

# Homecoming provides hope for HIV/AIDS patients

June 20 2014, by Paul Mayne

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Eric Arts' arrival isn't about nostalgia; it's about combating one of the world's deadliest diseases.

Nearly 30 years ago, Arts, BSc'90 (Microbiology and Immunology), walked into Western professor Anthony Ridgway's lab looking to volunteer for the summer. Little did he realize that moment would solidify his research career, which has brought him full circle as Western's new chair in the Department of Microbiology and Immunology.

"I came to Western (as an undergraduate) with a general interest in [biomedical research](#). At that time, I thought I was interested in [cancer research](#)," Arts said. "He (Ridgway) said, 'Why don't you work on this [new virus](#), which was just recently discovered, called HIV.' I knew about the AIDS epidemic, but less about the virus, with it being 1986, and just two years after it was discovered.

"I got hooked and have been studying it ever since."

Arts is already one of the globe's leading HIV investigators, with strong ties to [developing countries](#) through Case Western Reserve University's Center for AIDS Research. Now, as Western's recently named Microbiology and Immunology chair, he joins an existing core of Schulich School of Medicine & Dentistry researchers already answering the riddles of HIV/AIDS.

"What Eric brings to the school is a whole range of different strengths," Schulich Dean Michael Strong said. "From the research side of the equation, we have a strong history here already in HIV research and virology and, in particular, looking at new treatment modalities.

"What Eric brings is an entirely new area of strength so that we have different ways of thinking about the virus and how it might be dealt with."

Arts adds to the high-profile HIV/AIDS expertise already on campus.

Dr. Chil-Yong Kang and his team, with the support of Sumagen Canada, developed the first and only preventative HIV vaccine based on a genetically modified killed whole virus (SAV001-H). In September 2013, Phase I Clinical Trial (SAV CT 01) of the vaccine was successfully completed with no adverse effects in all patients. The vaccine is currently in trials to test its immunogenicity and efficacy.

Strong noted this is probably the single largest recruitment that the university has ever done in bringing an entire team on board.

"From a leadership side, it is always important to be looking outside of your own walls for leadership – for new ideas and for people who bring things to the game that we haven't quite got here yet," he continued. "If you look at our school, one of the rich histories we have is in Microbiology and Immunology. What Eric brings is the next level to that."

Right now, the HIV epidemic is expanding in the human population, with approximately 33 million people infected worldwide and increasing by nearly 1 million each year.

Early on, general consensus was that all HIV strains were basically the

same and everyone progressed to AIDS at the same rate. However, this is not the case, as some strains progress in a couple years, while others can take up to two decades.

The strain expanding most in the population, generally subtype C of the HIV, is actually a strain that causes the slowest [disease progression](#).

"One of the difficulties is, if we don't develop a vaccine, or very good preventative strategies, this population will continue to grow and the burden of the developed countries to provide resources for treatment becomes more and more," he said. "What we really need is a way to prevent the disease, and prevent transmissions, rather than just treat the people that are infected. Otherwise, it will just continue to increase."

At its core, Arts' work explores the virus' rapid evolution, which makes its treatment a moving target for researchers. Utilizing new technologies and methodologies, including personalized medicine, Arts and his team look to stop that evolution in its tracks.

He has also provided the international medical community with a better understanding of how different strains of HIV mutate in different parts of the world, causing not only major differences in disease development but also varying timelines in terms of progression to full-blown AIDS.

"We've found that the strain of HIV that spreads most aggressively within populations, which is the one most dominant in southern Africa, eastern Africa, India, Brazil and China, actually causes the slowest disease progression," said Arts, who has authored or co-authored more than 120 papers in scientific and medical journals. "The findings show that the expansion of HIV in the human population is directly related to how long a patient lives with the virus and can transmit it to others."

One of the big developments for Arts is trying to design a way of

creating a vaccine that is personalized for every patient, in order to eliminate the remaining amounts of viruses in the patient's body when they're on long-term treatment. That would allow them to stop treatment and effectively be cured of the disease.

"One of the interesting aspects for us is the evolutionary biology in the virus, and how that impacts things like disease progression in a patient, how the virus changes, how the patients progress, how they respond to drugs, how we can design vaccines based on the evolution of the virus," he said.

As for a cure, Arts and his team have made some bold discoveries in the last year or so. Supported by the American Foundation for AIDS Research, as well as various pharmaceutical companies, Arts hopes to move forward with clinical trials within the year.

But he balances optimism with reality.

"There are two types of cures," he said. "One is where you eradicate the virus from the patient and never find it anywhere. Then there is the cure where you remove the burden of the virus so much that there may be a few cells that are infected with the [virus](#), but the immune system can effectively control it and you don't need drugs.

"I think the latter is more likely. A pure cure is probably unlikely."

Provided by University of Western Ontario

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