



2025 year in review: Five insights we're still thinking about

Welcome back to Science Changing Life – I'm your host, Lauren Fish. As 2025 comes to a close, we're taking a step back to reflect—not on everything that happened this year, but on what stayed with us. Scripps Research scientists shared their thoughts that continue to shape how we think about science, health and the world around us. In this special year-in-review episode, we're revisiting five insights we're still thinking about. Take a listen.

Insight 1: Amy Lightner on her advice for aspiring scientists

So I think it's just finding what you really are passionate about, what you really love, because especially in science along the way, there's a lot of failures. And a lot of times things don't work and it can be very frustrating. Well, you spend so much time doing it right, so much time, and then something doesn't work as you expected it to, and you have to pivot. And so I think you have to really love the why of what you're doing, what you're doing.

So I think it's just making sure that what you're doing, there's something that really resonates with you that drives kind of the intrinsic motivation, because someone from the outside is not going to be telling you, keep going, keep going. You're doing a great job. So there's just something has to resonate with you that really drives you forward. And so I think finding that thing will be very helpful as you go through along the way, because there's ups and downs in every career. And so I think that carries people forward if they have some kind of personal connection that they're really excited about what they do.

Insight 2: Cindy Ehlers on the genetic connection to alcohol dependence

Data suggest that alcoholism runs in families. We've known this for quite a long period of time. And in studying the genetics, we understand that about 50% of the risk for developing alcohol dependence is genetic, and the other 50% is less understood factors such as culture and the environment.

One of the well-known protective factors against developing alcoholism is differences in alcohol metabolizing enzymes, which are found in different ethnic groups. The one ethnic group that's probably understood the best is Asians. In about 40% of Asians, one

of the enzymes that metabolizes alcohol—aldehyde dehydrogenase—is less active. Because of that, they have problems metabolizing alcohol. And so, when they drink, they experience a facial flush. They often have headaches and high blood pressure and rapid heartbeat; and because of this, they're at very low risk for developing alcoholism.

Differences in alcohol-metabolizing enzymes are also found in African Americans, which also lowers risk in that group. We have found that one of the alcohol-metabolizing enzymes is also different in Hispanics and provides protection within that group. But it's also very important to note that cultural factors affect alcohol dependence and affect it differently depending on the cultural group. For instance, new immigrants—and we've studied this in Mexican Americans in San Diego County—that are experiencing difficulties in adjusting to the new culture. This is called acculturation stress, and we've found that acculturation stress can lead to loneliness and also lead to increased risk for developing alcohol dependence.

And among American Indians, the legacy of historical trauma—the loss of their lands, culture and language; and the genocide that was foisted upon them early on in this country—has led to a lasting legacy of trauma. And historical trauma is associated with increased risk for alcohol dependence and suicide.

Other factors such as religion are really important because they provide protective factors. If a religion bans the use of alcohol, then people don't get exposed to the drug, and so they have much lower risk. So, it's combined genetic and cultural and environmental factors that lead to the final risk in any one individual.

Insight 3: Josh Levy on wastewater surveillance's wide-reaching capabilities

Wastewater surveillance is wildly flexible. We can use wastewater surveillance anywhere from the level of individual buildings to the whole City of San Diego—and this can be used in very targeted ways. So, if there's a nursing home where we're worried an outbreak could lead to significant public health issues, we can monitor specifically that one building to make sure that no outbreaks go undetected and lead to potential disease spread across the community.

That also means that we're able to use this in a whole variety of contexts. So, we can use this to monitor migratory birds as they move from place to place. We can also use this to monitor communities that might not have formal sewage infrastructure. So, by using some creative approaches, we're able to collect in slightly different ways and do the same sorts of analyses that we would for wastewater at the community scale.

Insight 4: Julia Moore Vogel on common misconceptions around Long COVID

There are so many things that are misunderstood. I'm making a whole list in my mind—misunderstood by the general public. So I think one of the most misunderstood things is that you can have an asymptomatic COVID infection where you actually didn't even know that you had COVID unless you happen to test at that time, and you can develop long COVID from that.

You can develop long COVID from a mild COVID case as well. A lot of times, there's this misperception that it's mostly folks that were hospitalized, but it can also develop from even an asymptomatic infection. So that's another challenge with people labeling their own illness as being part of a COVID infection if they didn't even know if they had it.

A misperception among even the medical community is about how to address the fatigue that's caused by long COVID in a lot of people. And there is a tendency to prescribe what's called graded exercise therapy—so it's the idea that you're doing a little bit of exercise and you're adding, you're adding, you're adding over time. And I mentioned before, the energy envelope concept of “you have only this much energy, you have to stay within your envelope.” Those two things are completely at odds with each other. You can't add and expand the size of your envelope; that's just not how it works. It actually makes the condition much worse. And many folks, myself included, got that sort of advice and it has made us worse. So it's really important for the medical community to understand that.

The other thing that's really important for the medical community and the population at large to understand is this is not a condition that is in people's heads—this is real and biological. There's a lot of evidence out there that we can talk about demonstrating the biological changes that are behind this, and that's why you'll see so many people in the long COVID community continuing to mask and take precautions alongside, of course, immunocompromised individuals as well.

But we in the long COVID community know what can happen to you by getting a COVID infection—and we try very, very hard to avoid it. The other thing I'll say is just because you get COVID once and you don't get long COVID, does not mean that you're free and clear. You could get long COVID from any given infection; each one is a roll of the dice.

Insight 5: Sumit Chanda on how we should prepare for future viral threats

I think people are getting into, okay, the last pandemic was a hundred years ago. We're not due for another one in a hundred years, but this is just like these hurricanes and floods and wildfires. The ground beneath us has shifted, right?

The rules of the game have changed. So once in a hundred year floods are now happening once every 10, 20 years. Once in a hundred year wildfires, same thing.

Hurricanes, same with pandemics. If I were to put money down, I would say in the next 20 years, there's greater than a 50% chance that we're going to see something, I mean, first of all, we're way better connected by traveling.

It's basically the playing field, right? We are encroaching into areas that these reservoir species generally inhabit. So there's more chance of that interaction. So that chance jump, which is called a kind of zoonotic event, and then with dengue, the vectors that carry this because of climate change, the footprint is changing.

The reason now we have *Aedes aegypti*, which carries Dengue and West Nile and other mosquito-borne viruses, is that because those are now, our climate is becoming more habitable to those before they were restricted to the tropics. And it's bad there. It's not great there, but it was out of sight, out of mind for us.

But the climate is changing. The climate changing causes these species to adapt new areas of habitation, and that means that we're going to have more interactions with them. That means the risk is going to get worse, not better. So that a hundred year paradigm, you throw in a couple of airplanes into that shifting climate, and we are primed. And so that's the bad news. The good news is we know what to do. It is just getting together. I think the political will both domestically and internationally. This is, again, viruses don't know nation states. That's just not a thing. And so this is a world issue. And so the first line of defense is surveillance, knowing what's out there, knowing what's popping up, getting a global early warning system in place, and that's the first thing that we need to do.

The second thing is there needs to be a more concerted effort to develop tools that can save us from this. Before SARS-CoV-1 came out, people were developing drugs and vaccines, but by 2008, they just stopped. They said, oh, problem solved.

Don't have to worry about it. The drugs that we have now didn't come from nowhere. They didn't start from scratch. The Pfizer drug was originally, paxlovid was originally being developed for SARS-CoV-1, they stopped it, and then they kind of brushed it off and used that. They were developing a vaccine for SARS-Cov-1 that they stopped funding in 2008. Now, would that being a perfect vaccine? No. But would it have saved hundreds of thousands of lives? Yes.

As we look ahead to 2026, one theme ties all of these conversations together: science doesn't happen in isolation. Whether it's supporting the next generation of scientists, recognizing the biological reality of Long COVID, or building the surveillance and tools

needed to confront future viral threats, these insights remind us how science needs collaboration, persistence and sustained attention in order to thrive.

Thank you for listening to Science Changing Life this year. If you found this episode meaningful, please share it with a colleague or friend—and join us in the new year as we continue exploring the discoveries shaping our future.