

# How our understanding of HIV/AIDS has evolved: Researcher shares his insights

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Credit: Klaus Nielsen from Pexels

Just over 40 years ago, the first case of acquired immunodeficiency syndrome—more commonly known as AIDS—was reported, setting into motion a worldwide panic about the unknown, devastating disease. At

the time, AIDS was universally considered to be a death sentence.

"It's very hard to recapture the widespread panic by the public when AIDS was first reported, although we had a little flavor of that with the SARS pandemic," said Jonathan Karn, Distinguished University Professor and director of the Case Western Reserve University Center for AIDS Research.

Living and working in the United Kingdom at the time of the outbreak, Karn was among the researchers tasked with applying his studies in gene-delivery methods to understanding the disease, which was similar to others he was exploring. He is credited with unraveling the [human immunodeficiency virus](#)' (HIV) transcription process, helping to shape further advances in understanding the infection that leads to AIDS.

In the years since, researchers' understanding of AIDS has advanced enormously, allowing for the development of drugs that can suppress the virus and enable patients to lead normal lives. But there is still much to learn about AIDS or HIV, the infection that leads to AIDS.

In honor of World AIDS Day (Dec. 1), The Daily sat down with Karn, a preeminent HIV/AIDS researcher, to learn how our understanding of the disease has evolved over time, how it has shaped our understanding of other viruses, and what misconceptions the general public still holds.

Answers have been lightly edited for clarity and length.

## **1. HIV has been the driver of the study of virology for the last 35–40 years**

Many of the tools that were developed to understand HIV and the infrastructure around them have been critical for exploring many other

viral diseases including Hepatitis C, flu, and coronavirus.

For example: The COVID-19 mRNA vaccines were derived from experimental vaccines strategies originally designed for HIV. Also, the clinical testing for the COVID vaccines was done through the HIV Clinical Trials Networks (including our site here at CWRU/UH), because those were the groups that were able to—within months—do trials on tens of thousands of people. Having that kind of intellectual capacity, and also practical capacity was extremely important for the COVID response, and will undoubtedly be critical in combating future epidemics.

## **2. When HIV was first discovered, there were essentially no antiviral drugs in existence**

There was a huge international effort to develop drugs against HIV. The initial drugs being used in the 1980s as single agents weren't very effective. The breakthrough came with the discovery that you have to use combinations of drugs in order to prevent the virus from escaping. And so by the late 1990s, which was nearly 20 years after the first HIV cases, there were the introduction of the first truly effective combination therapies. These types of combination therapies have become mainstay of HIV treatment these days, and the drugs have become increasingly refined.

## **3. There are some misconceptions that, since we have these great drugs, HIV is cured and you don't have to worry about it**

It's really not like that. People need to keep taking their drugs continuously, because when therapy is interrupted, any virus that is still lurking around rebounds. Then it's just like you've never been treated in

the first place! So a lot of contemporary HIV research is focused on where the virus is hiding, and if there are ways of targeting the virus that prevent the rebound.

#### **4. If you look globally, HIV is still a very major pandemic**

There are over 20 million people living with HIV globally. In Sub-Saharan Africa, it's still a very major global public health challenge. There are groups of people—especially young women—who are at high risk of acquiring HIV infections. We've been working with colleagues in Uganda for many years on HIV and also on tuberculosis. The situation in Uganda has evolved dramatically over time, and they now have access to all the latest drugs. The research has gotten much more advanced and we're working with them on some of these challenges of preventing virus rebound. So there are a lot of positive things on the science side.

#### **5. People living with HIV are generally willing to contribute to research efforts**

Because of the history of research on HIV, people are extremely willing to participate in clinical studies, and that's really driven HIV research forward.

It was a little shocking how difficult it was in comparison to get people who had COVID or long COVID to participate in [clinical studies](#) because there wasn't a history or tradition of getting involved, or activists in the community who could encourage participation in the first research studies.

Provided by Case Western Reserve University

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