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We can help identify ways to improve lives and create lasting progress where it is most important to you. Philanthropic contributions to UC Davis enhance care of ill patients, turn novel research into new treatments, develop tomorrow's health leaders and more.

Opportunities exist in your interest area, where you can make a difference.

For more information about leading-edge research at the UC Davis Institute for Regenerative Cures, please contact Laurie MacIntosh at 916-734-9408 or laurie.macintosh@ucdmc.ucdavis.edu.

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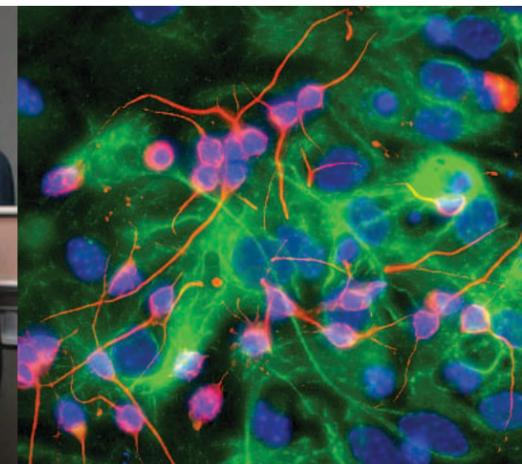
UC DAVIS INSTITUTE FOR REGENERATIVE CURES

A facility supported by the California
Institute for Regenerative Medicine



CIRM Spotlight on
Huntington's Disease at
the California Legislature,
March 2010

Pictured clockwise from
top left: Vicki Wheelock,
Sherry (patient advocate),
Claire Pomeroy, Judy
Roberson and Jan Nolta



How patient advocates changed the course of science



A group of families impacted by Huntington's disease inspired a "Eureka!" moment for Jan Nolta, UC Davis' pioneering stem cell researcher

It all started in an elevator.

"Have you ever considered using stem cells to treat Huntington's disease?" asked Vicki Wheelock, the director of the UC Davis Movement Disorders Clinic.

Jan Nolta pondered the question. Nolta, a stem cell researcher, was touring UC Davis Health System to consider directing the soon-to-be created Institute for Regenerative Cures. Like most people, she knew little about Huntington's disease. She knew it impacted the brain, and that it had caused the death of legendary folk singer Woody Guthrie, but not much more.

Nolta was honest in her response. "You know, for the last 20 years, I have been researching how to use stem cells to treat every part of the body except the brain," she said. "You know how difficult the blood/brain barrier is . . ."

Wheelock nodded. Over the years, many neurologists and scientists have tried to determine how to use medication to treat brain-injured patients. But the blood/brain barrier – a unique membrane that separates and protects the brain from foreign substances – rarely allows medicine to enter.

"The families impacted by Huntington's disease are truly remarkable," Wheelock said. "I'd love to introduce you to them."

And with that, she left the elevator to treat yet another person impacted by a devastating neurological disease.

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UC Davis Institute for Regenerative Cures



“Stem cell cures are the medicine of the future. Through our outstanding teamwork at UC Davis we will develop a vast range of treatments for the diseases and injuries that affect people around the globe. There has never been a more promising time for medical research.”

Jan Nolta, Ph.D.

Director, UC Davis Institute for Regenerative Cures and Director, UC Davis Stem Cell Program



“Medical universities of UC Davis’ power and reach have a unique role to play in curing the 21st century’s worst ills.”

Gerhard Bauer

Director, Good Manufacturing Practice Laboratory, UC Davis Institute for Regenerative Cures

Compelled to act

A few months later, Nolta had settled into her new role overseeing the UC Davis stem cell program and the Institute for Regenerative Cures. She had been wooed back to Sacramento, her childhood home, by voter approval of Proposition 71, which supports and funds stem cell research. Nolta brought with her an entire laboratory full of researchers who had been working with her at a prestigious Midwestern university. None wanted to work for anyone else.

The conversation in the elevator had never left Nolta. In fact, she’d begun to read about Huntington’s disease (referred to by many as “HD”) and the more she read, the more compelled she felt to do something, anything. Although HD is fatal, it does not impact enough people to make it profitable for most drug companies to conduct the expensive, lengthy research trials needed for new treatments. Yet 30,000 people in the U.S. are currently diagnosed with HD, and hundreds of thousands more are at risk of developing it.

Several months after her arrival, Nolta was asked to speak to Huntington’s family members about how she could help their loved ones. Up to that point, she had explored the use of bone marrow-derived mesenchymal stem cells (often referred to as “the paramedics of the body”) to produce growth factors that would cause dying neurons to flourish again – in essence, helping to repair brain damage that had already occurred. But she did not feel it was enough for Huntington’s.

“What research can we do to give these families real hope?” she wondered aloud.

Although scientists understood the mechanics of HD in the human brain, no one had found a way to counteract them. People with Huntington’s disease are born with an abnormal gene that contains an expanded and unstable DNA segment. Nolta quickly realized the enemy was the mutant Huntingtin (not “Huntington”) protein that is produced by the abnormal gene – and that this rogue protein, also known as “htt,” needed to be knocked down before it caused destruction. But how?

Breakthrough

While vacuuming one day, Nolta thought again of HD families she was about to meet – and an idea came to her. While the body’s own paramedic stem cells could help repair brain damage, perhaps they could also deliver a knock-out punch to the mutant protein that causes it. By engineering the paramedic stem cells to continually produce a htt-killer, this “RNA interference” strategy would keep the toxic protein from ever being made.

Nolta’s team tested engineered stem cells in a petri dish – and was thrilled to see the htt being decisively knocked down. If the same mechanism could be replicated in humans, HD could be treated, or possibly even cured.



Sending HD Safety data to the FDA for clinical trials discussion. Pictured left to right: Gerhard Bauer, Jan Nolta and GERALYN ANNETT



Gerhard Bauer in the clean lab, creating stem cells for safety testing



Vicki Wheelock, M.D., Director, UC Davis Movement Disorder Clinic

Wheelock shared the news with the Northern California chapter of the Huntington’s Disease Society of America, where members were encouraged enough to honor Nolta at their annual Celebration of Life dinner. It was here that she first experienced the full brunt of HD and its impact on patients and their families. People in all stages of the disease thanked her personally for doing whatever she could to help them. Family members of those who could no longer speak asked plaintively for her to do something.

Scientists are not supposed to cry. Thankfully, Jan Nolta is not your everyday scientist.

Support from patient advocates

The research team’s next challenge was to see if engineered stem cells could treat Huntington’s disease in mice. Regrettably, this type of research often falls into what scientists call “The Valley of Death” – where scientific insights and discoveries fade away due to lack of funding. The federal government will not pay for research that has yet to be proven to work, nor will many large foundations. So, what is an inspired scientist to do?

Nolta decided to talk with patient advocates. At a regional HD function, she made the case that groundbreaking RNA interference research could not move forward without their help.

Without hesitation, multiple families stepped up to offer generous support. They eliminated a year’s delay. That very night, Nolta made the calls to launch the project.

Reason for hope

After meticulous testing, Nolta and her team proved conclusively that mesenchymal stem cell therapy is safe in the brains of both mice and non-human primates. They applied for funding from the California Institute for Regenerative Medicine, the state stem cell agency funded by Proposition 71 bond sales, and were awarded \$2.7 million to demonstrate they can reduce levels of the toxic htt protein in the brains of Huntington’s patients.

Every experiment along the way has shown that RNA interference is safe and effective. After providing the FDA with a final round of requested safety data, we expect that UC Davis will soon be approved to begin human clinical trials for Huntington’s disease. The team is now actively applying for funding to initiate the actual clinical trial, as soon as clearance is obtained from the FDA.

This never would have happened without families touching the heart of a brilliant scientist – who believes to her core that there is, at last, reason for hope.