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What worms are telling us about aging — and more with the Buck Institute's incoming chief scientific officer

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For Malene Hansen, science and education is a way of life.

The new chief scientific officer at the Buck Institute for Research on Aging in Novato will step into the job next month with a particular focus on helping scientists understand how their work can be applied to the mechanisms that make us age.

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Malene Hansen is the incoming chief scientific officer at the Novato-based Buck Institute for Research on Aging.

At the Sanford Burnham Prebys Medical Discovery Institute in La Jolla, Hansen is associate dean of student affairs, a faculty adviser of postdoctoral training as well as a professor in the development, aging and regeneration program. She also is director of the research

and development core at San Diego's Nathan Shock Center — a multi-site effort by the National Institute of Aging targeting basic research into the biology of aging — and chair of the National Institutes of Health's cellular mechanisms of aging and development study section.

Born in Denmark and an avid volleyball player since moving to the San Diego area after her postdoctoral work at the University of California, San Francisco, nearly 20 years ago, Hansen will start the transition to the Buck in February. She won't fully assume the new post until Aug. 1.

"They all say when you start a new job, the most important thing is to learn and listen, so there will be an extended period for me to learn," Hansen said. "To some extent, we do a lot of things online (because of Covid), so I will be in two places at the same time."

Edited for length and clarity

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What attracted you to the Buck Institute? Step back 20 years, I was a very fresh postdoc at UCSF — early 2001 — and the Buck had really just started. It was sort of brand new, but I hadn't known I was doing aging research. We were fully aware of this beautiful new building and aging institute that was about to open north of San Francisco — I knew a postdoc there — so the time came for me to look for a job at the end of my postdoc and I thought that would be a cool place to work, but there were no openings. So I ended up in San Diego.

I have seen them grow stronger and change leadership and recruit new people. It's been exciting to see.

It's a homecoming for me.

Describe your role as CSO? I guess it's an internal but also external position. Mainly it is to help oversee the scientific operations, supporting the CEO, Eric Verdin, and the operations that support the research, including a set of really

outstanding core facilities that are in-house equipment and support to different research projects.

One of the things that I come in with is a lot of experience with education and training. So, really, first and foremost internally it is to oversee and develop and expand that aspect of the mission of the Buck: to educate and train the next generation of scientists.

Buck is the only, institute dedicated to aging research as a place for training and education within the field. So imagine something like expanded sabbatical programs for faculty or people that are interested in entering that field. I think the institute would be in a really unique position and has unique potential for that.

But it's also to help see this vision through and help with other aspects, like fundraising and communicating the mission more broadly.

So you're talking more about helping people who are already in research bore deeper into the aging research area, right? Exactly. I suppose we build like an office dedicated to education, training and mentoring. "Education" is really related more to students — the bachelor's, masters or Ph.D. level — but "training" is the word we typically have used when we educate or train our postdoctoral fellows, the scientists who are technically in a little bit of a prism shift or running independent groups of their own, or "mentoring."

They are faculty that are doing something related to aging but need sort of a way to enter the field.

The Buck is one of the research centers that the National Institute on Aging supports what are called Nathan Shock Centers of Excellence. The Buck recently won one of those awards — here in San Diego, I've been part of bringing in another one — but it's meant as a center that has a research component where people provide cores internally and externally. But all of them also have a research and development component that would speak to this training and education of the next generation of researchers.

They may be in other fields that are now just realizing, "Well, perhaps, this aspect of my research is relevant to aging," but you know it can be a big sort of hurdle to climb and learn a new language.

The idea is, they will help more people get interested and educated and knowledgeable around the field. It's like training without borders.

The Buck has done a lot of translation work — pushing projects beyond the lab bench, closer to handing those off to a for-profit company and patient bedsides. How will you be involved in that work? They've been incredibly successful. Working with that team would be an objective for me for the future. But it's not my first and foremost job as I walk in. It's definitely important. I have done some of it here (at Sanford Burnham Prebys), more in a supportive role.

Your own research is an "autophagy." Tell me more about that. "Auto" means "self" and "phagy" means "digestion" or "to eat." It's a cellular recycling process.

This was a research area that I kind of took on as a postdoc at UCSF. It later was recognized by the Nobel Prize in 2016 — Yoshinori Ohsumi of Japan was the first to kind of decipher many of the genes and the building blocks of the process.

Think about it like how your household recycling works. You put your plastic bottles in a bin, the truck comes and takes it to the recycling plant — it is very similar to how the cell does it. It will take an old liquid droplet or even maybe an invading bacteria that it wants to get rid of, and it can sequester it into sort of bags of trash that are literally like little vesicles within the cell that can be transported along internal highways toward other vesicles that have, like, little PacMen that can degrade the whole thing.

It needs to be very controlled, because you don't want to have these little PacMen running around the cell and chewing up everything else. You can selectively pick up things that are no longer functioning, or malfunctioning, and help keep the house clean.

But something goes wrong? As many other things go with aging, this tends to be a process that doesn't work as well anymore. We have studied this in a short-lived nematode called C. elegans that lives for a couple of weeks.

You can actually observe many of the changes that will happen during aging in our cells. There tends to be more damage accumulating and, at the same time, this process doesn't work as well, so it can't keep up with the damage or the trash, or there is too much trash that now complicates the process.

We don't really know the chicken-or-egg side of that, but what we are trying to figure out is, how can we intervene and kind of make this process work better for longer.

There seems to be very strong links for many diseases, like Alzheimer's disease, where you have a lot of aggregated kinds of plaques and proteins that are not functional. This process is very critical for neurodegenerative diseases beyond general basic biology of aging.

It's an objective that's very strong also for the Buck that we would eventually like to translate into interventions.

At UCSF, you worked in Cynthia Kenyon's lab, one of the top folks in aging research and now vice president of aging research at Calico. What stays with you from that time, in terms of management of a lab or how you approach science? When I was in the Kenyon lab, it was an exciting time. She was really pioneering the genetic approach to thinking about aging and, subsequently, a number of us that have come out of her lab and other labs have really started to make more sense of what really was a time of finding a lot of things. ...

Being able to give back and help others contribute to the fields of their research interests is something I give a lot of thanks to UCSF. And then, obviously, still following what she's doing at Calico. I called her up (about the Buck job), and she thought for me to return and add to the Buck was a wonderful idea.

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