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HEALTH // AGING & LONGEVITY

This 'anti-aging' supplement is the hot new wellness craze — but should you take it?

By **Catherine Ho**, Staff Writer
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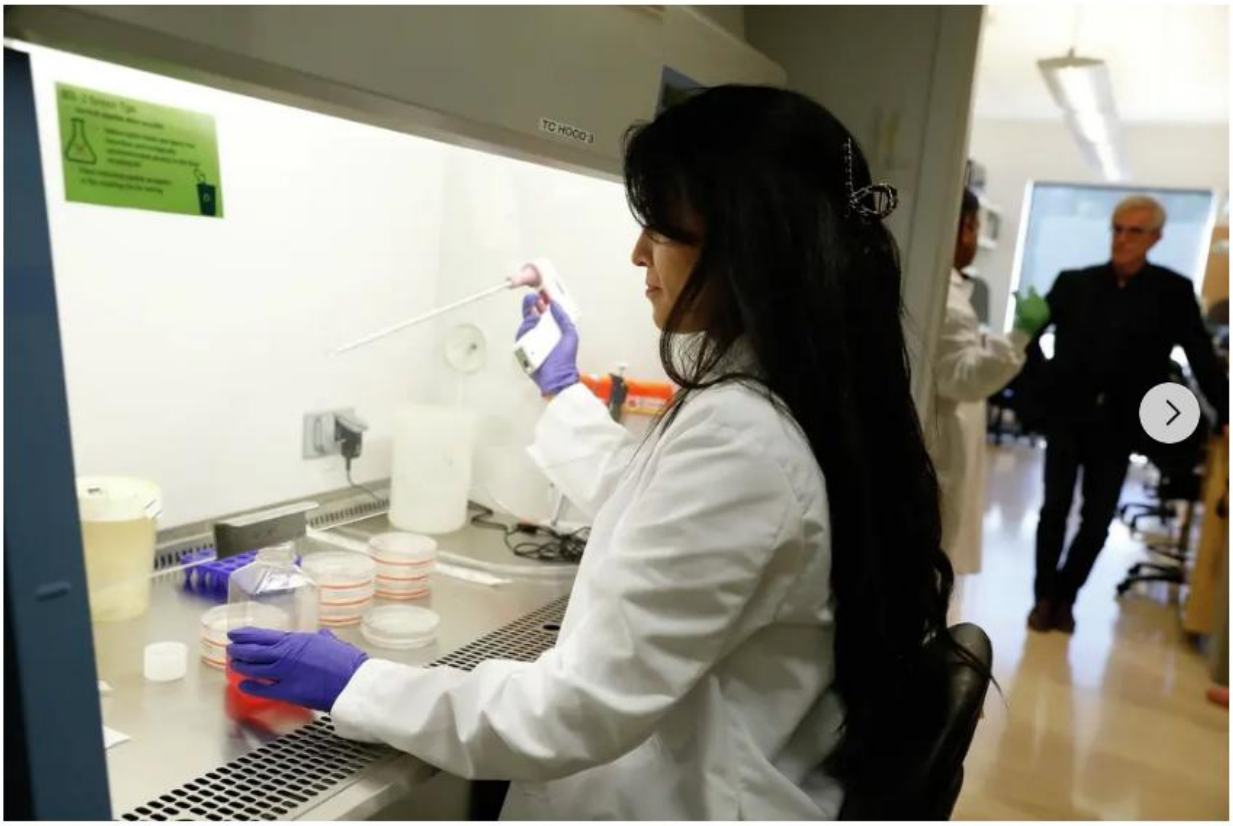

Postdoctoral researcher Genesis Vega Hormazabal works Thursday in a lab at the Buck Institute for Research on Aging in Novato, which studies age-related disease. Its president and CEO, Dr. Eric Verdin, says the hype around NAD supplements has outpaced the science.
Lea Suzuki/S.F. Chronicle

You may have seen wellness influencers touting the benefits of NAD on Instagram — or seen Kendall Jenner and Hailey Bieber getting IV infusions of the compound in an episode of "Keeping Up With the Kardashians." Some swear NAD supplements give them extra energy.

Researchers say NAD supplementation shows promise in animal studies, but urge caution because there have yet to be large clinical trials completed in humans that show proven benefits.

Here's what to know about the latest longevity trend.

What is NAD?

NAD, which stands for nicotinamide adenine dinucleotide, is a compound found in all cells of the body, particularly in the mitochondria, the energy centers of cells. NAD plays an important role in energy production, and is needed by sirtuins — proteins involved in cellular repair — to function.

Because NAD levels decline with age, the theory behind NAD supplementation is to restore NAD levels in the body, which then help sirtuins with cell function.

Buck Institute for Research on Aging research scientist Jingqi Fang, left, talks with Dr. Eric Verdin, the organization's president and chief executive officer, on Thursday in Novato.

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"NAD plays a key role in energy transfer in cells," said Dr. Eric Verdin of the Buck Institute for Research on Aging in Novato, an independent research organization that studies age-related disease. He likens NAD's role in the body to that of armored trucks in the economy.

“They take money from the stores and bring it to the bank,” said Verdin, who studies why NAD levels decrease with age. “If that stops, the whole economy grinds to a halt. NAD shuttles energy from one part of the cell to another.”

What does research on NAD supplementation show?

NAD supplementation appears to be safe, but hasn’t been studied in large controlled studies in humans, said Dr. Michael Fredericson, a sports medicine specialist and co-director of the Longevity Center at Stanford.

Most studies on NAD supplementation have been conducted in animals, and have shown it can potentially help DNA repair, neurodegeneration, organ health, insulin sensitivity and metabolism, he said.

“There’s a lot of promise here,” Fredericson said. “That’s why people are so excited about this.”

The findings in animal studies were particularly exciting because they show that giving high levels of NAD precursors to mice appears to alleviate some diseases associated with aging, like heart attack, stroke, cancers, type 2 diabetes, macular degeneration, Parkinson’s and Alzheimer’s, Verdin said.

NAD precursors are the building blocks to making NAD. Because the body cannot absorb pure NAD, NAD supplements are given in the form of precursors called NR (nicotinamide riboside) and NMN (nicotinamide mononucleotide). Taking the precursors gives the body the components to make NAD.

There are some important limitations to these findings in animal studies. For one, animal studies used much higher doses of NAD precursors than the doses that are used for humans.

And second, animal studies don’t directly predict what will work in humans, Verdin said, pointing out that researchers have identified cures for Alzheimer’s and diabetes in mice, but those have not translated to successful therapies for humans.

“The field jumped ahead of itself by selling the supplements,” he said. “The evidence in humans is lacking. It’s not nonexistent, but it hasn’t been as positive as we had seen in animal studies. People have seen some promising effects, but nothing I’d take home to say, ‘Everyone has to now take NAD precursors.’”

What should you know if you’re considering it?

There’s no specific agreed-upon dose for people, but supplement companies generally sell oral NAD supplements at doses around 125 mg to 250 mg per day, which are considered relatively low.

If you’re shopping for a reputable supplement seller, look for companies that have an independent certification of analysis, Verdin said.

Some wellness centers also offer NAD IV infusions, which experts do not recommend because the body can’t absorb pure NAD, despite some celebrities like Jenner and Bieber extolling the health benefits. NAD infusions may cause more harm than benefit because they can elicit a major immune response, including chest pain, diarrhea and nausea, Fredericson said. This is because the infusion puts a huge amount of NAD straight into the blood serum, where it doesn’t belong, and the body treats it like a foreign substance, he said.

“It’s not dangerous, you just feel horrible,” he said. “I’d stay away from the IV pure NAD because not only do you get that massive immune response, but you’ll pee most of it out. If you were going to try it, probably start with the oral forms.”

Fredericson cautioned against taking NAD if you have a history of cancer because in some animal studies, very high doses of NAD may enhance tumor growth.

Even though the doses in those animal studies were much higher than the doses you can find on the market for humans, “it’s just not worth the risk,” he said.

NAD supplementation can also raise homocysteine levels in the blood, which can be a sign of dysfunctional metabolism. Verdin said this was the reason he stopped taking it.

Who might benefit?

Fredericson has recommended NAD supplementation for some middle-aged and older patients who feel like they're not healing as well as they used to, or who feel like their energy level is not what it used to be.

"I'm prescribing it cautiously at this point," he said.

The main feedback he's gotten from patients, he said, is that some feel like they have more energy — though that may be a placebo effect.

Fredericson himself is taking 250 mg a day, and echoes that observation.

"It's hard to tell. I think my energy's been a little better than normal, but it's just so hard to tell because there's so many factors that go into it. Maybe I'm sleeping better. Maybe it's in my mind. But I think there's something to it."

If research does in fact show that NAD is neuroprotective, "that's going to be huge," he said. "We have to wait and see on that. It's one of those things where we still need more information. In five years it'll be the biggest hit in the world, or we won't even be talking about it anymore."

What anti-aging or longevity supplements should you consider instead?

Supplements in general are considered somewhat controversial, as studies have found that many supplements do not contain what the label on the bottle claims. Medical experts generally say supplements aren't necessary for people who get proper nutrition from their diet.

"There are dozens of supplements being touted or sold by different companies, and very few that have been shown to actually have an effect," Verdin said.

Among the most well-studied, he said, are vitamin D, vitamin B-12 and omega-3 fatty acids. Verdin recommends getting tested to see if you're deficient in these nutrients, and to consider taking supplements if your levels are too low.

Most of all, though, the most effective action you can take for aging well is to exercise, he said.

"People are looking for a magical pill that will solve their aging problem," he said. "Physical activity is the magical pill we have today. That has an enormously protective effect.

"I'd urge people to look at all of this with some degree of circumspection and to not forget what does work, which is great nutrition, physical activity, stress mitigation," he said. All the things your grandmother told you to do."

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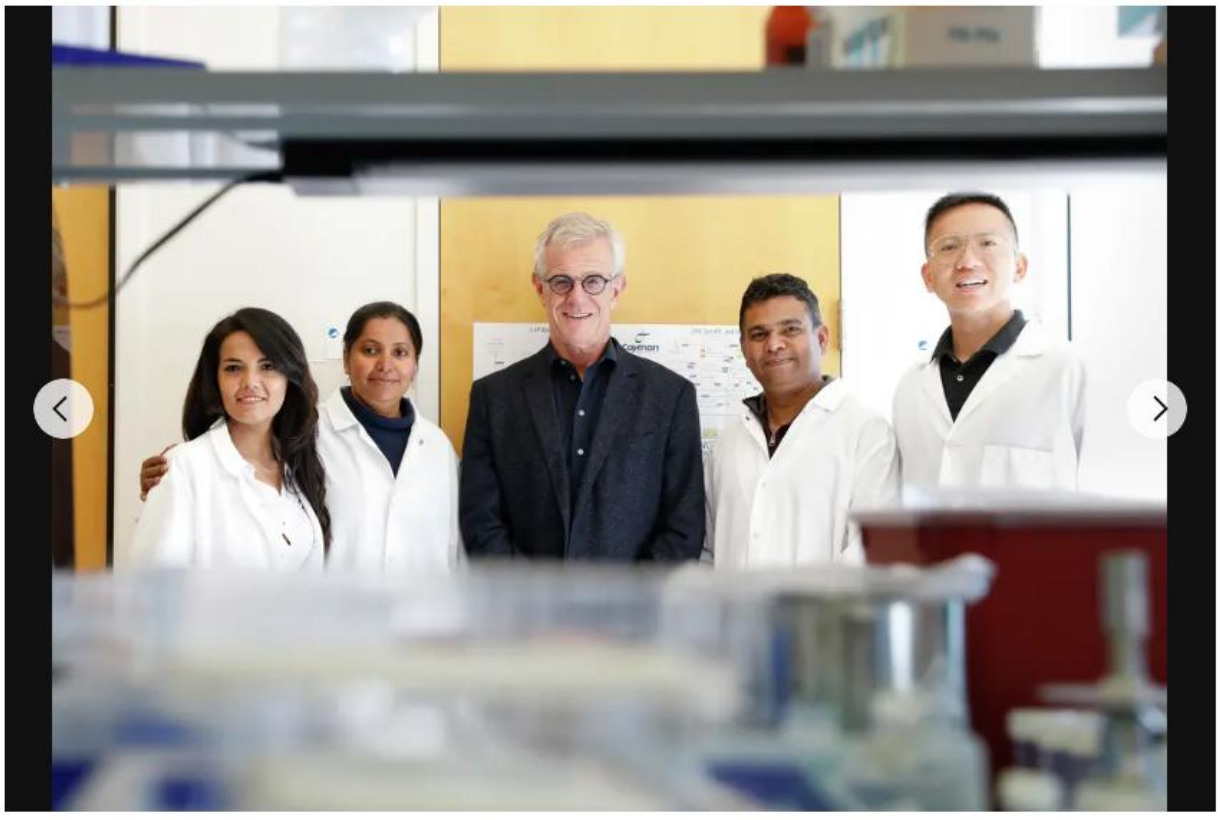
Catherine Ho

HEALTH CARE REPORTER

Catherine Ho covers health care at The San Francisco Chronicle. Before joining the paper in 2017, she worked at The Washington Post, the Los Angeles Times and the Daily Journal, writing about business, politics, lobbying and legal affairs. She's a Bay Area native and alum of UC Berkeley and the Daily Californian.



From left, Genesis Vega Hormazabal, postdoctoral researcher; Prasanna Vadhana Ashok Kumaar, associate director, Metalobics Core; Eric Verdin, president and chief executive officer; Durai Sellegounder, scientific manager; and Jingqi Fang, research scientist at the Buck Institute for Research on Aging in Novato on Thursday. The institute is an independent research organization that studies age-related disease.

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