# RESEARCH for A cure

National Foundation
for Cancer Research
2008 Annual Report

## NFCR MISSION STATEMENT

The National Foundation for Cancer Research (NFCR) was founded in 1973 to support cancer research and public education relating to the prevention, early diagnosis, better treatments and ultimately, a cure for cancer. NFCR promotes and facilitates collaboration among scientists to accelerate the pace of discovery from bench to bedside. NFCR is about Research for a Cure—cures for *all* types of cancer.

## TABLE OF CONTENTS



## FROM THE PRESIDENT

Dear Friend of NFCR,

The black box that was the cancer cell has been opened and with the support of millions of Americans NFCR researchers are redefining cancer as a genetic disease, transforming medicine so that hope for a cure is now within sight.

I know you've heard this before. The war on cancer has made measurable but frustratingly slow progress. Still, a new era is dawning in the treatment of America's No. 1 most devastating killer—cancer—and NFCR scientists worldwide are making phenomenal progress in developing cancer therapies that target the products of specific genes—the very genes that make a cell cancerous. The hope is that these treatments will be more effective, longer lasting, and far less toxic than traditional chemotherapy and radiation—treatments that inspire dread so deep that they are almost as feared as cancer itself.

But this isn't just hope; these are targeted cancer therapies and molecular diagnostics.

By integrating molecular-based technologies and medical informatics, NFCR is at the cutting-edge of identifying clinically applicable genotype-phenotype associations across cohorts of patients that are being translated into novel diagnostic and treatment strategies.

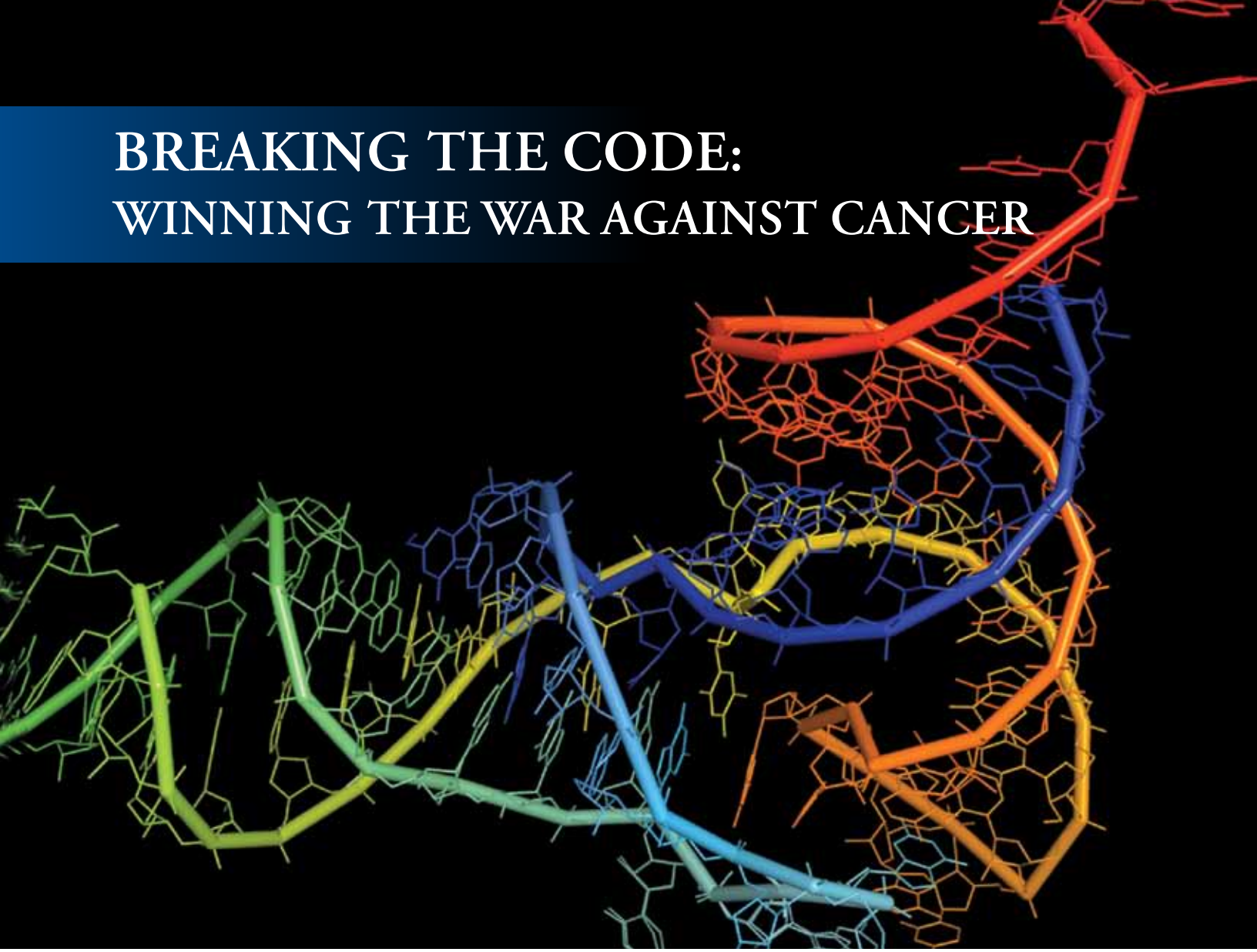
These breakthroughs make it clear that each cancer must be treated on a patient-by-patient basis. Precise molecular diagnostics, the discovery of biomarkers, and drugable targets, are providing keys to new therapeutic approaches to treating cancer.

These aren't just empty promises. At the NFCR Personalized Medicine Research Clinic in Scottsdale, Arizona, physician-scientists are prescribing optimal treatments based upon the underlying molecular basis of each person's cancer. This is a new paradigm for treating cancer; this is *Research* for a **Cure**.

Thank you and sincerely,

Franklin Salisbury, Jr.
President

# BREAKING THE CODE:
## WINNING THE WAR AGAINST CANCER



Today, more individuals diagnosed with cancer are surviving longer than ever before. Even those who ultimately succumb to cancer live longer and experience a much better quality of life than was possible just a few years ago. Every day at NFCR, our researchers report progress in the development of promising new treatments for cancer. But until there is a cure, we will not be satisfied—too many lives are at stake.

In 1973, Nobel Prize laureate and NFCR co-founder, Dr. Albert Szent-Györgyi, insisted that "cancer is a disease that can be cured." Today, in laboratories across the United States, England, Germany, and China, NFCR scientists are moving cancer research toward that ultimate goal—finding cures for *all* types of cancer.

For over 35 years, NFCR has spent more than $250 million to fund "high risk/high reward" research at universities and research hospitals worldwide. The money we've spent has had a catalytic effect, and NFCR now funds translational research to move many breakthroughs from "bench to bedside."

Vital research dollars have been provided by nearly 4 million individual donors from across the United States who share our commitment to funding the kind of laboratory research that will cure cancer. NFCR works to fund cancer research at the molecular and genetic levels, and provides a unique approach to cancer research: we've engineered a continuum for research and discovery—a pipeline where new therapies actually reach the patient.

**Here are just some of the research breakthroughs NFCR funding has made possible.**

- Discovered **Vascular Endothelial Growth Factor (VEGF)**. This breakthrough discovery pioneered research in tumor angiogenesis, and led to the development of VEGF-targeting anti-angiogenic drugs such as **Avastin™**.

- Launched the world's largest **computational drug discovery program**—the **Screensaver-Lifesaver Project**. The Project used idle PC power from 3.5 million individual computers worldwide to screen potential drug candidates against 12 cancer protein targets. This public endeavor resulted in tens of thousands of lead compounds for further biological tests, significantly reducing the time needed in the initial phase of anti-cancer drug development.

- Discovered a landmark chemotherapeutic that can *cure* patients with hairy cell leukemia. This purine nucleoside agent can selectively kill **hairy cell leukemia** cells. This discovery led to the drug **Cladribine**, the first-line treatment for this disease.

- Proposed the "**Oncogene Addiction**" theory—the basis and guideline for the development of many of today's targeted cancer therapies, including **Herceptin™, Iressa™, Tarceva™,** and **Gleevec™**.

- Discovered **Progesterone Receptors (PR)** in breast cancer and subsequently developed **PR detection tools** which have become a routine test for breast cancer patients. These findings have a profound impact on directing clinical usage of **Tamoxifen** in breast cancer patients.

- Identified six **Metastasis Suppressor Genes**. These findings opened up an entirely new avenue for the development of novel **anti-metastasis therapies**, holding great promise for controlling the seemingly uncontrollable cancer cell in a variety of types of cancer.

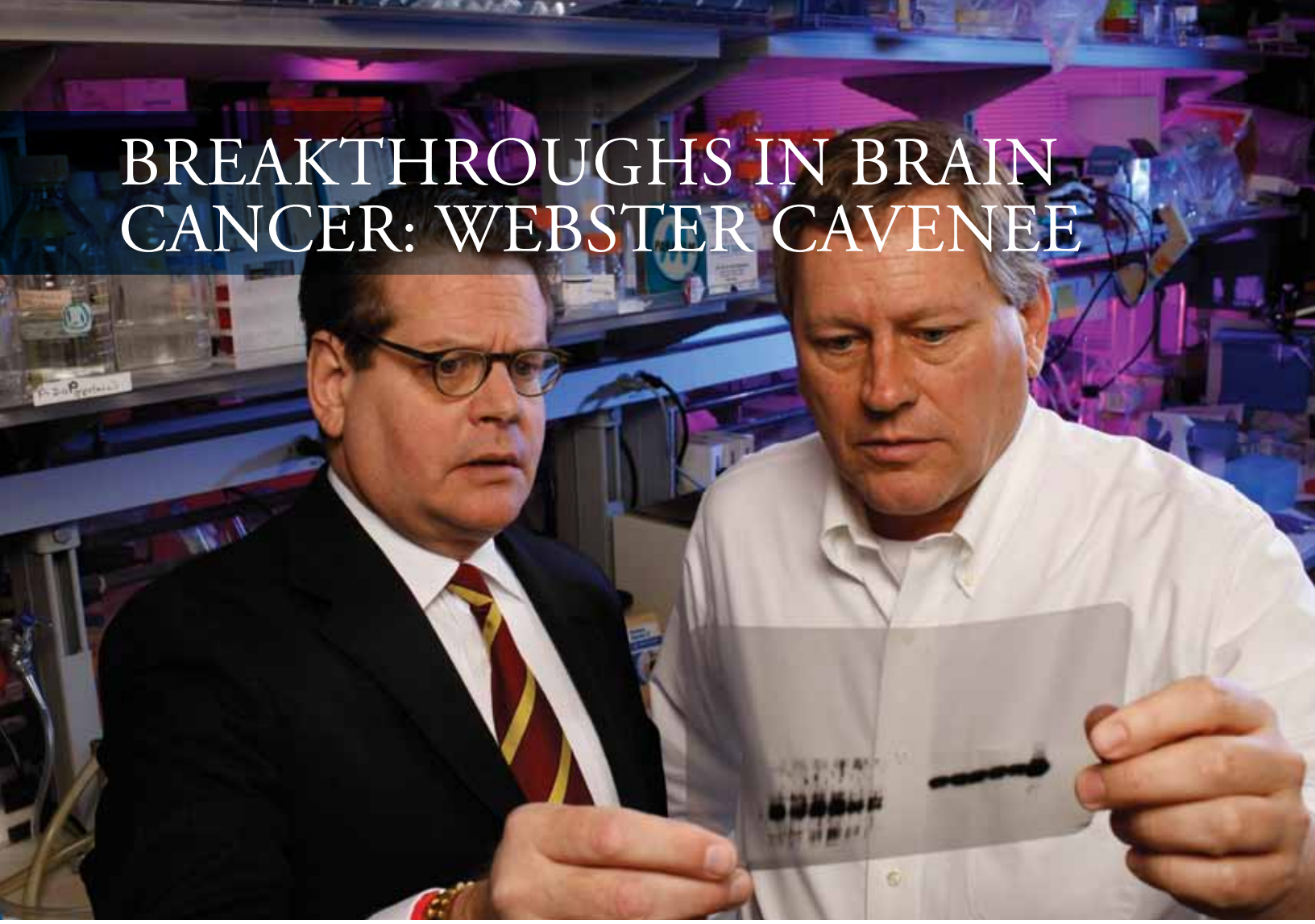
- Discovered the specific mutation on **Epidermal Growth Factor Receptor (EGFR)** that is targeted by **Iressa™** and **Tarceva™** in about 10% of lung cancer patients. Through **molecular profiling**, this critical finding makes it possible to identify patients who can potentially benefit from these targeted cancer therapies, providing crucial guidance for **personalized medicine** in patients with cancer.

- Identified the cancer preventative effects of **Lycopene**, a widely recognized antioxidant. This finding has led to a substantially enhanced public notion of a healthy diet as a means of cancer prevention.

BBB ACCREDITED CHARITY

UICC global cancer control

# BREAKTHROUGHS IN BRAIN CANCER: WEBSTER CAVENEE



Research for a Cure? Look no further than NFCR Fellow Webster Cavenee, Ph.D., Director of the Ludwig Institute for Cancer Research at the University of California San Diego, whose very life is making that happen. Because of his enormously influential research in cancer genetics—seminal discoveries of the predisposing genetic mechanisms of human cancer and the malignant progression of human brain tumors—Dr. Cavenee has changed the face of cancer research and the way we understand the genetic underpinnings of human cancer predisposition and progression.

While cancer had been known for many years to be able to cluster in families, its characteristics were paradoxical and its underlying basis difficult to decipher. Whereas autosomal dominance is most often the case, individuals within families develop typically one or a few tumors rather than the complete malignant transformation of target tissue that would be expected. The types of tumors occurring in any one family can be different. Finally, despite these indications of a single gene involvement, classical epidemiological studies had proposed a requirement for 5 to 7 "hits" for the development of common cancers.

Dr. Cavenee has explained each of these observations; his choice of childhood cancer was critical. Statistical analyses of such diseases had led to the notion that as few as two hits might be required. These studies could not distinguish among several mechanistic possibilities such as: were the "hits" in the same chromosomal locus?; were they in homologous alleles of the same locus?; were they merely two random events in the process of cancer development?; and, were they in the same targets in inherited and sporadic cancer? It should also be remembered that the 1970's and 1980's were the era of the dominantly acting viral (or cellular homolog) oncogene. Dr. Cavenee's work on inactivating mutations was, therefore, intellectually courageous and impacted on the conceptual framework of the field.

He proposed that a comparison of many chromosomal regions from normal and tumor tissues from individuals would allow precise definition of cytogenetically invisible aberrations. Using this novel approach first in retinoblastoma, he secured the first hard experimental evidence for the existence of tumor suppressor genes. This has been one of the most influential breakthroughs in cancer research and has engendered an entire field. He then made several more seminal discoveries: 1) direct genetic proof that tumor suppressor gene mutations could cause inherited predisposition; 2) the discovery of the pleiotropy of such genes and their role in more than one cancer; 3) the first premorbid predictions of cancer; 4) the first direct evidence of somatic chromosomal recombination in mammals; and, 5) the demonstration that these genes were the

underlying target in human solid cancers including those of muscle, melanocytes, kidney, prostate and breast.

Among his seminal discoveries in brain cancer are that: 1) high stage astrocytomas can evolve directly from lower-stage tumors by clonal evolution; 2) that this caused loss of inhibition of the angiogenesis required for brain tumor growth; 3) a recurrent cytogenetic alteration in CNS tumors caused targeted inactivation of PTEN; and, 4) a commonly mutated EGF receptor is constitutively active, growth enhancing, cannot engage internalization machinery, causes resistance to some DNA-damaging drugs and sensitivity to tyrosine kinase inhibition. He then showed that cells with the mutated receptor could be specifically killed using a drug and the kinase inhibitor or monoclonal antibody that are in Phase1/2 clinical trials. He has also done important studies of the PTEN gene—the most commonly mutated in glioma—showing that this protein has anti-oncogenic activity that is independent of its phosphatase activity and that it is regulated by acetylation—the first such instance of enzymatic activity regulation by this posttranslational means.

## WHAT DOES ALL THIS MEAN?

The onset, as well as the increase of malignancy of human cancers, is a result of the occurrence and accumulation of genetic defects in cancer cells. In many types of cancer, these genetic defects involve either the under-expression of tumor suppressor genes, over-expression of tumor causing genes (oncogenes), or both. Identifying these genes and then validating their functional activities in tumor models is a critical approach for cancer researchers to understand cancer biology. More importantly, when scientists gain enough knowledge about the molecular mechanisms by which these genes impact the development or malignant progression of cancer, they can develop novel therapeutic strategies that either specifically target the products of oncogenes or reverse the effects of tumor suppressor gene mutations in cancer cells.

Dr. Cavenee's NFCR research has been concentrated on glioblastoma, a very aggressive brain cancer in both adults and children. In order to develop effective treatments for this lethal type of cancer, scientists must first figure out the initial genetic errors that lead these cells to become cancerous.

*Web Cavenee, Ph.D., Paul B. Fisher, Ph.D., Ron DePinho, M.D., Susan Band Horwitz, Ph.D.*

Several years ago, Dr. Cavenee's group discovered that an abnormal version of the Epidermal Growth Factor Receptor (EGFR), named EGFRvIII, is commonly found in primary brain tumors such as gliomas. In a normal healthy cell, growth factor receptors on the cell surface, such as EGFR, are inactive until their respective ligands bind to them. The activation of EGFR turns on cascades of signaling pathways within the cell and eventually leads to cell growth and proliferation. Under normal circumstances, these events are tightly controlled. However, genetic mutations can render the controlling mechanisms useless, resulting in uncontrolled and aberrant cell growth, or cancer.

Dr. Cavenee discovered that EGFRvIII is constantly active and transmits growth signals without binding of the ligand. In tumor models, such signaling has a dramatic effect on enhancing the growth of glioma cells.

## FROM NEW TARGETS TO NEW TARGETED THERAPIES

This intriguing discovery strongly indicated that the EGFRvIII may be an important molecular target for novel therapeutics. Dr. Cavenee's team is developing monoclonal antibodies, small molecules, and nucleic acid-based therapeutics as EGFRvIII inhibitors to target this tumor-specific molecule. One of these, an EGFRvIII-targeting monoclonal antibody targeted a variety of tumors, including glioblastoma, without causing significant side effects in a Phase I clinical trial. In late 2008 this antibody was licensed to a major pharmaceutical company for clinical development.

Dr. Cavenee's current work continues to lead the research community's thinking on cancer genetics and targeted therapies by advancing the promise of 'personalized medicine.'

Dr. Cavanee, in attempting to understand why some patients respond to therapies that inhibit EGFR and others do not, discovered that multiple points in the EGFR-activated signaling pathways need to be targeted for effective therapy for the majority of patients. Dr. Cavenee has begun to identify the genetic signatures that predict response to EGFR inhibitors and also identify the new targets that will supplement EGFR inhibition. Targeting multiple points of a signaling pathway rather than targeting a single molecule with a single drug is a paradigm shift in therapeutic strategy.

By understanding the fundamental issue of how genetic lesions influence tumor development and progression, new and more effective therapeutic strategies can be developed to save more lives. NFCR will continue to fund Dr. Cavenee's innovative research to find improved treatment, and eventually, cures for brain tumors and other types of cancer. His discoveries have had a broad influence on cancer biology and promise better lives for cancer patients. This is what NFCR is helping make possible.

# FUNDING INNOVATION

## NFCR RESEARCH DISCOVERY CENTERS

NFCR works to accelerate the pace of cancer research by recognizing innovative ideas while they are still in their infancy, and providing scientists with the initial funding to substantiate their ideas. To maximize the productivity of its cancer research programs, NFCR has established an international network of **Research Discovery Centers**, each of which is directed by a highly accomplished cancer research leader. Together, these Centers constitute our "Laboratory Without Walls"—promoting the sharing of ideas and information across research institutions and engaging top research minds from a wide range of scientific disciplines.

Scientists in these Centers are connected to more than 30 lead investigators at other NFCR-funded institutions. Together, NFCR's scientists constitute a "research collaborative" working on cancer from diverse perspectives and actively sharing ideas and information with one another.

Beginning at the molecular and genetic levels, NFCR scientists are leading the way in some of the newest and most promising research fields, including chemoprevention, nanotechnology, molecular profiling, genetic mapping, angiogenesis, antibody therapies, the development of new targeted therapeutics, and more. Because our scientists are encouraged to share their latest findings with one another, NFCR's approach increases the likelihood that discoveries in one area of cancer research will lead to advances in another.

**NFCR Center for Computational Drug Discovery** – *University of Oxford, Oxford, UK*

Developing cutting-edge computer program for ultrafast screening of new anti-cancer drug candidates. This NFCR center involves collaborators from the United States, United Kingdom, Spain, Portugal, and Italy.

A novel 3-D Molecule Search Engine software developed by Center researchers, known as the **Ultrafast Shape Recognition (USR)**, can search for virtual compounds as anti-cancer drug candidates with a speed up to 14,000 times faster than other similar technology. This novel method enables scientists to find drug-like molecules within a huge database in a few hours rather than a few years. In the past year, numerous trials using this new technique have been conducted at a number of pharmaceutical companies; the results were very satisfactory. USR may soon run in full speed and significantly accelerate the pace of computational drug screening.

**NFCR Center for Anti-Cancer Drug Design and Discovery** – *Yale University, New Haven, CT*

Developed anti-cancer ß-peptide inhibitors to address one of the biggest challenges in drug discovery. ß-peptide inhibitors represent a new generation of anti-cancer drugs that are highly effective and specific in targeting almost any cancer-related protein-protein interactions. To date, Center researchers have identified ß-peptides against protein interactions involving hDM2, and are continuing to improve

their therapeutic effects by making these peptides enter the tumor cells more easily. The new platform technology developed at the Center may positively impact the treatment of half of all cancers.

**NFCR Center for Therapeutic Antibody Engineering** – *Dana-Farber Cancer Institute, Harvard Medical School, Cambridge, MA*

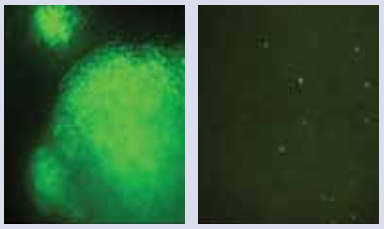
Discovering and engineering therapeutic antibodies for cancer research and clinical applications. The Center has established a library containing 1.6 billion different human sFv antibody-displaying phages, a tremendous resource for developing monoclonal antibody-based targeted therapies. Currently, Center researchers are identifying high-affinity human sFv antibodies against selected cancer targets.

**NFCR Center for Metastasis Research**
*University of Alabama at Birmingham, AL*

Addressing the most lethal aspect of cancer—metastasis, which is related to more than 90% of all cancer deaths. Research at the Center is focused on identifying the fundamental molecular changes in cancer cells that enable them to metastasize, and developing strategies to stop this lethal process. To date, Center researchers and collaborators have discovered six metastasis suppressor genes. In the past year, scientists continued to investigate how these genes function in suppressing metastasis, and the data generated will be crucial for translating their laboratory discoveries into new anti-metastasis therapies for cancers including breast, prostate, colon, ovarian, pancreatic cancer and melanoma.

**NFCR Center for Targeted Cancer Therapies** – *Translational Genomic Research Institute, Phoenix, AZ*

Developing new targeted cancer therapies and improving treatment efficacies of existing therapies. In the past year, Center researchers discovered four potential targeted therapeutic compounds against a molecular target known as B-raf kinase. These drug candidates may be further developed to effective treatment for colorectal, pancreatic, thyroid cancer and melanoma. Using cutting-edge genome technology, Center researchers also identified genes that can improve patients' response to commonly used targeted therapies such as Gleevec™, Tarceva™, Sutent™, and Nexavar™. These results hold promise in improving clinical care of patients with breast, lung, kidney, and many other types of cancer.



**NFCR researchers at the Center for Metastasis Research have engineered metastatic tumor cells to express a green fluorescent protein, allowing them to track tumor cells more easily. The panel on the left shows a lung in which melanoma cells have spread and have grown to a size that will kill the tumor-bearing mouse. The panel on the right also shows the same tumor cells, but now these cells make the KISS1 metastasis suppressor. The green dots are actually single cells. Those single cells persist for a long time, but they don't kill the mice!**

**NFCR Center for Proteomics and Drug Actions** – *Vanderbilt University, Nashville, TN*

Developing advanced proteomics techniques to understand drug efficacy and toxicity. The Center is aimed to determine if novel anti-cancer drugs work and how the drugs produce therapeutic effects or cause undesired side effects. Research at the Center will provide essential information for directing the right drugs to patients who will benefit most from them.

**NFCR Center for Molecular Imaging**
*Case Western Reserve University, Cleveland, OH*

Establishing a new technology platform – molecular imaging for early detection and improved treatment of cancer. The Center is currently focusing on developing advanced, highly-sensitive imaging tools to detect single or multiple molecular markers specific to cancers such as breast, prostate, and brain cancer. This new technique, in particular the simultaneous imaging of multiple molecular markers, would identify cancer at a very early and more treatable stage, significantly improving patients' chance of survival. Techniques developed at the Center can also help surgeons to determine tumor margins during operation and make it possible for more complete surgical removal of aggressive, infiltrated tumors.

**NFCR Center for Global Collaboration**
*Tianjin Medical University Cancer Institute and Hospital, Tianjin, China*

Building a platform to streamline the preclinical development of new anti-cancer treatments and promote international collaborations by fully utilizing China's rich resources in man-power, biospecimens and technology.

# ACCELERATING DISCOVERY


## NEW COMPUTATIONAL DRUG SCREENING TOOLS

NFCR and InhibOx, a computational drug discovery company founded by NFCR scientists at the University of Oxford, joined forces to launch a powerful new computational drug screening tool, called **DrugFinder**. This new drug screening service is available to academic groups and biotechnology companies worldwide.

**DrugFinder** enables scientists to leverage the power of computer-aided virtual drug screening technology for novel cancer drug discovery and development. It is estimated that this unique and powerful virtual screening tool could speed up the drug discovery process by as many as four years.

DrugFinder

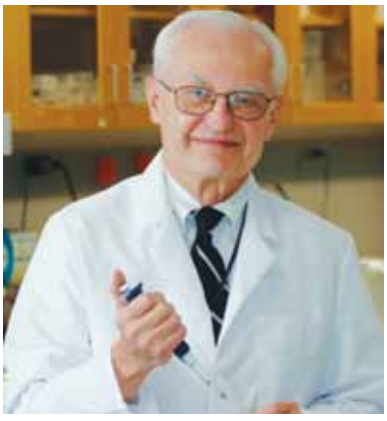
inhibOx

**In laboratories across the United States, Europe, and China, NFCR scientists and their research teams are working at the cutting-edge of cancer research today. Highlighted here is a sampling of the important research breakthroughs in fiscal year 2008. To learn more about the latest research by NFCR scientists, visit www.NFCR.org.**

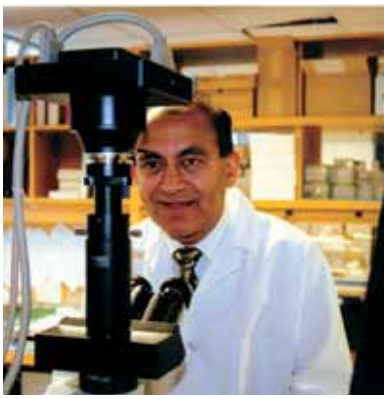
## BONE MARROW-DERIVED CELLS AND PROSTATE CANCER

**David Lyden, M.D., Ph.D.,** *Cornell University,* found that a specific subset of bone marrow-derived cells (BMDCs) facilitate tumor growth by contributing to the formation of new blood and lymph vessels within tumors. A simple blood test measuring BMDCs and its protein VEGFR1 can help to predict which individuals have prostate cancer as well as to determine whether a patient would respond well to standard therapies. In addition, promising new therapies could be developed to target BMDCs and VEGFR1, offering more effective treatment to the patients.

## ANTI-ANGIOGENESIS: SHUTTING DOWN CANCER



**Harold F. Dvorak, M.D.,** *Beth Israel Deaconess Medical Center,* NFCR Fellow and Albert Szent-Györgyi Prize winner for his discovery of vascular permeability factor/vascular endothelial cell growth factor (VPF/VEGF). Dr. Dvorak's work has led to the development of the anti-angiogenic therapies, a new generation of anti-cancer drugs that target tumor blood vessels. Dr. Dvorak's recent discoveries demonstrate that the therapeutic effects of individual anti-angiogenic drugs distinguish among different types of tumor blood vessels. This work has significant clinical impact as it identifies the strengths and weaknesses of a new anti-angiogenic drug for treating cancer.



**Rakesh K. Jain, Ph.D.,** *Massachusetts General Hospital,* is investigating ways to repair the highly abnormal tumor blood vessels with anti-angiogenic therapies, opening new windows for chemotherapy and radiation therapy to reach the tumor cells and destroy them. In addition, the group has identified a set of markers in patients' blood that may be directly involved in tumor resistance to current therapy. Dr. Jain's breakthrough discovery is changing the way cancer is treated and may benefit tens of thousands of cancer patients.

## TARGETING OVARIAN CANCER

**Robert C. Bast, Jr., M.D.,** *M.D. Anderson Cancer Center,* is finding new ways to eliminate the persistent ovarian cancer cells that live through conventional chemotherapy. Ovarian cancer continues to kill three quarters of all women with this disease, largely due to the chemotherapy-resistant cells that can remain dormant for years and then awaken to grow progressively and kill the patients. Dr. Bast has discovered a novel strategy to kill dormant cancer cells with the anti-malarial drug chloroquine. With further investigation, this new treatment may save many women's lives from this highly aggressive disease.

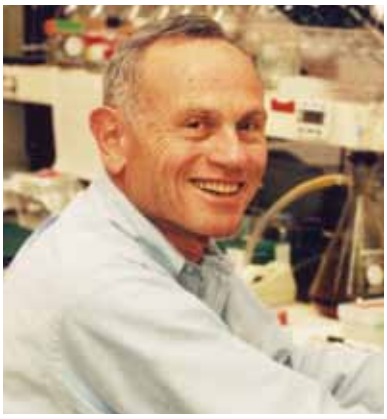
## CHINESE HERBAL MEDICINES AS BENEFICIAL ADJUNCT TO CANCER CHEMOTHERAPY

The therapeutic effects of traditional Chinese medicines have been documented for centuries. Nowadays, scientists like

**Yung-Chi Cheng, Ph.D.,** *Yale University School of Medicine,* are exploring their new applications in modern medicine. Dr. Cheng discovered that PHY906, a Chinese herbal medicine formula described 1,700 years ago, enhances activity of a variety of anti-cancer drugs, while decreasing their toxicity. This formula is currently being studied in clinical trials with colon, liver, and pancreatic cancer patients. If proven effective, PHY906 could become one of the first FDA-approved oral herbal medicines for anti-cancer treatment.

## CANCER PREVENTION

**Waun Ki Hong, M.D.,** *M.D. Anderson Cancer Center,* is a world-renowned cancer researcher who has long been studying the role of smoking on lung cancer development. Dr. Hong is currently leading his team in building "risk prediction models," which will help smokers who are at high risk take proactive measures that might prevent or delay lung cancer.



**Michael B. Sporn, M.D.,** *Dartmouth Medical School,* is developing new triterpenoid compounds for the prevention and treatment of cancer. His highly-fruitful research has resulted in several triterpenoid compounds which have potent preventative effects against liver cancer, melanoma, and highly-aggressive lung cancer.

**Janos Ladik, Ph.D.,** *University Erlangen-Nurnberg,* Germany, is investigating the cancer prevention effects of DNA intercalating agents. Certain cellular conditions disrupt the normal electronic status of DNA and its surrounding proteins, which can lead to a cancerous state of the cell. Dr. Ladik is investigating DNA intercalating agents which may reverse these detrimental effects and prevent cancer initiation.

## SOFT TISSUE SARCOMA RESEARCH

**Dina C. Lev, M.D.,** *M.D. Anderson Cancer Center,* is leading her research team in identifying key molecular players in an aggressive soft tissue sarcoma, known as malignant peripheral nerve sheath tumor (MPNST). Using the unique tissue microarray technology, the team discovered that a protein called AKT may play a key role in the most lethal aspect of MPNST – its spread (metastasis) to other body sites. This finding suggests that the development of specific drugs that block AKT may help to stop MPNST metastasis, saving more patients' lives.

## NANOSCALE TUMOR-TARGETING DRUG DELIVERY SYSTEM

**Esther H. Chang, Ph.D.,** *Georgetown University,* has developed a nanoscale, liposome-based tumor-targeting drug delivery system that can carry anti-cancer agents directly to both primary and metastatic tumor cells, significantly enhancing tumor's sensitivity to chemo and radiation therapy. Dr. Chang and her team successfully delivered tumor suppressor gene p53 and anti-HER2 siRNA to tumors, including breast and pancreatic cancer. The p53 nanocomplex is currently in clinical trials for patients with solid tumors, and the anti-HER2 nanocomplex may soon enter clinical trials for treatment of breast cancer patients.

## PERSONALIZED MEDICINE: Prescribing The Right Drugs To The Right Patients

**Kathryn B. Horwitz Ph.D.,** *University of Colorado Health Science Center,* is working with breast cancer patients enrolled in a clinical trial to identify genetic biomarkers that can predict which tumors will respond to hormone therapies, and which will not. New biomarkers discovered through Dr. Horwitz's research will help doctoonocologists provide the

right anticancer therapy to each and every patient and save their precious time by avoiding prescribing treatment that won't work for them.

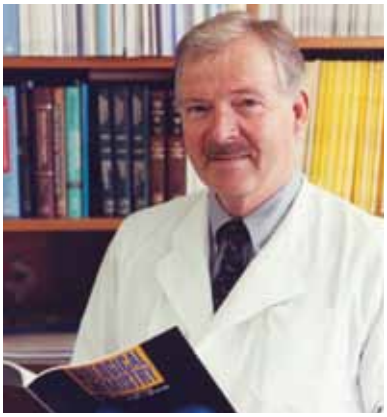
## TRACKING CANCER IN REAL-TIME

**Daniel A. Haber, M.D., Ph.D.,** *Massachusetts General Hospital Cancer Center,* and his team of scientists have developed a cutting-edge microchip-based device, called the CTC-chip that can isolate rare circulating tumor cells (CTCs) in the bloodstream and analyze their genetic mutations in real-time. This novel technology will help scientists to better determine how to adjust the treatment and fight the tumor more effectively. Dr. Haber is currently optimizing the CTC-chip for large-scale clinical application, and his breakthrough technology may soon reach patients' bedsides, changing the face of clinical cancer care.

## NATURAL WEAPONS TO BATTLE AGAINST CANCER

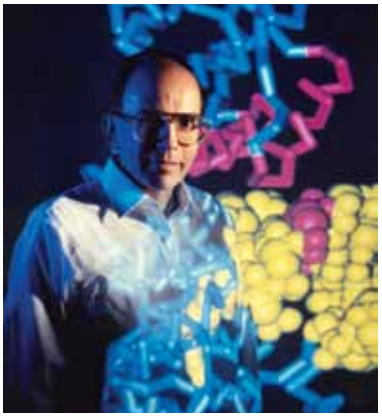
**I. Bernard Weinstein, M.D.,** *Columbia-Presbyterian Medical Center,* and his research team are most recently focused on developing naturally occurring or synthetic compounds for cancer prevention and therapy. Their laboratory work showed that compounds isolated from green tea, black cohosh and other plants hold promise in prevention and/or treatment of esophageal, liver, colon, and breast cancer. As a result of Dr. Weinstein's research, a clinical trial on a green tea extract Polyphenon E has been initiated to study its potential anti-cancer effects in patients who are at increased risk of esophageal cancer.

**Alan C. Sartorelli, Ph.D.,** *Yale University School of Medicine,* has designed and synthesized Cloretazine™, a promising novel anti-cancer drug that is currently being evaluated in patients with AML (Acute Myeloid Leukemia), brain tumors, and lung cancer. To make the best use of Cloretazine, Dr. Sartorelli recently developed the AGT assay, a simple and reliable laboratory test that can help oncologists to choose patients who will likely benefit from Cloretazine. This is a significant step toward personalized treatment of cancer patients with this novel therapy.



**Helmut Sies, M.D.,** *Heinrich-Heine-Universität,* Germany, is well recognized for his research on the cancer prevention effects of lycopene, the antioxidant found in tomatoes and carrots. His recent research suggested that the antioxidant effects of synthetic compounds derived from two natural products, flavonoids and carotenoids, named flavocarotenoids, may be more powerful in skin cancer prevention than the single components.

## PROTEIN SYNTHESIS AND CANCER



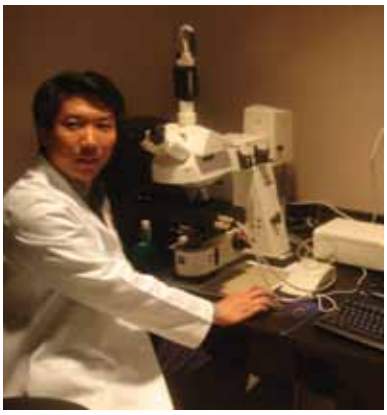
**Paul Schimmel, Ph.D.,** *Scripps Research Institute,* is seeking answers to why cancer occurs more frequently as people get older. Dr. Schimmel discovered that errors in protein production accumulate over time and occur more often as a cell ages, which can eventually lead to cancer. Further verification of this novel mechanism of carcinogenesis would introduce new concepts for preventing and treating cancer in aging population.

## IDENTIFICATION OF NEW THERAPEUTIC TARGETS

**Bin Teah Teh, M.D., Ph.D.,** *Van Andel Research Institute,* is identifying new molecular signatures of kidney cancer and developing new treatment strategies for this lethal disease. A systematic study of more than 170 human kidney cancer samples yielded a novel molecular target, STK6. Further laboratory

tests demonstrated that drugs that inhibit STK6 stopped the growth of kidney cancer cells. Next, Dr. Teh will investigate whether combining currently available drugs with STK6 inhibitors could lead to a better therapeutic outcome than using single agents for treating kidney cancer.

**Jiayuh Lin, Ph.D.,** *Children's Research Institute,* is working with his team of scientists in developing more effective anti-cancer compounds to combat the most deadly cancer killer – pancreatic cancer. Dr. Lin's team has developed targeted compounds against a novel drug target, the Stat3 protein, in pancreatic cancer. Further research will evaluate whether a combination of these new targeted therapeutics with conventional chemotherapy drugs could achieve more powerful anti-cancer effects.



**Wei Zhang, Ph.D., M.D.** *Anderson Cancer Center,* is conducting an in-depth investigation of key cancer promoting genes in colorectal cancer. Through a series of analyses using tumor samples from colorectal cancer patients, Dr. Zhang discovered that NGAL, a protein normally expressed in white blood cells, is produced in abnormally high amounts in colorectal cancer and serves as a key driving force in cancer development. NGAL may become a new therapeutic target for developing more effective treatments for colorectal cancer patients.

## OVERCOMING THE SIDE EFFECTS OF CANCER TREATMENT

**Rebecca W. Alexander, Ph.D.,** *Wake Forest University,* is investigating protein-to-nucleic-acid interactions which are fundamental to cellular processes in both normal and tumor cells. This research will provide scientists with more knowledge in designing new antibiotics that are particularly important to fight infections in cancer patients whose immune systems are often destroyed by radiation and chemotherapy.

## TARGETING GLIOBLASTOMA

**Stanley Cohen, M.D.,** *Stanford University School of Medicine,* has identified gene signatures that are correlated to cell migration and invasion of glioblastoma. These findings underscore that a gene signature might directly govern the invasive and metastatic potential of a tumor. The gene signatures also provide novel molecular targets around which new therapies could be developed to stop the lethal invasion of glioblastoma.

**Webster K. Cavenee, Ph.D.,** *Ludwig Institute for Cancer Research,* is identifying genes whose mutation or altered expression leads to malignancy. Glioblastoma is a highly-aggressive brain tumor which commonly expresses EGFRvIII, a variant version of EGFR (Epidermal Growth Factor Receptor). A novel treatment regimen, including an EGFRvIII inhibitor developed in Dr. Cavenee's lab, has shown powerful anti-glioblastoma effects, and may represent a novel therapeutic approach to overcome chemoresistance.

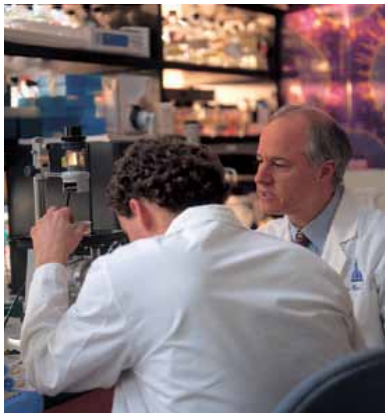
## IMMUNOTHERAPY AND VIROTHERAPY

**Laurence J. N. Cooper, M.D., Ph.D.,** *M.D. Anderson Cancer Center,* is developing new cutting-edge technology which genetically engineers human immune cells for the treatment of leukemia and lymphoma. This novel immunotherapy is currently being evaluated in a Phase I clinical trial in patients with CD19+ lymphoma. To make this therapy more applicable clinically, Dr. Cooper is now developing methods which would allow quick and cost-effective manufacturing of large number of therapeutic immune cells for the patients in less than 24 hours.

**Paul B. Fisher, M.Ph., Ph.D.,** *Virginia Commonwealth University School of Medicine,* has developed an innovative gene therapy to treat prostate cancer. This new therapeutic is a genetically-reprogrammed virus which is designed to specifically infect and destroy tumor cells. A smart control system installed into the virus ensures that the viruses only fire on tumor cells and leave normal cells unharmed.

**Howard Kaufman, M.D.,** *Columbia University,* is developing a cancer vaccine for the treatment of kidney cancer. This new vaccine, called MVA-5T4, has demonstrated its power in boosting immune responses in tumor models, which triggers immune reactions that only target kidney cancer cells, but not normal kidney tissue. This promising new treatment has already entered a Phase I clinical trial in which it is evaluated in patients with late stage (metastatic) kidney cancer.

## MicroRNAs AS MASTER SWITCHES FOR BLOOD CELL MATURATION



**Curt I. Civin, M.D.,** *Johns Hopkins University School of Medicine,* is elucidating how the survival, proliferation, and differentiation of normal and malignant blood stem cells are regulated, and then translating the results into useful clinical tools. Dr. Civin's team discovered a set of microRNAs functioning as powerful "master switches" that control the maturation of adult blood-forming stem cells. Breaking the code of blood cell maturation may one day enable scientists to grow new blood cells for transplant into patients with cancer and other bone marrow disorders.

## REMEMBERING I. BERNARD WEINSTEIN, M.D. CANCER PIONEER

With deep affection, the National Foundation for Cancer Research honors and remembers NFCR Fellow, I. Bernard "Bernie" Weinstein, M.D., for the commitment and passion he brought to unlocking the mysteries of cancer. Dr. Weinstein died Monday, November 3, 2008 after experiencing kidney failure.

Dr. Weinstein was a visionary and an inspiration to many in cancer research. A vital part of the National Foundation for Cancer Research for nearly thirty years, Dr. Weinstein pioneered the fields of molecular carcinogenesis, preventive oncology, and molecular epidemiology, earning the admiration and respect of the scientific community. Credited for helping shape the new frontier of cancer genomics and therapeutics with his theory of oncogene addiction, Dr. Weinstein discovered what many have called the "Achilles Heal" of cancer. His pioneering research gave rise to targeted cancer therapies, a new approach to treating cancer which is offering new hope a promise to cancer patients.

## DRUG RESISTANCE OF TUMORS

**Susan Band Horwitz, Ph.D.,** *Albert Einstein College of Medicine,* is deciphering how tumors develop drug resistance to Taxol, and is developing new strategies to overcome the drug resistance problem of tumors. Her research has shown that combining Taxol with natural products (such as discodermolide) or with certain small molecule compounds can enhance the therapeutic activity of Taxol and may even reduce the emergence of drug resistance. The availability of such drug combinations for the treatment of lung, breast, and ovarian cancers could make a significant difference for those patients whose tumors are resistant to Taxol.

# NFCR PERSONALIZED MEDICINE RESEARCH CLINIC


**What's broken in cancer cells are genes, and since 1973 the National Foundation for Cancer Research has spent over $250 million to underwrite basic discoveries about the ways broken-down genes lead to cancer. That research is now beginning to pay off, and a better understanding of the biology of cancer cells has led to the identification of the genes, proteins, and pathways involved in cancer cell growth, survival, and metastasis.**

But we cannot wait another three decades for these discoveries to reach cancer patients who need them now. There are still nearly 600,000 deaths per year from cancer in the United States alone, and most physicians continue to practice traditional trial-and-error medicine when treating cancer patients. Too often today, a patient presents with symptoms, and his/her doctor makes a "most likely" diagnosis that is consistent with those symptoms. The doctor then prescribes chemotherapy and/or radiation and, possibly, other treatments such as surgery.[1] This symptomatic approach to treating cancer has produced many failures in treatment; multiple studies have shown that most drugs prescribed for cancer in the United States today are effective in fewer than 25% of treated patients.[2]

Eventually, the majority of patients with metastatic cancer run out of treatment options for their tumors. Patients with advanced metastatic cancer need options for newer approaches against their disease. After progression of their tumor on standard front line and second line (and sometimes third line and beyond) therapies, patients have limited options.[3] But there is hope made possible by new targeted cancer therapies which are more targeted, usually against a cell surface receptor or an up-regulated or amplified gene product.

Targeted cancer therapies are a new class of anti-cancer drugs that hone in specifically on cancer cells, disrupting the molecular signals that sustain them. This is a new approach to treating cancer, and every month researchers

*Dr. Daniel Von Hoff, Director, NFCR Personalized Medicine Research Clinic*

are identifying another genetic marker that says, TREAT HERE. If a patient is treated based on that target, the chance of having an anti-tumor response isn't 5 percent, it's upwards of 80 percent.[4]

While targeted cancer therapies are meeting with success (e.g. Herceptin against HER2/*neu* in breast cancer cells, bevacizumab against VEGF, cetuximab against EGFR, etc.), patients' tumors still eventually progress on these therapies. If it was possible to measure a larger number of targets in a patient's tumor, it may be that targets could be identified which could be exploited by the use of specific therapeutic agents thus giving the patient a viable therapeutic alternative. Ultimately, most cancer researchers envision utilizing multiple agents to hit multiple targets present in a patient's tumor. However, identification of precisely which agents to use against that specific patient's tumor is challenging. NFCR researchers are developing new technologies in pathology and in molecular biology that have now led to initial efforts to look for specific targets in patients' tumors and treatment of patients with agents (biologic, chemotherapeutic, other modalities), which hit these targets.

Now NFCR has established the first of what will be a network of NFCR Personalized Medicine Research Clinics to accelerate progress toward developing optimal cancer treatments based upon the underlying molecular basis of each patient's cancer. In addition to a basic shift of focus from tumor histology and symptom-based diagnosis to underlying genetic abnormalities, clinical researchers at the NFCR Personalized Medicine Research Clinic in Scottsdale, Arizona are developing distinctive cancer therapies oriented toward subsets of cancers and the patients in those sub-groups who can experience dramatic responses to treatment.

The availability of new molecular profiling techniques—and soon to be sequencing of a patient's tumor genoma versus their normal genome—allows clinical researchers at the NFCR Personalized Medicine Research Clinic to clearly characterize the potential targets in an individual patient's tumor. This truly personalized medicine approach is frequently talked about by many, but few have actually started to put this approach into practice.

Patients seeking care and treatment at the NFCR Personalized Medicine Research Clinic oftentimes have refractory cancer for which there are no therapeutic options. While Clinic Director, Dr. Daniel Von Hoff, offers patients a selection of new agents in phase I studies he believes it is preferable to try to select the anti-cancer agent which has the best chance of working against their tumor. Then, clinical researchers profile each patient's tumor to see if his or her tumor may contain a target for which there is a new agent.[5] Clinical researchers at the NFCR Personalized Medicine Research Clinic have begun to report the results of these initial studies, and they look promising.[6] [7]

[1] Mara G. Aspinall and Richard G. Hamermesh, "Realizing the Promise of Personalized Medicine," Harvard Business Review, October 2007, p. 1.

[2] Brian B. Spear, Margo Heath-Chiozzi, and Jeffrey Huff, "Clinical Application of Pharmacogenetics," Trends in Molecular Medicine (May, 2001).

[3] They may participate in Phase I or Phase II trials of new anticancer agents if they meet usually quite strict eligibility criteria and have access to centers which can administer investigational agents. When patients participate in these trials, the new agent will give response rates of between 5% and 10% (on average) in a Phase I setting and 12% (on average) in a Phase II setting. Patients also have an option for best supportive care to attempt to address their symptoms.

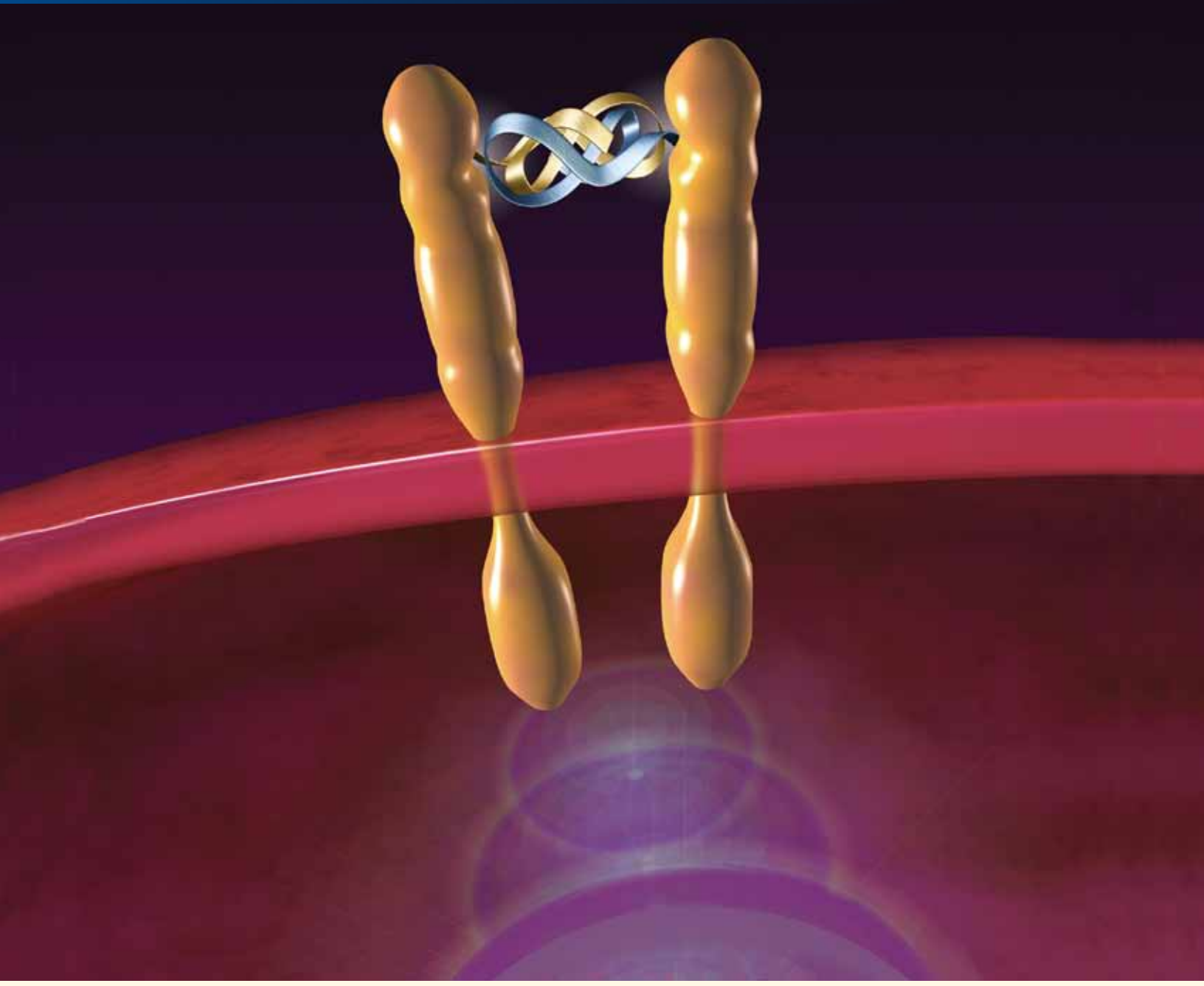
[4] JR Nevins, "Genomic Signatures to Guide the Use of Chemotherapeutics," Nature Medicine, November 2006, p. 1294.

[5] In this NFCR PerMed Research Clinic treatment protocol, clinical researchers address this question by using state-of-the-art immunohistochemistry /fluorescence in situ hybridization and a quality-controlled microarray technique to determine whether or not molecular profiling of a patient's tumor can provide clinical benefit for patients with advanced cancer (e.g., control their symptoms, fix what is bothering them, slow progress of their tumor, or indeed, shrink their tumor). Clinical researchers will determine how often targets are present in a patient's tumor which could make the tumor susceptible to an existing treatment or predict resistance to an otherwise available treatment. Patient are then treated with a single agent or combination therapy that relates to a particular target(s) identified via the IHC/FISH and/or the microarray technique.

[6] Bittner MJ, Penny R, Shack S, Campbell E, Taverna D, Borad M, Love R, Trent J, Von Hoff, DD. Frequency of potential therapeutic targets identified by immunohistochemistry (IHC) and DNA microarray (DMA) in tumors from patients who have progressed on multiple therapeutic agents. J Clin Oncol, 2006;24 (18S): 3071.

[7] The success of the NFCR PerMed Research Clinic treatment approach will be determined by comparing the time on treatment for the patient after therapy with a drug selected by molecular profiling with the time on treatment for the latest regimen the patient had progressed on, i.e. each patient is his/her own control. Patients as their own control (a rediscovered technique) will be the method used to reliably elicit activity during early development.

# TARGETING TOP KILLERS TO SAVE LIVES



## VEGF

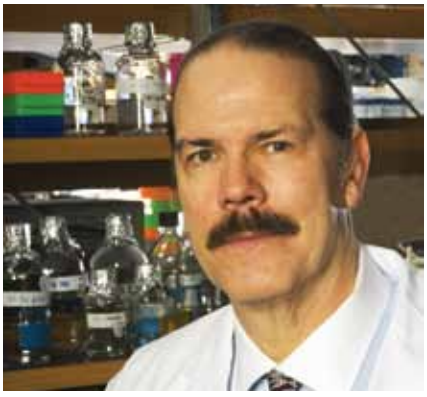
VEGF was discovered in 1983 by Dr. Harold Dvorak and colleagues as a factor that made blood vessels leaky; hence, it was given the name of vascular permeability factor (VPF). Senger, D. R. *et al.* Tumor cells secrete a vascular permeability factor that promotes accumulation of ascites fluid. Science 219, 983-985 (1983). Then, in the late 1980s, several groups showed that VEGF/VPF stimulated endothelial cell migration and replication and was a potent angiogenic factor *in vivo*.

**In 2008, it was estimated that about 1,437,180 new cases of cancer were diagnosed, and 565,650 people died from it in the United States alone. Nearly half of all cancer deaths in the United States are caused by four types of cancer: lung, breast, prostate, and colorectal. Besides the research on other types of cancer, NFCR has developed a comprehensive approach to support promising research programs that target the four leading killers. NFCR helps bring scientists closer than ever to developing early diagnostic tools, discovering new cancer targets, and bringing more effective anti-cancer treatments to cancer patients.**

## LUNG CANCER RESEARCH

Causing nearly one-third of all cancer deaths in the United States, lung cancer remains the number one killer amongst all types of cancer. NFCR provides funding to support eight outstanding scientists from around the world to find a cure for lung cancer. NFCR-supported research is focused on several critical areas, including chemoprevention, early diagnosis, personalized medicine, and the development of cutting-edge microchip-based technology for real time monitoring of cancer. Research breakthroughs in these areas will bring significant benefits to lung cancer patients, improving their survival rates and quality of life.

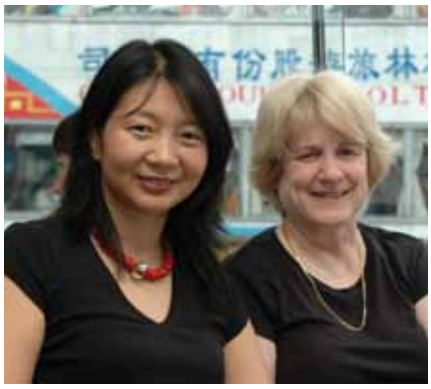
## PROSTATE CANCER RESEARCH



*Paul Fisher, Ph.D.*

More than 186,000 men were diagnosed with prostate cancer in 2008 in the United States, and about 28,600 died from it. The 5-year survival rate for prostate cancer patients has dramatically increased to nearly 100%, largely due to recent advances in cancer research. However, once the cancer has spread, it can be fatal because there is no curative treatment available at this time. Six NFCR scientists are seeking novel strategies to tackle metastatic prostate cancer from multiple fronts, including gaining more insights into the molecular mechanisms that drive cancer invasion and spreading; identifying new tumor targets for improved therapies; and developing novel gene therapies for the treatment of metastatic prostate cancer. Their critical and innovative research will lead to better strategies in predicting and treatment of prostate cancer.

## BREAST CANCER RESEARCH



*Sujuan Ba., Ph.D., and Mary-Claire King, Ph.D.*

Breast cancer is the most frequently diagnosed cancer and the second leading cause of cancer death in women. NFCR supports breast cancer research in the laboratories of 11 leading scientists in this field. These scientists are at the frontline of multiple areas of breast cancer research including the development of cutting-edge molecular imaging technology that will allow early diagnosis, seeking new strategies to overcome tumor drug resistance, developing nanocomplex drug delivery technology, researching new anti-cancer drugs for improved treatments, and establishing more effective strategies to stop metastasis — which kills more than 90% of breast cancer patients.

## COLORECTAL CANCER RESEARCH

Colorectal cancer is the third leading cancer killer of both men and women in America. With NFCR's support, nine outstanding scientists are launching attacks on this deadly disease. Their research has already led to the discovery of new biomarkers for more accurate monitoring of drug efficacy, and has brought more potent therapies for treatment of colorectal cancer to the patient.

## OTHER TYPES OF CANCER

*Laurence Hurley Ph.D.*

Besides conducting leading-edge research, NFCR scientists are also working around the clock to find more effective treatments for other types of cancer. Pioneering research is being conducted to fight pancreatic, ovarian, brain, liver, esophageal, gastric, cervical, kidney, head and neck cancer, as well as leukemia, lymphoma, multiple myeloma, melanoma, soft tissue sarcoma, and many other types of cancer.

*NFCR scientists are moving cancer research toward our ultimate goal—finding cures for cancer…* **all** *types of cancer.*

# SZENT-GYÖRGYI PRIZE FOR PROGRESS IN CANCER RESEARCH


*Carlo Croce, M.D.*

The 3rd *Szent-Györgyi Prize for Progress in Cancer Research* went to Carlo Croce, M.D., Director of the Human Cancer Genetics Program and Director of the Institute of Genetics at the Ohio State University. Dr. Croce was awarded the Prize for his groundbreaking discoveries into the direct and causative association of chromosomal translocations with the molecular mechanisms of oncogene activation. Dr. Croce's discoveries are credited for revealing the genetic origins of cancer and paving the way for entirely new therapeutic approaches to targeting and treating cancer.

The *Szent-Györgyi Prize for Progress in Cancer Research* was established to recognize outstanding scientific achievement in the war against cancer and to honor pioneering scientists who have made extraordinary contributions in the field of cancer research. In presenting the award to Dr. Croce, Selection Committee Chair, Webster Cavenee, said that he was "particularly delighted" to recognize Dr. Carlo Croce as his research epitomized the very essence of the *Szent-Györgyi Prize* and research for a cure for cancer. Focusing on the earliest genetic stages of hematopoietic malignancies and cancer, Dr. Croce mapped the first viral integration site on a chromosome—and started down the uncharted road of cancer genetics.

Dr. Croce is credited for detailing the role played by genes in lymphomas and other tumors. He defined the role of microRNA in cancer development, identifying micro-RNA signatures that correlate with diagnosis and prognosis of leukemia, lung cancer, and many other types of tumors, key indicators in the role of mutating genetic expression. Dr. Croce has developed a gene chip that enables the assessment of the genome-wide expression of microRNAs in normal cells and tumor tissue.

Dr. Croce shares Albert Szent-Györgyi's passion for basic cancer research. "Dr. Szent-Györgyi was an inspiration to so many of us in the cancer research field for his belief in the role of basic science in breaking apart cancer's mysteries," said Dr. Croce. "Without basic science cancer research, we'll never cure cancer."

"Winning the *Szent-Györgyi* Prize means a great deal to me personally, and I am humbled to have been selected by my peers to receive it. It is my hope that the discoveries I have advanced will make a significant long-term impact on those patients who suffer from cancer. The support of the National Foundation for Cancer Research over the years, both for this Prize and for basic cancer research, has been a vital part of many significant research discoveries."

Dr. Croce is a Professor of Molecular Virology, Immunology and Medical Genetics at the Ohio State University where he is Director of the cancer genetics program. He has received numerous awards including the General Motors Cancer Research Foundation Charles S. Mott Prize, the Italian Gold Medal for Public Health, and the G.H.A. Clowes Memorial Award of the American Association for Cancer Research. Dr. Croce is a member of the National Academy of Sciences, was Editor-in-Chief of *Cancer Research*, and continues to be the Subject Editor for the *British Journal of Cancer*. Dr. Croce received his M.D. from the University of Rome in Rome, Italy.

Albert Szent-Györgyi, M.D. won the Nobel Prize for Physiology and Medicine in 1937 for his discovery of Vitamin C. In 1973, Dr. Szent-Györgyi helped change the face of cancer research by co-founding NFCR to provide scientists with the financial support necessary to pursue innovative basic cancer research.

The 3rd Annual *Szent-Györgyi Prize* selection committee was chaired by the most recent prize recipient, Webster K. Cavenee, Ph.D., Director of the Ludwig Cancer Research Institute University of California San Diego. Committee members included Sujuan Ba, Ph.D., NFCR; Stanley Cohen, M.D., Stanford University; Ronald A. DePinho, M.D., Dana-Farber Cancer Institute; Paul B. Fisher, Ph.D., Columbia University; Richard Gaynor, M,D., Eli Lilly; Thea Tlsty, Ph.D., University of California, San Francisco; Peter K. Vogt, Ph.D., The Scripps Research Institute; Daniel Von Hoff, M.D., FACS, TGen; and Bruce Zetter, Ph.D., Children's Hospital Boston.

*Carlo Croce, M.D. and Ken Hansen*

# GLOBAL COLLABORATION


*Franklin Salisbury, Jr. President of NFCR and Dr. HAO Xi-Shan, President, Tianjin Medical University and Cancer Hospital signing multiyear tissue bank collaboration agreement.*

## BIOMARKERS: Revolutionizing Cancer Therapies and Diagnostics

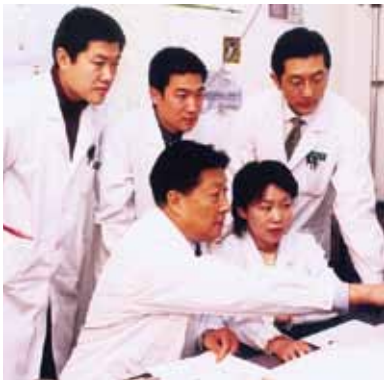
With the growing and urgent need for biomarker profiling and validation in cancer research today, the Consortium for Clinical Diagnostics (CCDx) is a partnership of scientists at research institutions and biopharmaceutical companies dedicated to facilitating genomic research and diagnostics. CCDx provides a centralized infrastructure and expertise in genomics and molecular imaging as well as translational medicine. The Consortium provides key capabilities in all aspects of predictive medicine, including identification and validation of disease susceptibility genes and genetic signatures, pharmacogenomics, and the development of medical response tests as well as new and improved diagnostic tests—especially in the area of cancer.

## PROGRAM OF ACTION FOR CANCER THERAPY

Today, in developing countries, cancer kills more people than HIV-AIDS, malaria, and tuberculosis combined. And while mortality rates for the latter three are coming down, deaths from cancer are increasing. In 2008, the International Atomic Energy Agency (IAEA) continued its Program of Action for Cancer Therapy (PACT) in partnership with NFCR to enable developing countries to provide patients with novel and effective cancer treatments. NFCR enables donors in the U.S. to help PACT deliver cancer treatment integrated with prevention, screening radiotherapy, and palliative care to patients in developing countries.

## TISSUE BANK CONSORTIUM

Tissue preserved in a tissue bank is the single most valuable resource for cancer researchers. Genetic data from cancer tissue, coupled with the development of technologies to assay these molecules and pathways in patients, is revolutionizing modern cancer treatments. Working in partnership with leading research hospitals such as the Tianjin Medical University Cancer Institute and Hospital in China, scientists from NFCR have established the Tissue Bank Consortium to provide high quality cancer tissue to researchers around the globe who are seeking to gain a deeper understanding of the role of specific genes, proteins, and pathways, in cancer. NFCR established a steering committee of leading scientists from universities and research hospitals in the United States and China to ensure that tissue banks operate in total compliance with the highest international standards. At its fourth annual meeting in 2008, the steering committee initiated several important research projects which may lead to important new and significant breakthroughs in cancer treatment.



*Hao Xi-Shan, Ph.D., President, Tianjin Medical Univeristy Cancer Institute and Hospital*

# TAKING ACTION AGAINST CANCER

**Donor-initiated and corporate-sponsored special events are great ways to show support for cancer research and turn a passion to cure this disease into action. These events help raise funds and awareness while also serving as a catalyst for many top supporters of cancer research and prevention education to collaborate, expand their knowledge, and increase their commitment to helping NFCR find cures for all types of cancer.**

## DAFFODILS AND DIAMONDS LUNCHEON


In March 2008, over 400 women from across the Washington, D.C. metro area gathered to enjoy an elegant lunch and bid on items such as Tiffany necklaces and Gucci bags at the annual Daffodils and Diamonds Luncheon at the Congressional Country Club in Bethesda, Maryland. The event was sponsored by Lord & Taylor and featured a chic spring fashion show along with presentations by cancer survivors, including event co-founder and cancer survivor, Alice-Anne Birch. The event was emceed by Alison Starling, co-anchor of WJLA-TV's morning program "Good Morning Washington." This annual event has become a staple of support for NFCR's work against a number of women's cancers.

## CALVIN KLEIN, HARPER'S BAZAAR, AND LORD & TAYLOR FASHION SHOW

Calvin Klein, *Harper's Bazaar*, and Lord & Taylor joined together to support life-saving cancer research when the three giants of the fashion industry hosted a fashion show in Chevy Chase, Maryland, featuring an exclusive presentation of Calvin Klein women's sportswear. The event included refreshments, music, and a beautiful collection of fashionable clothing. Jane Loddo, Executive Events Director for *Harper's Bazaar*, says that the event "is a wonderful way for our industry to give back and help raise funds and awareness for the NFCR mission." A portion of proceeds were donated to NFCR to enable the Foundation to continue to fund research for prevention, early diagnosis, better treatments and ultimately, cures for *all* types of cancer.

*Alice-Anne Birch with daughter Alexandra Birch Rose and grand daughter, Annabelle.*

## "ASK THE EXPERTS" AT JOLIE DAY SPA

NFCR was featured at the Jolie Day Spa "Ask the Experts" event, an afternoon packed with refreshments and conversation about skin care and skin cancer prevention. Dr. Jie Zhao, NFCR Science Program Manager, was on hand to answer questions and give tips about skin care prevention, including ways to protect yourself from the sun, how to choose a sunscreen, and how to do a skin cancer self-exam for early detection. The event also included prize drawings and refreshments, and was free and open to the public.

*Y. L. Kwong, M.D., University of Hong Kong, Ed Chu, M.D., Yale; Waun Ki Hong, M.D., M.D. Anderson Cancer Center; Brian Leyland-Jones, M.D., Ph.D., Emory-Winship Cancer Institute; Web Cavenee, Ph.D., UCSD Ludwig Institute for Cancer Research.*

## CANCER PROGRESS CONFERENCE

NFCR was a proud sponsor of the 19th Annual *Cancer Progress Conference* in New York City. A premier cancer forum for bio/pharmaceutical executives and investors alike, the Cancer Progress Conference focuses primarily on breakthroughs in cancer research leading to novel treatments and therapies. NFCR scientists join top oncology-focused executives and leading financial analysts to address new approaches and strategies for accelerating progress towards a cure for cancer.

## 4TH INTERNATIONAL THINK TANK FORUM: Anti-Cancer Innovation and Global Collaboration

The *4th International Think Tank Forum: Anti-Cancer Innovation and Global Collaboration* provided a unique opportunity for cancer researchers from the United States, China, and all of Asia to meet with biopharmaceutical executives and venture fund managers to discuss the latest advances in cancer research and examine ways to accelerate progress against cancer through innovative global collaboration.

The 4th International Think Tank Forum was presented in conjunction with another major cancer meeting, the *14th Hong Kong International Cancer Congress.*

By combining these two conferences, registrants were able to discuss the broad waterfront of cancer research—from the latest developments in basic and translational research to the most exciting advances in clinical cancer research. This conference featured interactive dialogue between attendees and world-class researchers discussing recent advances and promising new directions in cancer research; and the challenges currently facing researchers in basic, translational, and clinical arenas, as well as emerging areas of cancer research that merit a greater investment of time, talent, and funding.

# FINANCIALS

## National Foundation for Cancer Research, Inc. and Affiliates
## Consolidated Statement of Financial Position, September 30, 2008

### Assets

| | |
|---|---|
| Cash and cash equivalents | $1,475,210 |
| Accounts receivable | 339,411 |
| Bequests receivable | 548,500 |
| Prepaid expenses and other assets | 155,095 |
| Furniture and equipment, net of accumulated depreciation | 103,072 |
| Investments | 7,091,168 |
| Amounts held in trust by others | 1,625,941 |
| **Total Assets** | **$11,338,397** |

### Liabilities and Net Assets

| | |
|---|---|
| **Liabilities** | |
| Accounts payable and other liabilities | $ 852,046 |
| Research grants and contracts payable | 1,657,735 |
| Accrued compensation and benefits | 186,546 |
| **Total Liabilities** | **$2,696,327** |
| **Net Assets** | |
| Unrestricted | |
| Designated for research | $ 5,150,079 |
| Undesignated | 486,211 |
| Total unrestricted | $ 5,636,290 |
| Temporarily restricted | 1,594,273 |
| Permanently restricted | 1,411,507 |
| **Total Net Assets** | **$ 8,642,070** |
| **Total Liabilities and Net Assets** | **$11,338,397** |

# FINANCIALS

## National Foundation for Cancer Research, Inc. and Affiliates
## Consolidated Statement of Activities for the year ended September 30, 2008

### Revenue and Support

| | Unrestricted | Temporarily Restricted | Permanently Restricted | Total |
|---|---|---|---|---|
| Public support | $11,544,337 | $333,619 | $ – | $11,877,956 |
| Bequests | 2,132,593 | 6,865 | 13,566 | 2,153,024 |
| Noncash support | 741,562 | – | – | 741,562 |
| Mailing list rentals | 421,342 | – | – | 421,342 |
| Net investment income | (756,379) | – | – | (756,379) |
| Change in value of split–interest agreements | (28,820) | (58,834) | (285,688) | (373,342) |
| Other revenue | 394,928 | – | – | 394,928 |
| Net assets released from restrictions | 530,004 | (530,004) | – | – |
| **Total Revenue and Support** | **$14,979,567** | **$(248,354)** | **$(272,122)** | **$14,459,091** |

### Expenses

| | | | | |
|---|---|---|---|---|
| Program services | | | | |
| Research | $4,681,312 | $ – | $ – | $4,681,312 |
| Public education and information | 6,319,207 | – | – | 6,319,207 |
| **Total Program Services** | **$11,000,519** | **$ –** | **$ –** | **$11,000,519** |
| Supporting services | | | | |
| Fundraising | $4,316,413 | $ – | $ – | $4,316,413 |
| Management and general | 1,028,841 | – | – | 1,028,841 |
| **Total Supporting Services** | **$5,345,254** | **$ –** | **$ –** | **$5,345,254** |
| **Total Expenses** | **$16,345,773** | **$ –** | **$ –** | **$16,345,773** |
| **Change in Net Assets** | **$(1,366,206)** | **$(248,354)** | **$(272,122)** | **$(1,886,682)** |
| **Net Assets, Beginning of Year** | **7,002,496** | **1,842,627** | **1,683,629** | **10,528,752** |
| **Net Assets, End of Year** | **$5,636,290** | **$1,594,273** | **$1,411,507** | **$8,642,070** |

*To receive a copy of NFCR's Financial Statements and Schedule for September 30, 2008 (with independent Auditor's Report) from the auditing firm of Squire, Lemkin + O'Brien, LLP, please call us at 1-800-321-CURE (2873) or visit our website, www.NFCR.org.*

# EXTRAORDINARY SUPPORT

## THE NFCR LEGACY SOCIETY: DONORS COMMITTED TO THE CONQUEST OF CANCER

The Legacy Society recognizes donors who have chosen to create a substantial legacy in cancer research by leaving a gift to NFCR through their estate, or by utilizing other planned gift vehicles to support NFCR's cutting-edge cancer research. We are grateful to these donors for their dedication and foresight, and are proud to recognize them through membership in the NFCR Legacy Society.

Members of the Legacy Society may designate their gifts to NFCR in general, to a specific NFCR research program, for work focused on a specific cancer type, or to a favored aspect of cancer research.

Estate gifts are made through a will or trust. Planned gifts are generally made from a donor's assets. Important financial, tax, and estate planning goals should be taken into consideration as such commitments are made in order to maximize the benefit to both the donor and NFCR. Therefore, NFCR encourages donors to consult with their tax or legal advisors before making a planned gift commitment. Inquiries from advisors are welcome.

Enrollment in the NFCR Legacy Society is simply a matter of advising NFCR of the creation of a legacy gift: a bequest in a will or through a living trust, designation of NFCR as a beneficiary of a retirement plan or IRA, an investment or savings account, or a life insurance policy. Society members receive invitations to special, Legacy Society events, as well as frequent cancer updates from NFCR containing information on the newest developments in the fight against cancer. We, of course, honor requests for donor anonymity, but hope that by sharing the names of our generous Legacy Society donors, others will be inspired to join them and make their own lasting contribution to cancer research.

We are proud to welcome these new members into the NFCR Legacy Society who made their intentions known by January 1, 2008.*

*List of NFCR Legacy Society Members can be found at www.NFCR.org

NFCR gratefully acknowledges the support of the following foundations whose gifts ranging from $500 to over $200,000 help support the full array of NFCR cancer research and prevention education programs worldwide. With the generous support of our Foundation Partners, NFCR continues to lead the way toward *Research for a CURE*.

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