

advancing science and human health



**CENTER FOR
DRUG DESIGN**
UNIVERSITY OF MINNESOTA

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health is improved

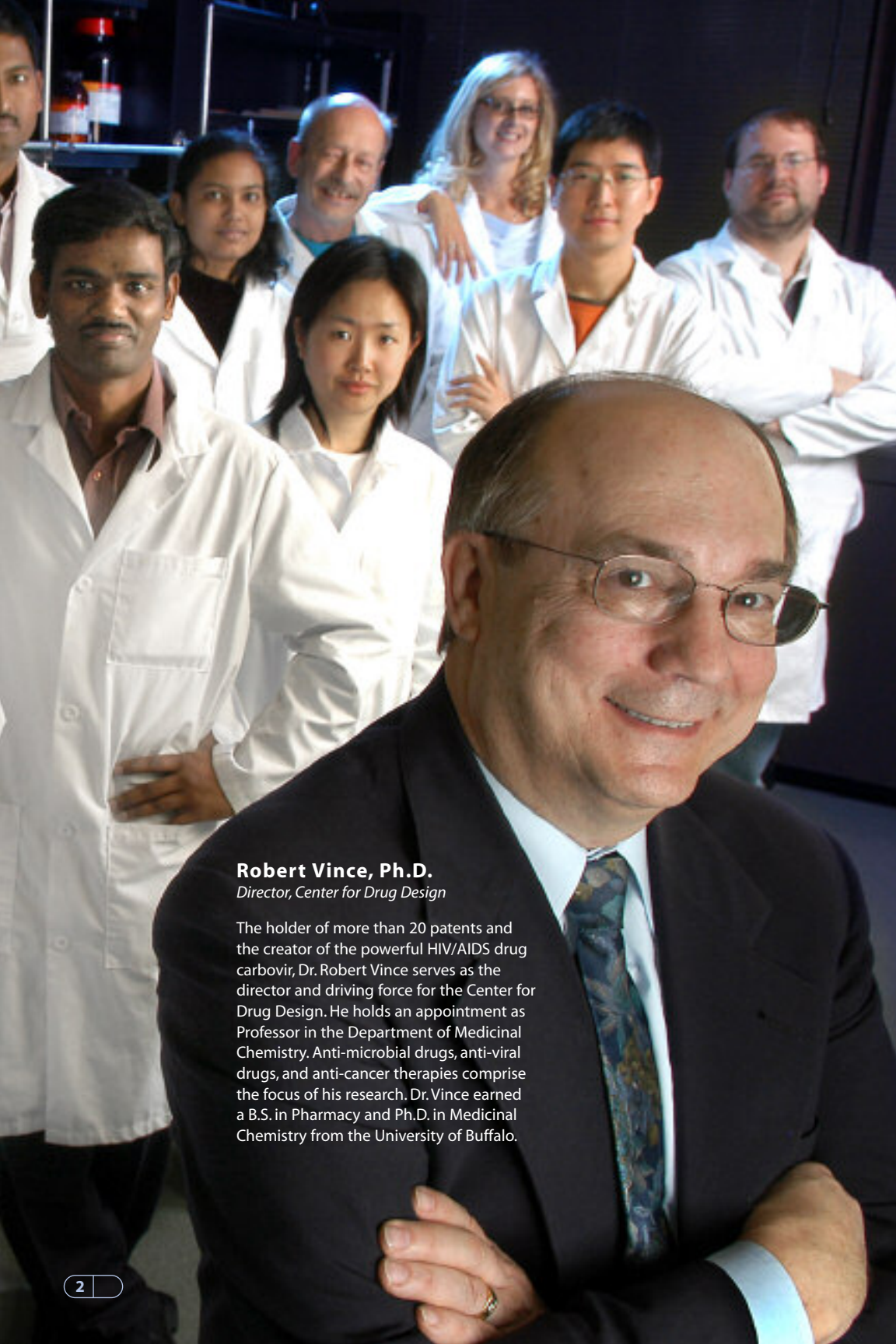
Today the lives and health of people across the world are improved because of the Center for Drug Design. This extraordinary research center is streamlining and shortening the flow of new, useful drugs from the laboratory to the dispensary through cutting-edge drug design and scientific research. Its simple yet sophisticated methodology combines the best attributes of academic and industrial research environments. The result is a vibrant, extremely efficient, high-level research community structured to become one of the world's leading drug institutes.

Research at the Center for Drug Design focuses primarily on developing new anti-cancer, anti-microbial, and anti-viral drugs and therapies. Drug discovery is a multi-disciplinary endeavor that the Center is distinctively formulated to handle. With a staff drawn from the nation's foremost industrial and academic research laboratories, the Center for Drug Design recruits the best of the best. All senior members at the Center are respected scientists, recognized as leaders within their fields. Working beside them in the Center's state-of-the-art laboratories are high-caliber post-doctoral researchers and specialists recruited for their specific knowledge and expertise.

Discovering useful, new medicines to treat ancient diseases is a continuous struggle. Intelligently planned, highly skilled, fully equipped, financially endowed, and resolutely energized, the Center for Drug Design is singularly well prepared to advance science and human health.

disease is thwarted

As part of the Academic Health Center, the Center for Drug Design continues the legacy of pioneering scientific discoveries for which the University of Minnesota is known. Carbovir, the first drug specifically designed to treat HIV/AIDS—and the inspiration for the Center for Drug Design—shares this tradition of original, life-saving advances.



Robert Vince, Ph.D.

Director, Center for Drug Design

The holder of more than 20 patents and the creator of the powerful HIV/AIDS drug carbovir, Dr. Robert Vince serves as the director and driving force for the Center for Drug Design. He holds an appointment as Professor in the Department of Medicinal Chemistry. Anti-microbial drugs, anti-viral drugs, and anti-cancer therapies comprise the focus of his research. Dr. Vince earned a B.S. in Pharmacy and Ph.D. in Medicinal Chemistry from the University of Buffalo.



the story of carbovir

In the early years of the HIV/AIDS epidemic, there was no known treatment or any prospect of recovery. Anxious to alleviate suffering, the Federal Food and Drug Administration asked pharmaceutical companies to test their inventories of unassigned drugs against the virus. The hope was that one might prove effective against the disease.

The University of Minnesota medicinal scientist, Dr. Robert Vince, took a different approach. He concentrated his efforts on designing a new drug entirely, one that would expressly target the HIV/AIDS virus. Within six months, working with one research assistant, he created the compound carbovir. As pre-clinical testing appeared promising, the drug was patented and subsequently licensed to a pharmaceutical company.

Due to industry consolidation and other issues, carbovir was initially overlooked and its potential unfulfilled. An initiative by a new corporate owner brought the compound to the market under the brand name of Ziagen®. Almost immediately, the drug was recognized as a potent and highly effective treatment for HIV/AIDS.

Today the Ziagen royalties fund a multitude of programs and hundreds of graduate students throughout the University. It also provides the seed money for the Center for Drug Design. This reinvestment—and commitment—to the Center's research and learning will provide useful new medicines and innovative therapies to benefit people worldwide.

therapies are expanded

The Center for Drug Design practices innovative, intellectually advanced research in its discovery of new anti-microbial, anti-cancer, and anti-viral therapies. Efforts focus on developing the initial drug and then transferring the technology into the private sector to speed development and testing for clinical applications.

ANTI-MICROBIAL DRUGS

Increased resistance to traditional antibiotics by disease-causing pathogens is an ever-growing threat to health across the globe. From tuberculosis to staphylococcus, the clinician's pharmaceutical options to annihilate and/or control disease and infection range from nonexistent to severely limited. Responding to this need, the Center for Drug Design is exploring the mechanism for resistance to existing antibiotics to create the next generation of effective antibiotic drugs, along with other treatment strategies. A drug targeting the iron acquisition system of the TB bacillus, for example, may someday be the preferred treatment for tuberculosis. In addition, anti-parasitic research is looking at new drugs to treat infections caused by single-cell parasites, such as giardia, that have cell structures not present in mammals and humans.

Scientists at the Center for Drug Design are currently launching preliminary research efforts against Alzheimer's and Parkinson's diseases.

ANTI-CANCER DRUGS

One of the Center's primary anti-cancer programs is exploring the concept that cancer cells may be normal cells trapped in an immature—or less differentiated—state which impedes their ability to regulate their own growth. The Center is designing drugs that prompt cancer cells to mature into cells possessing the missing growth-regulating component. As a departure from more conventional chemotherapeutics which destroy cancer cells along with healthy cells, this work by the Center offers the hope of developing far less toxic anti-cancer drugs. With potential to become the next breakthrough cancer treatment, this innovative

One in 10,000 molecules makes it into the marketplace.

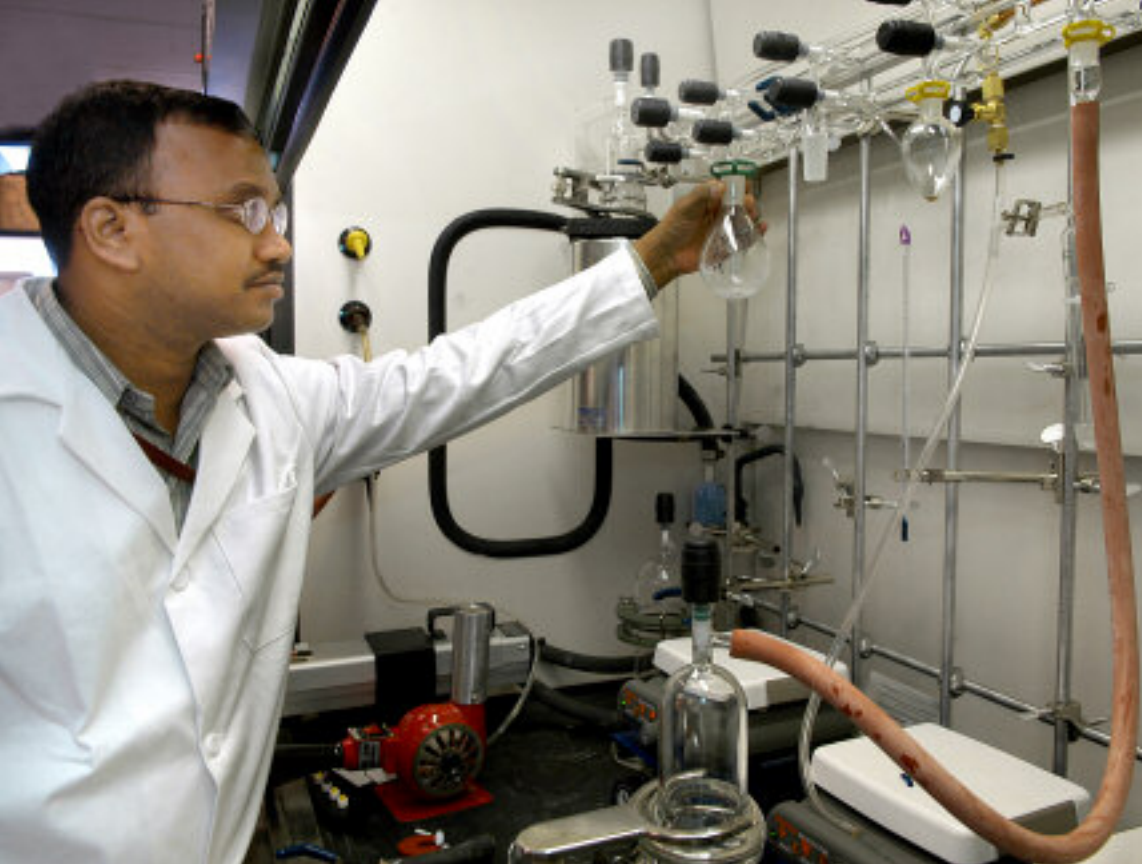
—1996 Annual Report Medicinal Chemistry



new class of drugs may also lead to expanded treatments for organ transplant patients and new antiviral therapies.

ANTI-VIRAL DRUGS

Consistent with the Center's heritage, new anti-viral treatments for the Acquired Immune Deficiency Syndrome (AIDS) are being investigated. Current efforts are looking at blocking chemical reactions conducted by viral proteins unique to the disease and thus preventing the virus from growing in the human body. Other research is synthesizing analogues of mycophenolic acid (MPA), which is very effective against the West Nile virus, in hopes of creating a more potent anti-viral drug with broader applications.



knowledge is shared

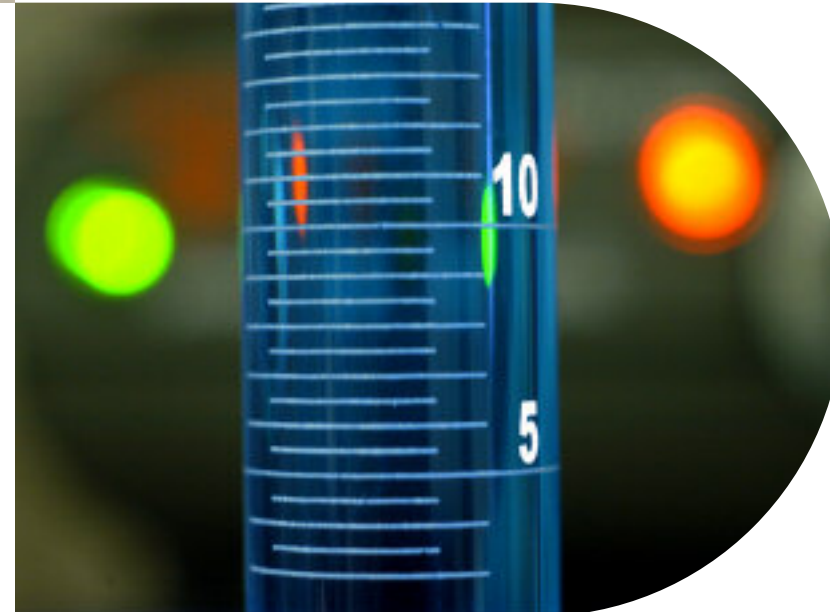
Collaboration and communication are fundamental to the Center's mission. To facilitate pre-clinical testing as well as the exchange of information and learning, the Center maintains a dialog with scientists at other research centers around the world. This rich transmission of ideas contributes to the Center's highly efficient research environment and makes it a focal point for the most advanced drug research.

As part of the University of Minnesota Academic Health Center, the Center for Drug Design benefits from the vast resources and talents of one of the nation's most important educational and research institutions.

While research is the primary activity, the Center for Drug Design is actively involved in training the next generation of scientists, organizing conferences, sponsoring seminars and disseminating advances in knowledge.

laboratories are equipped

Possessing multi-discipline laboratories makes the Center for Drug Design a complete and comprehensive research institute. From its inception, the Center committed to building research laboratories unrivaled in their capability and equipment. Within these state-of-the-art chemistry and biology labs, the Center facilitates the deep, intensive, interactive research that is most effective in making rapid progress and stimulating scientific discoveries.





research is continued

A major goal for the Center for Drug Design is to become financially self-sufficient. Royalty income from Ziagen® currently funds the Center for Drug Design. To continue developing cutting-edge drugs once the royalties end, the Center seeks grants and contributions from government, foundations, and individuals. In 2002, an endowment fund was established. Grant awards fund specific projects. Developing useful drugs to alleviate human suffering requires ongoing support.

For information on how to contribute to the Center for Drug Design's lifesaving research, visit the Web site at www.cdd.umn.edu or call 612-624-4227.