



Veteran HIV/AIDS Researcher Helps Uncover a New Strategy Behind Potential Cure

Dr. Savita Pahwa and her lab were part of a national research team that has helped a New York cancer survivor become the third person to achieve remission from HIV/AIDS.



Dr. Savita Pahwa, right, director of the University of Miami's Center for AIDS Research, in her lab with research assistant professor Suresh Pallikkuth.

Savita Pahwa, M.D., can clearly recall the start of her career as a pediatric immunologist in New York City during the early 1980s.

While she had spent years training to treat allergies, immune deficiencies, and cancer, her expected path was quickly



diverted. As the AIDS pandemic unfolded, Dr. Pahwa found herself tasked with caring for some of the first babies born with HIV.

It was a frightening time, when doctors and medical professionals did not yet know how the virus was transmitted. Many of her colleagues were afraid to come close to the sickly, vulnerable children because they feared contracting the illness themselves.

But Dr. Pahwa was not only determined to help her patients; she was also intrigued by the new pathogen. She collected samples and data to help identify the virus, and joined a task force, the International Maternal Pediatric Adolescent AIDS Clinical Trial (IMPAACT) Network, created by the National Institutes of Health (NIH) to find ways to combat the illness in mothers and children. Dr. Pahwa continues to work with pioneering medical colleagues at the University of Miami and across the country to develop and test drugs and treatments that help prevent HIV transmission and mitigate the impacts of the virus.

Naturally Mutated Stem Cells Lead to Breakthrough

Recently, Dr. Pahwa—who now directs the University's Center for AIDS Research—and her lab were part of an IMPAACT team that achieved a breakthrough. They were investigating whether using transplanted umbilical cord blood stem cells with a natural genetic mutation could potentially cure a patient with HIV/AIDS and cancer. At a medical conference in February, the team unveiled its findings: A patient from New York was only the third person, and the first woman, to achieve a cure of HIV, just 14 months after she stopped taking her antiretroviral drugs.



However, the patient, who was being followed by a team of doctors at Weill Cornell Medicine, also had acute myeloid leukemia, which is why stem cell treatment was offered in the first place.

“This approach does not offer a widespread means of curing HIV, because it’s a very restricted scenario where you have cancer and HIV, but it provides a roadmap toward a cure,” said Dr. Pahwa, who is also professor of microbiology and immunology, pediatrics, and medicine.

Umbilical Cord Cells Less Challenging to Match

Still, the methods used in the study—in particular, the use of umbilical cord blood that naturally lacks a genetic expression of the CCR5 molecule—demonstrate an important milestone for HIV/AIDS research, Dr. Pahwa said. While two HIV-positive men with cancer have achieved remission of HIV through stem cell treatments in the past, those earlier methods used adult stem cells that were delivered through bone marrow transplants. Since these treatments are more challenging to match, after receiving the adult stem cell transplants, both men suffered from a complication called graft-versus-host disease. Because the third patient did not suffer this complication, using stem cells from umbilical cord blood may offer a better path to eradicating HIV, Dr. Pahwa said.

“It’s more forgiving if you transplant umbilical cord cells than adult stem cells [found in bone marrow] because they do not have to be fully matched,” she added. “You can get by with only four of six antigens matched, and the immune system in umbilical cord cells is not fully developed to reject its new host.”



HIV/AIDS is particularly notorious for recurring if a patient stops taking antiretroviral drugs, even after years of using them. The patient in New York waited four years after receiving the stem cell transplant to stop taking her antiretroviral drugs. More than a year later, the IMPAACT team detected no HIV in her body. Then Dr. Pahwa's lab, including research assistant professor Suresh Pallikkuth, Ph.D., and senior research associate Margaret Roach, Ph.D., analyzed the patient's blood and observed no inflammation or immune activation, which are hallmarks of HIV infection. They also noted a lack of immune cells that recognize HIV.

Potential Pathway for Curing HIV/AIDS

It was a joyful revelation for Dr. Pahwa, who worked closely with lead IMPAACT investigator Yvonne Bryson, M.D., of the University of California Los Angeles, and other team members to fine-tune the study design.

For several years now, stem cells have been explored as a potential pathway for curing HIV because they can be purified in different ways. Then, after a patient receives the stem cell transplant, their body begins making new cells with the modifications. This often helps people with leukemia, for example, to combat the grueling effects of cancer drugs and achieve remission.

Over time, AIDS researchers have discovered that one to two percent of people are born with a natural genetic mutation that results in what is called "CCR5 deficiency." Since the HIV virus attaches to CCR5 co-receptors, in addition to CD4 molecules, to enter the body, people whose cells are CCR5 deficient have a natural resistance to HIV/AIDS. Transplanting stem cells from adults or babies with this genetic mutation



has served to successfully cure three people with HIV.

While stem cells offer one avenue for people with cancer and HIV, Dr. Pahwa said that AIDS researchers across the country are also exploring gene therapy in which they could reproduce cells without CCR5 for HIV-positive patients. This is one of many different approaches being tested as HIV cure strategies, she added.



Savita Pahwa, M.D.

“Before this study, we couldn’t figure out if the scientific data would support our idea that if you could get rid of CCR5, it could lead to AIDS remission,” Dr. Pahwa said. “Now, many researchers across the country are trying to figure out if you can really cure HIV by getting rid of CCR5 through gene therapy. One day, we may be able to take a patient’s own cells and treat them, so that CCR5 is inactive.”



The full findings of the IMPAACT P1107 study, which Dr. Pahwa hopes will soon be published in a major medical journal, will further describe the process they used to help treat the New York patient.

Early Study of HIV in Babies and Children

It is not surprising that Dr. Pahwa helped develop this treatment that harnesses the power of umbilical cord blood. It has been her life's work to treat young HIV/AIDS patients, starting with a four-year-old girl named Tara, who passed away in the early days of the pandemic, before physicians had even named the virus.

As chief of allergy and immunology at North Shore University in Long Island, Dr. Pahwa collected some of the first samples to help pinpoint HIV and distinguish its symptoms in children.

At around the same time, in the early 1980s, internist Margaret Fischl, M.D., and pediatrician Gwendolyn Scott, M.D., at the Miller School were seeing some of the first HIV patients in Miami. Dr. Fischl and a team of University of Miami physicians helped the U.S. Centers for Disease Control recognize that the virus was not confined to gay men and intravenous drug users. Dr. Scott, along with allergist and immunologist Wade Parks, M.D., and obstetrician and gynecologist Mary Jo O'Sullivan, M.D., began to treat babies with HIV in Miami, and confirmed that mother-to-child transmission of the virus was possible. Drs. Scott and O'Sullivan began the first clinical trials of AZT to reduce mother-to-child transmission, which later proved effective in curbing the spread of HIV. Meanwhile, Dr. Pahwa was doing her own trials of AZT on Long Island.



In 2004, Dr. Pahwa was recruited to the Miller School's Department of Microbiology by Eckhard Podack, M.D., Ph.D., to help spearhead its HIV/AIDS research. At the challenge of then-Dean Pascal Goldschmidt, M.D., Dr. Pahwa earned an NIH grant in 2007 to start the University's Center for AIDS Research (CFAR). Since then, the CFAR team has grown to include 19 Miller School faculty, including co-director professor Mario Stevenson, Ph.D., and Dr. Pallikkuth.

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