career scientists who want to publish honest, independent work in a field where those pressures exist?*

A: My experiences have absolutely affected how I approach the technical literature. Checking affiliations, funding sources etc. is the first thing I review before investing my time reading an article. I also look at what references are included in the article. If a company is just citing their own research and ignoring everyone else's, well, that's a red flag. It's not that I don't read industry-sponsored research, but I do so with a heightened awareness of what is

and is not being addressed in light of a corporation's economic objectives.

I don't have a solution, however, for industry researchers who want to publish but are prohibited from doing so. One can and should refuse to author/represent conclusions you know are incomplete or incorrect, but it's harder to demand to publish if the corporation chooses not to. The research that doesn't get published, the questions that don't get funded, the critical results that stay inside the institution... that's what the sociologists call "Undone Science" or "Unseen Science." There's no individual-level solution that I know, unless it's just awareness that the conduct has a name.

Combating that challenge requires structural change: stronger disclosure requirements, independent funding for public health research, personal accountability for corporate executives, and journals and institutions that take seriously the difference between a negative result that was published and a negative result that was buried.

THE PERSONAL & ETHICAL DIMENSION

Q: *You spent 26 years at 3M, including years after you'd made findings that were suppressed. That's an incredibly complex position to be in. What do you want people — especially scientists early in their careers — to take from your experience?*

A: One of the unexpected benefits of the ProPublica/New Yorker article has been the number of people early in their scientific careers who have reached out for advice, or just to talk. It has been genuinely gratifying to speak with up-and-coming scientists who are motivated to use science for public health and positive change.

Reflecting on my time at 3M, one of the most important things I learned is that the data is my anchor. I tried to do the best science I could, document it carefully, and then let the results stand for themselves. It was never about me: it was about the data. I won't get this exactly right, but there's a quote: in a room where people maintain a conspiracy of silence, one word of truth sounds like a pistol shot. I think, in that environment, not everyone would speak up. I'm glad I did.

FINAL THOUGHTS

Q: *Thank you, Kris — for your time, your candor, and for sharing knowledge that so few people in this field have. As a final thought: is there anything else you'd like to share or advice you have for the medical device community as we navigate the evaluation and criteria for PFAS compounds?*

A: Medical devices provide life-saving therapy for so many people. I always think of metered dose inhalers as an example — the American Lung Association used to say: when you can't breathe, nothing else matters. We need those devices. They make life livable for so many people. And PFAS should be approached with the same rigor we apply to every other component of device development and construction. We need to ask and answer the critical questions that relate to patient risk, so we can be confident those risks have been fully evaluated.

A PERSONAL NOTE

Q: *We were colleagues during the years when your PFOS research was first unfolding. Looking back at that time from where you stand now — what do you wish someone had said to you then?*

A: Soon after the ProPublica/New Yorker story, I met a couple of sociologists who study, among other things, the ways in which industry manufactures doubt. They taught me so much it was almost like therapy. I had always felt that my experience was unique, but what I learned from them was just the opposite: there is a rich academic field on how industries use doubt and the deliberate cultivation of ignorance to continue making irresponsible decisions, decisions that, more often than not, benefit corporate profits at the cost of environmental and public health.

I wish I had been exposed to those ideas in undergrad or graduate school. As it was, I trusted too completely in the corporation and in corporate leaders. I'm always looking for opportunities to talk about my experiences, just to make sure that new scientists have that perspective, something I learned the hard way.