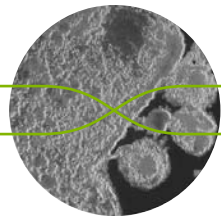




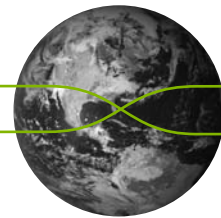
The Aaron Diamond AIDS Research Center
Affiliate of The Rockefeller University

NEW YORK CITY

Data: UNAIDS, World AIDS Day
Report 2011



1,800,000
people die of AIDS every year



7,300
people get infected with HIV every day

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ADARC
ADARC
ADARC
Science is the Solution

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New York City Mayor Ed Koch announces that a new HIV/AIDS research center will be built in the City, with support from the Aaron Diamond Foundation and the City

1989

Irene Diamond selects David D. Ho, MD to lead ADARC

1990



ADARC opens

1991

REMARKS FROM THE DIRECTOR



The mission of the Aaron Diamond AIDS Research Center, the world's largest HIV/AIDS research institute and my home for the past 20 years, is to find fundamental solutions to end the HIV/AIDS epidemic.

Irene Diamond founded ADARC in 1991 in response to the escalating epidemic that was killing a countless number of people each year. When Mrs. Diamond gave me the unique opportunity to lead the Center, the scientific community had many longstanding questions about HIV. We gathered some of the brightest minds in the field, and brought them together in a state-of-the-art facility, a comfortable and collaborative atmosphere that encourages the creative thinking that can spark lifesaving breakthroughs.

Since then, HIV/AIDS has become a global pandemic with over **33 million people currently living with HIV worldwide**. In the United States and other developed nations, people with HIV can now live long and productive lives with treatments pioneered at our institute. In the developing world, only a small fraction of the people who desperately need life-saving drugs have access to them. With over 7,000 new infections happening every day, it is clear that we must halt or slow the spread of this epidemic.

ADARC approaches HIV/AIDS research with a comprehensive focus. We study HIV's molecular structure and interactions with human cells, how it uses them to replicate, and how our cells fight back against the virus. We use the derived knowledge to create new treatment strategies as well as to develop novel preventive approaches. Our clinical program has spearheaded some of the field's most influential clinical trials, and continues to fulfill a vital part of our mission.

Private support helps us maintain a scientific environment that fosters creativity and bold inquiry. We believe that **science is the ultimate solution to this epidemic**, and your support makes our work possible. Please join us.

MAYOR DAVID DINKINS, 1991

“The creation of the Aaron Diamond AIDS Research Center represents an act of faith in our ability to end this epidemic through creative, hard work.”

1993

First demonstration of the genetic homogeneity of HIV in the blood of recently infected patients, which shows infection typically begins with a single virus.

ADARC HISTORY



The first cases of HIV/AIDS appeared in the United States 30 years ago. This new disease, clearly transmissible, was lethal. The public was alarmed, and the scientific community struggled to understand its cause while the epidemic grew to catastrophic proportions. Fear and ignorance led to discrimination. Even when HIV was identified as the pathogen that caused the syndrome, therapy for the infection was slow in developing.

Philanthropist Irene Diamond (above) embraced HIV/AIDS as the cause of her lifetime. In partnership with the City of New York, she set out to create New York's first institute dedicated to AIDS research. She named it the Aaron Diamond AIDS Research Center, after her late husband. An extensive search was held for the scientist who would lead



1995

50,000

the new organization. Mrs. Diamond selected a young California-based physician scientist: Dr. David D. Ho.

Mrs. Diamond, with Dr. Ho's input, oversaw the design and construction of ADARC's laboratories and administrative space. She envisioned an environment that would encourage scientists to interact and collaborate. She wanted them to be comfortable so they could focus on the science. She pushed for the Center to be operational as quickly as possible. ADARC opened its doors in 1991, and five years later, doubled its physical space. Nine large laboratories arranged around U-shaped corridors house ADARC's scientists—75 talented men and women from 34 countries. An administrative and support staff of nearly 25 people complete the Center's team.

ADARC's scientists work closely with leading research and funding organizations in the United States and abroad, as well as the pharmaceutical industry. **ADARC is proud of its academic affiliation with The Rockefeller University**, whose acclaimed research hospital provides a vital platform for the clinical translation of basic research findings developed in ADARC's labs, including new drug regimens and vaccines. This partnership maximizes opportunities for innovation and accelerates the research timeline.

"It's only been 30 years but it feels like a century since HIV/AIDS was first described. Irene Diamond was one of the first people to recognize the threat that HIV/AIDS carried as a new event in human history. Irene's vision, generosity and wisdom resulted in the founding of the Aaron Diamond AIDS Research Center, which has become one of the premier research institutions, creating the most important scientific advances in confronting HIV/AIDS over the past 20 years. We honor her memory and carry forward her vision."

GERALD FRIEDLAND, MD

ADARC CHAIRMAN

A microscopic image of cells, likely stained with a blue dye (possibly DAPI) and a red dye (possibly a fluorescent antibody). The cells are arranged in a cluster, and the staining highlights the nuclei and other cellular structures. The background is dark, making the stained cells stand out.

WALTER WANG, ADARC DIRECTOR

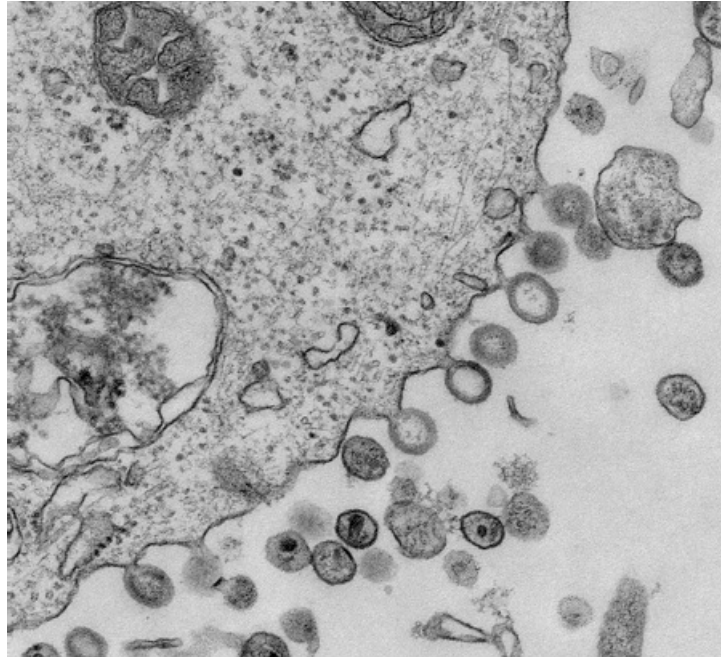
“I am honored to serve on the Board of ADARC, after supporting the Center for many years. I share the common goal and commitment of the Board, scientists and staff to fulfill ADARC’s mission to end the HIV/AIDS epidemic.”

Hallmark publications uncovering the highly dynamic nature of HIV replication in people. First clinical trial demonstrating the high antiviral activity of an HIV protease inhibitor in humans.

1995



UNRAVELING THE MYSTERIES OF HIV



HIV was identified as the cause of AIDS in 1983. At the time, there was hope that a vaccine, treatment and perhaps cure might be discovered within a reasonable amount of time. But HIV, a virus that has only nine genes, proved a formidable adversary. In order to fight it, it is essential to understand the virus' structure, function and dynamics of replication. **ADARC scientists work on the fundamental molecular mechanisms HIV uses to replicate, analyzing the role of individual molecules that enable the virus to multiply.** Retroviruses like HIV can mimic, manipulate and exploit components of the cells they infect in order to facilitate their own replication. The study of that relationship continues to generate much needed knowledge.

In the early 1990s, by analyzing how HIV behaves in an infected person, ADARC scientists discovered that the virus replicates

Suppressing HIV to undetectable levels for the first time and launching the era of combination antiretroviral therapy.

1996

Identification of CCR5 as an HIV coreceptor for virus entry into T-cells. Discovery of a mutation in CCR5 that protects humans against infection.

21.00 1997

relentlessly from the moment of infection, undermining the immune system even when the infected person shows no symptoms. This discovery falsified the notion that HIV infection was largely latent.

In 1996, studies revealed the identity of a coreceptor, CCR5, that the virus uses to infect immune system cells. This discovery made possible an entirely new class of drugs to treat HIV. ADARC scientists continue to work to understand what makes HIV select CCR5 versus another coreceptor, and how that affects virus transmission and the course of disease. Insights into how the components of the virus assemble into viral particles and how they enable the virus to gain access to the cell's nucleus during infection are providing scientists with unprecedented insights onto viral biology. Each of these lines of investigation is a potential area for the development of new therapeutic approaches.

Another focus of ADARC scientists is to discover and analyze ancient viruses, and to understand how evolutionary pressures exerted by them have endowed modern humans with genes and proteins that provide a natural defense against viral infection. Unraveling how HIV has gained resistance to our genomic defenses may reveal new opportunities for therapy and allow the establishment of improved animal models of HIV disease. **In 2007, ADARC scientists identified tetherin, a protein that tethers viruses to the surface of human cells, preventing them from spreading and infecting other cells.** They also found that HIV can neutralize tetherin using one of its own proteins.

"We've discovered a new way that cells defend themselves against viruses. This can open up a new area of study in virology: how this protein antagonizes other viruses, and how viruses learn to get around it."

PAUL BIENIASZ, PHD

A detailed quantification of T-cell destruction rate in HIV-infected patients

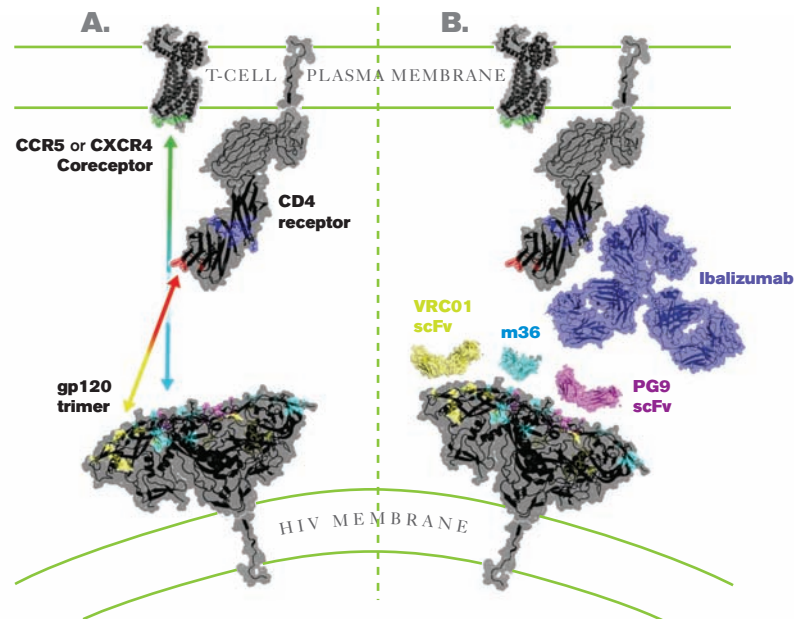


Construction of HIV/SIV, the first hybrid virus that could infect monkeys by using CCR5 as the co-receptor

1998

STOPPING A GROWING EPIDEMIC

1999



An effective preventive vaccine against HIV is the most important challenge facing the scientific community in this field, and the best hope to arrest the global pandemic. **The spread of HIV is outpacing the world's ability to deliver treatment, especially in the developing world where most new infections occur and millions lack access to medications.**

ADARC has been involved in vaccine research since 2000. ADARC scientists have engineered several candidate vaccines, which have been advanced into clinical testing in healthy volunteers. These vaccines were demonstrated to be safe and have laid the foundation for next generation vaccine candidates and delivery systems.

More recently, with the support of the Bill and Melinda Gates Foundation, **ADARC has pursued a novel "passive immunization" approach, which harnesses monoclonal antibodies to**

block HIV infection. One such antibody, ibalizumab, is highly active against HIV, and has been shown to be safe in people. It is currently in clinical trials among healthy volunteers to determine its safety and feasibility as an HIV prevention agent. At the same time scientists are working to develop improved versions of ibalizumab so it could be administered monthly.

Topical microbicides have recently been shown to protect women from HIV infection, revolutionizing HIV prevention by giving women the power to protect themselves. Scientists at ADARC have demonstrated promising results in animals by combining such microbicides with other vaccine modalities.

While these approaches remain in clinical development, ADARC has taken proven approaches to preventing vertical transmission of HIV from mother to child into the field in China. In cooperation with local authorities and existing healthcare structures, the program tests every pregnant woman for HIV infection, and offers treatment and counseling to those who test positive. **The treatment, combined with other preventive interventions, can reduce the rate of MTCT from over 30% to less than 1%.** Babies are tested and given a short course of treatment at birth, and mothers are taught feeding strategies that can help prevent transmission. To date, the transmission rate has been less than one percent. More importantly, the Chinese government has recently adopted our strategy as the national approach to eliminate vertical transmission of HIV.

"The AIDS problem is not only a scientific problem, it's a political, economic and social problem—a terrible, terrible plague. Ninety percent of people with HIV live in developing countries, and most Africans can't afford the drugs that have cut back the AIDS death rates in richer countries. An entire generation of children is going to be wiped out."

IRENE DIAMOND

Identifying Lv-1, a host T cell protein, that can inhibit HIV and SIV production



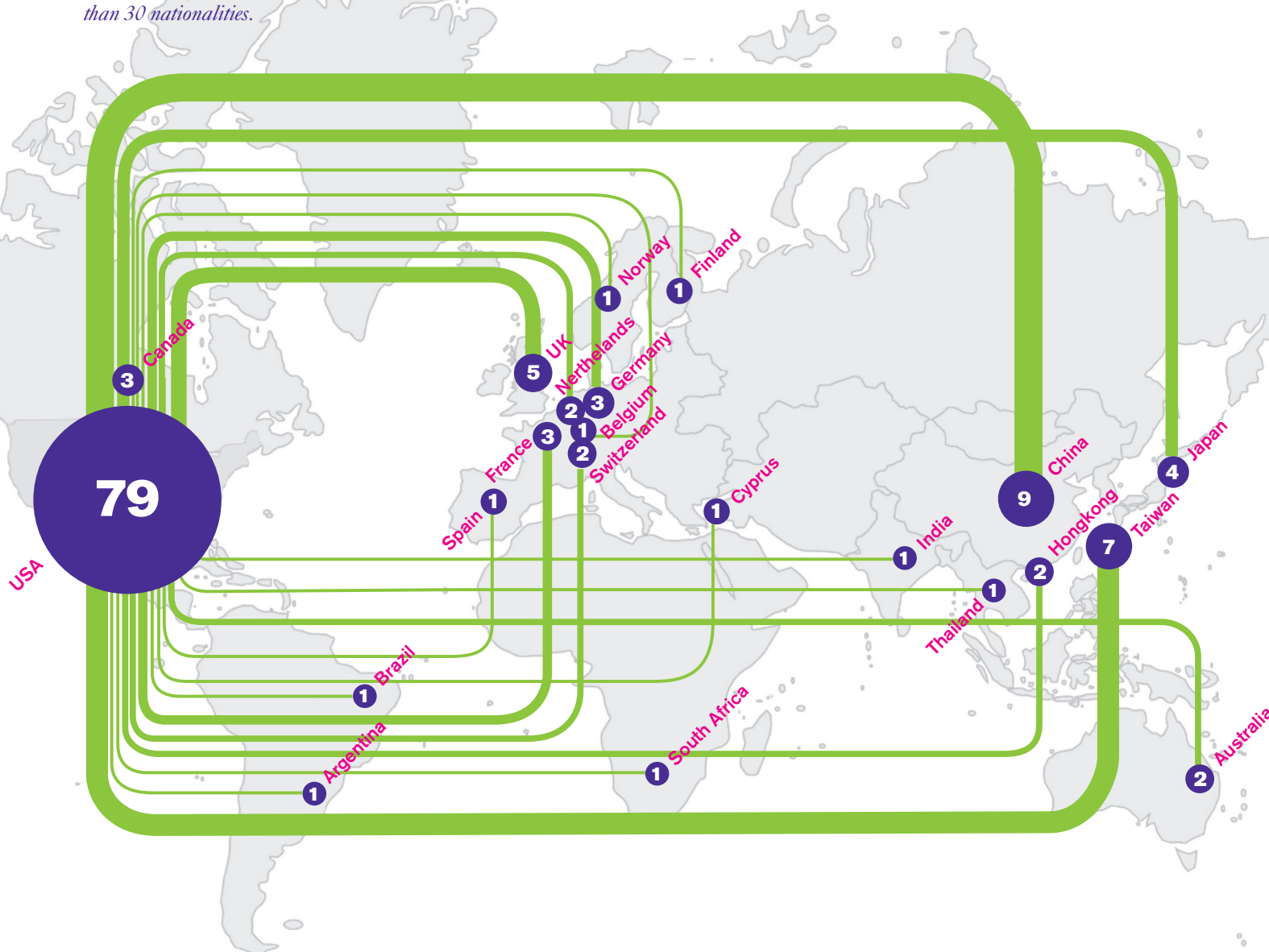
Documentation of dramatic CD4 T-cell loss in the gut of patients shortly after HIV infection.

2002

2004

ADARC IN THE WORLD

Over the past 20 years, ADARC has been a training ground for over 100 scientists who now study HIV/AIDS in 80 independent laboratories around the world. ADARC is proud to provide a nurturing home for the development of young investigators. Today, our scientific team is more international and diverse than ever: ADARC scientists represent more than 30 nationalities.



Paul Bieniasz, PhD

Joined ADARC 1999



Yaoxing Huang, PhD

Joined ADARC 1997



Martin Markowitz, MD

Joined ADARC 1994

1,100,400
PEOPLE LIVING WITH HIV IN THE U.S.

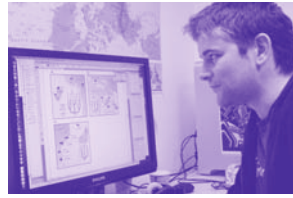


DAVID BALTIMORE, 2009

NOBEL LAUREATE & FORMER CHAIR OF SAB

“AIDS is a disease that has been with us too long. It’s too widespread, it is too hard to control. But complaining gets us nowhere. We need action, and Irene Diamond saw that truth, decades ago. Being in a position to act, she acted.”

Identification of tetherin, a novel human protein that traps HIV on the surface of the cells



Elucidation of how tetherin inhibits HIV particle release

World Health Organization estimates that 6.6 million people worldwide are receiving antiretroviral treatment

2008
16,805

LIVING WITH HIV

2009

2010

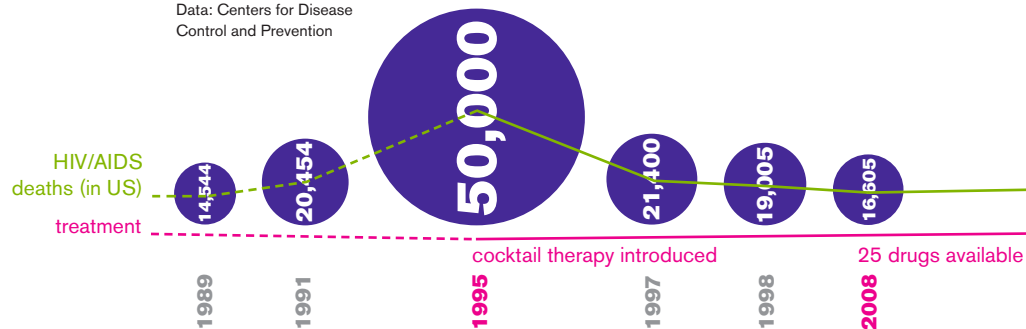
Treatment of HIV/AIDS has come a long way from the time when doctors could only treat opportunistic infections while the virus attacked the immune system, progressively and relentlessly. In the late 1980s to early 1990s, the first drugs to treat HIV infection by interfering with the virus' replication cycle were made available. Even when patients felt temporary improvement, the virus quickly mutated and escaped the drug.

At ADARC, studies of HIV replication rates in infected patients led to the understanding that, in order to keep HIV from bouncing back, one drug at a time would not be enough. **In 1995, ADARC scientists launched a series of experiments in patients, using what we now know as cocktail therapy: three anti-retroviral drugs used at the same time.** By the following year, scientists knew that the amazing results could be sustained for at least a year. That breakthrough changed the field of HIV/AIDS, especially in the developed world.

In the US, numbers of people dying of AIDS dropped precipitously for the first time. **While in 1995 50 thousand people died of AIDS in the country, two years later the number dropped to 21.4 thousand. UNAIDS estimates that over 14 million life-years have been gained since antiretroviral therapy was introduced.**

There are now over 25 drugs that can be used in combination for treatment of HIV and AIDS, with more in the development

Data: Centers for Disease Control and Prevention



pipeline. Patients can begin treatment with as few as one pill per day, and live a relatively normal lifespan. ADARC has led the way in understanding how HIV behaves early in the infection, and is a proponent of early treatment in order to protect the immune system. However, considering the average age of a person newly infected with HIV, the prospect of 40 years of treatment with difficult life choices and an uncertain outcome is far from satisfactory.

ADARC is pioneering new approaches to drug development through diverse research initiatives with a singular mission: to develop a finite course of treatment leading to HIV remission, and ultimately a cure. By probing the pathogenesis of HIV, ADARC scientists are gaining new insights that will enable patients to live longer lives with treatment that is more effective and less demanding.

"I feel very blessed to have found the Aaron Diamond AIDS Research Center during its early days. The relationship has afforded me knowledge about behavior that was based on actual research ("straight from the horse's mouth" as it were), knowledge about physical changes to look for, access to new medicines that were coming down the line, and a recommended primary care doctor in whom I have complete faith. The fact I was able to personally contribute for some years to the research (through testing of drugs and giving bodily fluids for study) during the "neutralizing antibody" experiments made me feel proud, useful, and part of the solutions to come. All this, while scores of my friends were crossing over. Would I be here if not for ADARC? Possibly, possibly not. However, I am here, and I feel completely comfortable in saying: I sincerely thank ADARC for my life."

B.P., ADARC patient since 1994, participated in one of the first trials of combination antiretroviral therapy that investigated the eradication hypothesis and provided critical knowledge on dynamics of HIV replication in vivo.

PATIENT VOICE

1,800,000
PEOPLE DIE OF AIDS EVERY YEAR

ADARC AND THE FUTURE

ADARC scientists are currently working on a variety of initiatives from studies of human genes with antiretroviral properties, to the development of new preventive approaches that can be combined to protect high-risk populations, to more affordable treatments that can be taken less frequently, with fewer side effects.

As the world continues to deal with HIV/AIDS, a pandemic of unprecedented reach, ADARC's scientists share a deep commitment to the mission initially conceived by Irene Diamond: science will ultimately deliver the solutions to stop the epidemic.

The knowledge accumulated during ADARC's first 20 years puts it in a unique position to continue generating breakthroughs that can change the course of the epidemic. A small, agile institute, ADARC is able to follow new ideas promptly, before they attract institutional funding.

Private support plays a large role in ADARC's ability to change scientific direction quickly, giving it a clear advantage in the field. Irene Diamond saw to that when she founded ADARC, and her vision has attracted the support of hundreds of others who want to see an end to the HIV/AIDS epidemic during their lifetimes.

Your contribution is an investment in the people and promise of ADARC, and will sustain the breakthroughs that will save millions of lives for years to come.



Science is the Solution

Your Help Makes it Possible

www.ADARC.org