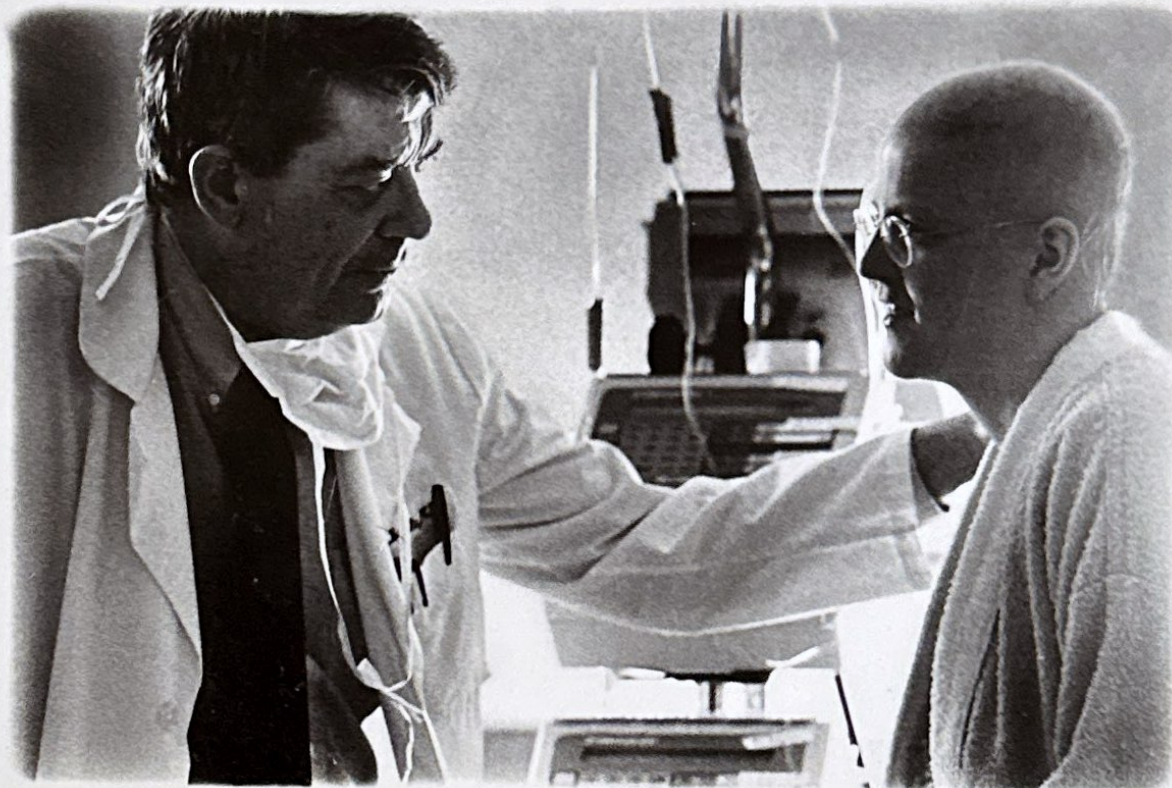


The Johns Hopkins
Oncology Center
1989 Annual Report

Programs of Healing and Discovery Cancerous diseases have stalked mankind for centuries. Today, cancer is newly diagnosed in over 1 million Americans each year. As our population ages, illness and death due to cancer are likely to increase. As a field of medicine and scientific inquiry, oncology is more important and challenging than ever. Persistent research has led to increasingly effective methods of cancer diagnosis and treatment. It is now possible to cure several cancers that were formerly lethal. Children with leukemia and other forms of



cancer can now look forward to normal lives. So can adults with Hodgkin's disease and testicular cancers. But there is still a long way to go before cancer loses its grip on the lives of so many. Continued persistence in research and training, as well as innovations in patient care, are key.

Recent years have seen a veritable revolution in our understanding of the basic biology of cancer. Scientists have begun to unravel the complex cascade of molecular genetic events responsible for the onset and progression of human cancer. This research is establishing a firm basis for the development of even more effective methods of diagnosis and treatment, including those for the more common cancers of bowel, lung and breast.

This new knowledge also presages a new era of cancer prevention. There is every reason to expect that, in the not too distant future, simple tests will enable us to identify individuals who are at high risk of developing cancer and that new drugs will be developed which can protect people against the progression of pre-tumorous conditions into clinical cancers. It is also very likely that we will be able to identify patients who are most likely to experience recurrent cancer following their primary therapy, and care for them accordingly.

The Johns Hopkins School of Medicine and Hospital have made a special commitment to cancer research and treatment, as well as to the education of gifted individuals who will lead the field of oncology in the future. The National Cancer Institute was quick to acknowledge the excellence of these activities in the early 1970s by designating Johns Hopkins as one of the first of a select group of university-based comprehensive cancer centers.



The Oncology Center at Hopkins was built in 1976 to house programs of healing and discovery. Many gifted people came forward to join the Center's faculty and staff, and to apply their talents to selected aspects of the cancer problem. Over the years, their efforts have resulted in major advances in bone marrow transplantation, leukemia treatment, radioimmunoglobulin therapy and anti-cancer drug development, as well as seminal contributions in the areas of cell and molecular biology and the genetics of cancers of the bowel, lung, brain and thyroid.

Our Oncology Center is a vigorous and flourishing enterprise. The special patient services and research laboratories are full to overflowing. The excellence of its work is acknowledged widely in this country and abroad. The success with which the Center is carrying out its mission has exceeded all expectations.

At this juncture, Johns Hopkins has rededicated itself to an even greater effort against cancer, soon to surpass heart disease as the nation's number one killer. With the unstinting help and support of a great many people, our faculty and staff will move forward into a future abundant with the promise of more effective ways of managing and preventing cancerous diseases.

A. H. Owens, Jr.

Albert H. Owens, Jr., M.D.

Director

Having established an oncology department in 1973, the University and Hospital Trustees authorized construction of The Johns Hopkins Oncology Center in 1974.

The Center received early recognition when it was designated a "Center of Excellence" by the National Cancer Institute, becoming one of 20 Comprehensive Cancer Centers.

1977

The Oncology Center officially opens.

1979

Animal trials with cyclosporin show promise for prevention of graft vs. host disease.



Early detection is key to attacking certain cancers while they are still curable. In 1989, the Oncology Center began a pilot screening project to test for a rare childhood cancer of the peripheral nervous system called neuroblastoma. A simple urine test will enable area pediatricians to detect the disease well before it would be found by physical exam.

Human trials indicate cyclosporin prevents graft vs. host disease following bone marrow transplant.

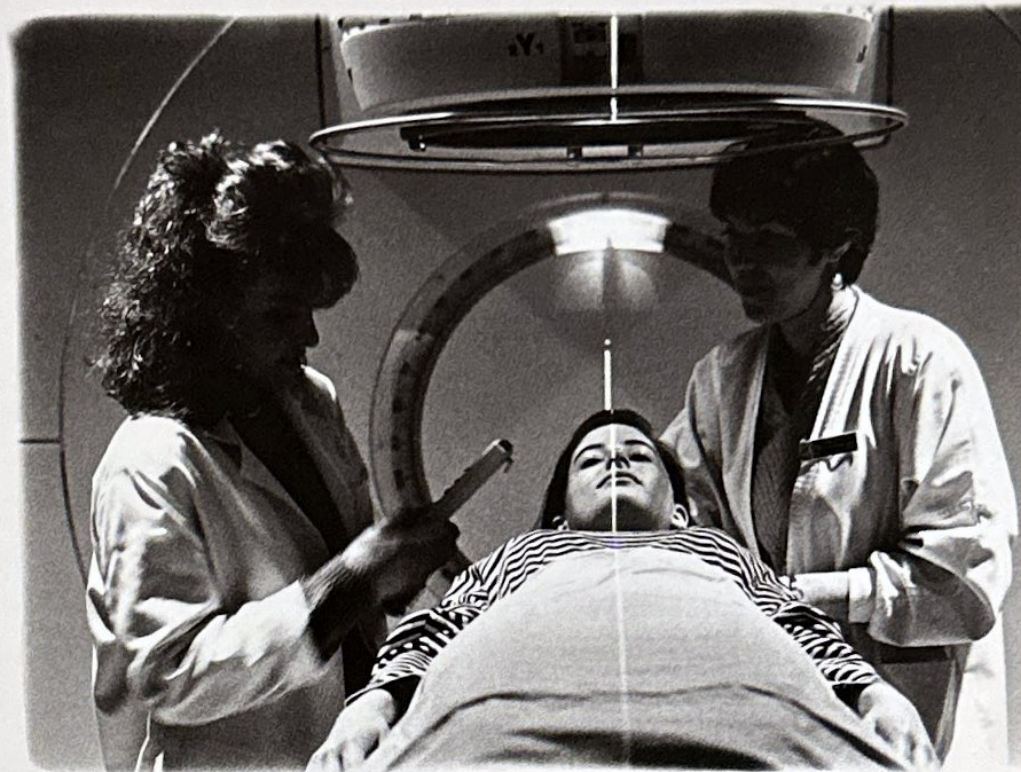
Initial trials with interferon to define its mechanism of action as an anti-neoplastic and anti-viral agent.

Discovery of the association of DNA replication and the nuclear matrix.

In 1989, about 155,000 Americans were told they have lung cancer. About 142,000 died from this form of cancer alone. More than 140,000 women faced a diagnosis of breast cancer. About one in four Americans will develop cancer. Even more people are likely to be affected as our population grows older.

Although the statistics make us pause to reflect on the enormity of the problem and how close it may be to our own lives, they only tell half the story. Early detection, new treatments and new paths of scientific inquiry are making inroads against the nation's second most common cause of death. Today, many cancers are curable. Others are beginning to reveal the secrets of their genesis and progression.

At The Johns Hopkins Oncology Center, we focus all our efforts on the problem of human cancer. In the laboratory, at the bedside and in the classroom, we seek new knowledge and the integration of that knowledge into more effective patient care.



Precisely targeted beams of high-dose x-rays now allow doctors to destroy tumors and deep-seated blood vessel malformations in the brain without cutting into brain

tissue. The Center maintains the only facility in Maryland and Washington, D.C. where this computer-controlled, knifeless surgery is performed.

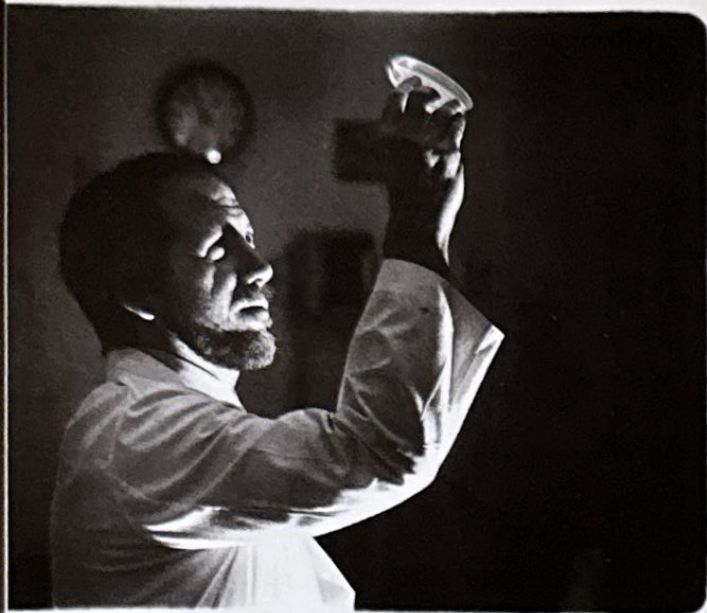
1981

Acyclovir proven effective against herpes simplex virus infections.

Neuro-Oncology Study Group forms, pulling together diverse specialists for patient care and basic and clinical research.

1982

The Center is chosen as a site for Phase I clinical trials of new drugs by the National Cancer Institute.



Research into genetic mutations in colon cancer cells is proving fertile ground for understanding how cancer develops at the molecular level. Hopkins scientists have successfully identified a number of genes responsible for initiating the uncontrolled growth of cells that characterizes cancer. From these discoveries—among the most significant in medical science in recent years—may one day come preventive measures and tests that can predict whether an otherwise healthy person is likely to get cancer.

Research The Oncology Center's research programs take their character and strength from an interactive, multi-disciplinary approach to human cancer. Inquiry in basic biological science and clinical investigation meet on common ground: seeking more effective methods for preventing, detecting and treating cancer.

The success of the Center's research programs has identified Hopkins as an international leader with a vital role to play in the evolution of cancer management. For example, early development of bone marrow transplant techniques at the Center paved the way for current refinements taking place here and elsewhere in such areas as autologous transplants, marrow purging, development of drugs for com-

bating transplant rejection and use of transplant strategies against solid tumors. Today, Hopkins runs one of the nation's foremost bone marrow transplantation programs.

The Center also introduced timed-sequential chemotherapy regimens to the treatment of leukemia, now standard around the world. Today, our highly acclaimed drug development program is producing safer, more effective anticancer drugs.

Collaborations among Hopkins immunologists, radiotherapists, chemists and physicists have led to innovative techniques such as radiolabeled antibody treatment, now proving effective against ordinarily lethal liver cancers. Our scientists are also investigating such critical issues as why a certain form of lung cancer becomes treatment-resistant, ways of assessing the metastatic potential of breast cancers and how best to deliver chemotherapy to tumors in the brain. The Tumor Registry serves as a point for collecting and analyzing data, which is then used by clinicians and epidemiologists for lifetime patient follow-up care and research support.

Finding that biochemical changes in tumor cells predict the virulent behavior of medullary thyroid carcinoma.

Inhibition of polyamine biosynthesis shown to be lethal for human small cell lung cancer cells in vitro.



1984

Discovery of dual chromosome losses associated with Wilms' tumor, a rare childhood kidney cancer.

Our research into the molecular mechanisms behind cancer is especially exciting. By identifying specific genes and the ways they mutate to initiate cancer, we are breaking new ground in our understanding of the disease. The Center's scientists have successfully located a number of genes and genetic processes responsible for the initiation and progression of cancer cells. This work, combined with advancing knowledge of immunologic processes, heralds a new era of prevention, earlier diagnosis and more effective treatment of cancer.

Our pharmacological research programs, including Phase I drug testing for the National Cancer Institute, bring patients early access to promising new treatments such as taxol, derived from the bark of the Pacific Yew tree pictured above. Taxol is proving effective against drug-resistant ovarian cancer.

Although Center discoveries such as alternative chemotherapy regimens and site-specific drug delivery systems herald a new era of treatment options, cancer of the brain and central nervous system remains one of the most deadly forms of the disease. The Center's Neuro-Oncology Study Group is seeking answers in the laboratory and clinic.

In addition to caring for patients, the Center's nurses are involved in research projects designed to enhance patient comfort and the effectiveness of nursing interventions during treatment. Current studies relate to such areas as pain control, management of refractory nausea and local toxicity of drugs.



Developed MY10 antibody (CD34) and process for purification of human hematopoietic stem cells.

1 9 8 5

Radiolabeled antibodies proven effective against primary liver cancer.

The President's Cancer Panel Meeting brings distinguished scientists to the Center.

Cloned human and mouse interferon genes; cloned interferon expressed bacteria.

Teamwork and the exchange of information among physicians, nurses, dietitians, pharmacists and social workers are the backbone of the Center's multi-disciplinary approach to treating cancer patients. Medical students and residents participate in morning rounds, learning to be skilled clinicians as well as investigators.



Education Hopkins' commitment to training new generations of oncologists is an additional source of the Center's scientific vitality. Given the fact that it takes years to translate the results of laboratory research into viable clinical applications, training takes on special importance. The physician-scientists and laboratory investigators training at Hopkins today have already been responsible for some of our major achievements and will carry our ideas and discoveries into the future.

In 1989, about 60 clinical and research fellows participated in the Center's training programs. These programs are geared toward producing academic oncologists who will continue the quest for a better understanding of cancer. In addition, interns and residents of The Johns Hopkins School of Medicine rotate through the Center, along with nurses, social workers and technicians specializing in cancer care.



Our commitment to increasing knowledge about childhood cancers has led to new chemotherapies and transplant techniques that extend survival while decreasing long-term effects on the patient's physical and mental development.

1 9 8 6

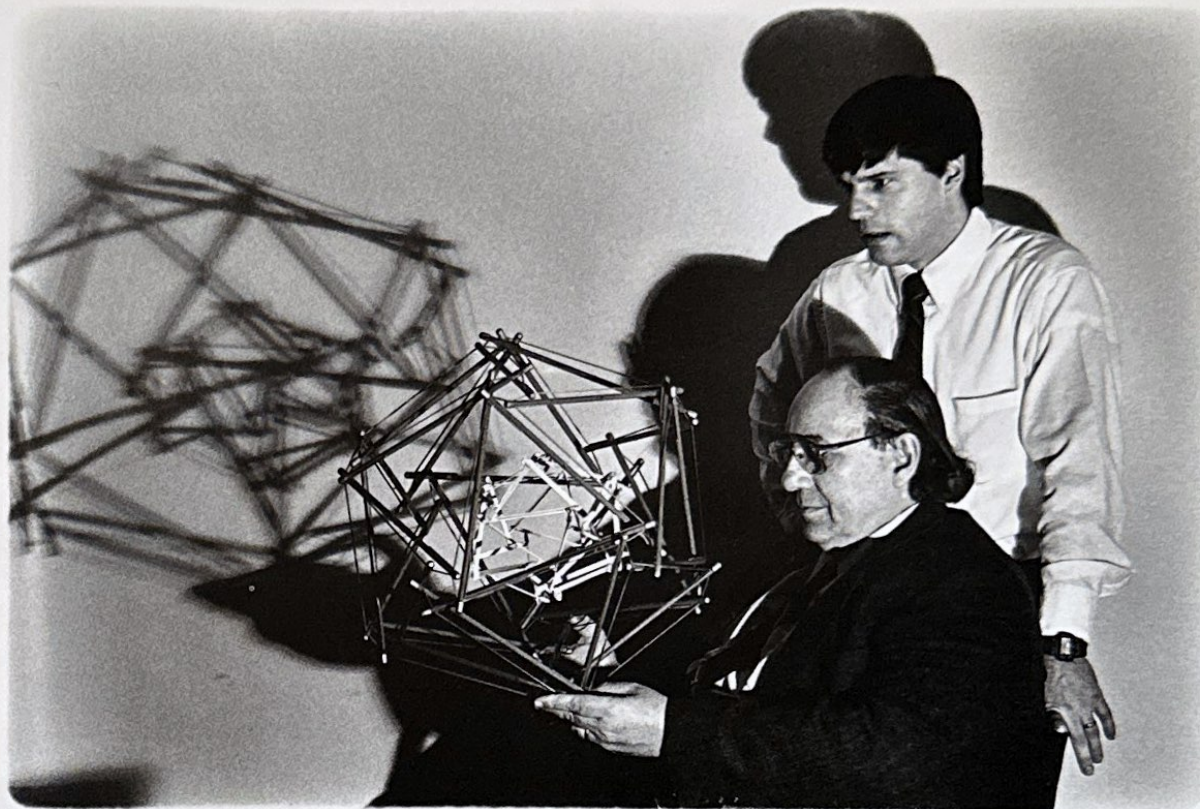
Cyclosporin found to inactivate immune response, may help protect against rejection of bone marrow grafts.

Pre-clinical studies of 4-HC lead to successful purging of cancer cells from bone marrow, paving the way for more effective autologous marrow transplants.

Identification of mammary cancer suppressor genes in experimental models.

The recent explosion of information and advances in the field of oncology has made continuing education essential. Ongoing postgraduate seminars and courses for community oncologists and nurses are just a few of the ways we help disseminate the most current information about cancer to a wide audience. We are now in the process of broadening our community programs to build on these links for education and research.

Hopkins is a regional referral center for all types of childhood cancers. The Center's pediatric oncologists saw about 100 new patients this year, while providing follow-up care for more than 600 others. Ninety percent of all children in Maryland requiring chemotherapy receive their treatment at the Oncology Center.



Because education of future leaders in the field of oncology is at the heart of our mission, the Center's educational programs prepare individuals for careers in clinical oncology and cancer research. In the class-

room, at the bedside and in the laboratory, young physicians are exposed to the most advanced information and technologies, while learning the fundamentals of compassionate patient care.

Biodegradable polymer/BCNU implants approved for clinical trials, may help prevent recurrence of brain tumors after surgery.

Discovery of "gli" gene which may be responsible for formation of often fatal brain cancers.

Intravenous BCNU and cisplatin therapy shown to reduce size of glioblastomas and astrocytomas, two types of brain tumors.

Understanding of the events of tumor progression of human medullary thyroid cancer.

Beginning to define the DNA sequences which regulate expression of the calcitonin gene in human tumors.



The Center established collaborative radiation oncology services at St. Agnes Hospital in Baltimore and Chambersburg Hospital in Chambersburg, Pennsylvania during 1989. Patient information from

Chambersburg, such as x-rays and charts, is relayed to the Center via computer, fax and video hook-up. A telephone and video conference brings physicians from the facilities together for case review.

Patient Care During 1989, more than 3,600 patients came to Johns Hopkins for initial diagnosis and treatment of cancer. More than 18,000 other patients received follow-up care. For those individuals and their families, the Center's programs—diagnostic services, inpatient treatment, outpatient clinics and special protocols for adults and children—represent the leading edge of medical care for cancer.

Equally important, the Center's programs represent care that responds to each patient as a human being. A diagnosis of cancer carries social and psychological implications along with the physical bur-



Elutriation, a process that removes certain cells from donated bone marrow, shown to help prevent graft vs. host disease.

Development of first test tube model of lung cancer cell growth—may help explain why some small cell lung cancers stop responding to treatment.

The Center's unrelated bone marrow donor pool produces its first match for transplantation.

Discovery of "hot spots" for increased DNA methylation in human cancers, may play a key role in genetic instability of tumors.

Interferon Alfa 2-n1 shown effective in treating juvenile airway papillomas in children.

den of disease for patients and their families. And, although we are constantly seeking ways to reduce the physical "cost" of cancer treatment, intensive combinations of therapies—surgery, chemotherapy, radiation therapy, immunotherapy—are required to combat the disease.

With quality of life our paramount concern, teams of physicians, nurses and social workers work closely with patients and their families, offering counseling, education and support throughout the treatment process. The Oncology Center is dedicated to innovative care in a decidedly humanistic environment.



The Center's Partnership Program focuses on improving the quality of life of cancer patients while promoting interdependence among patient, family and medical staff. A patient's active participation in his or her own care, along with the support of friends and family, contributes to overall emotional and physical well-being.

Oncology nursing demands a commitment to creating a supportive environment for patients and their families. In the outpatient clinic, which handled more than 31,000 patient visits this year, nurses and social workers provide information and referral to external support services such as those offered by the American Cancer Society.



Two residential facilities—The Joanne Rockwell Memorial House and The Hackerman-Patz House—offer patients and their families a home away from home during treatment. The 20 efficiency apartments, just a block from the hospital, provide communal dining, garden and living areas, classrooms, counseling programs and physical therapy rooms, and create a natural circle of camaraderie and support.



Hemapheresis Center donors supply platelet support for patients whose platelet production is suppressed by cancer treatment. In addition to ongoing research and donor recruitment, this Center is developing a Human Stem Cell Bank to support the Oncology Center's bone marrow transplantation programs.

Discovery of 3 genes involved in development of colon cancer, could lead to tests for early detection.

Combined AZT therapy and bone marrow transplant clear HIV virus in an AIDS patient.

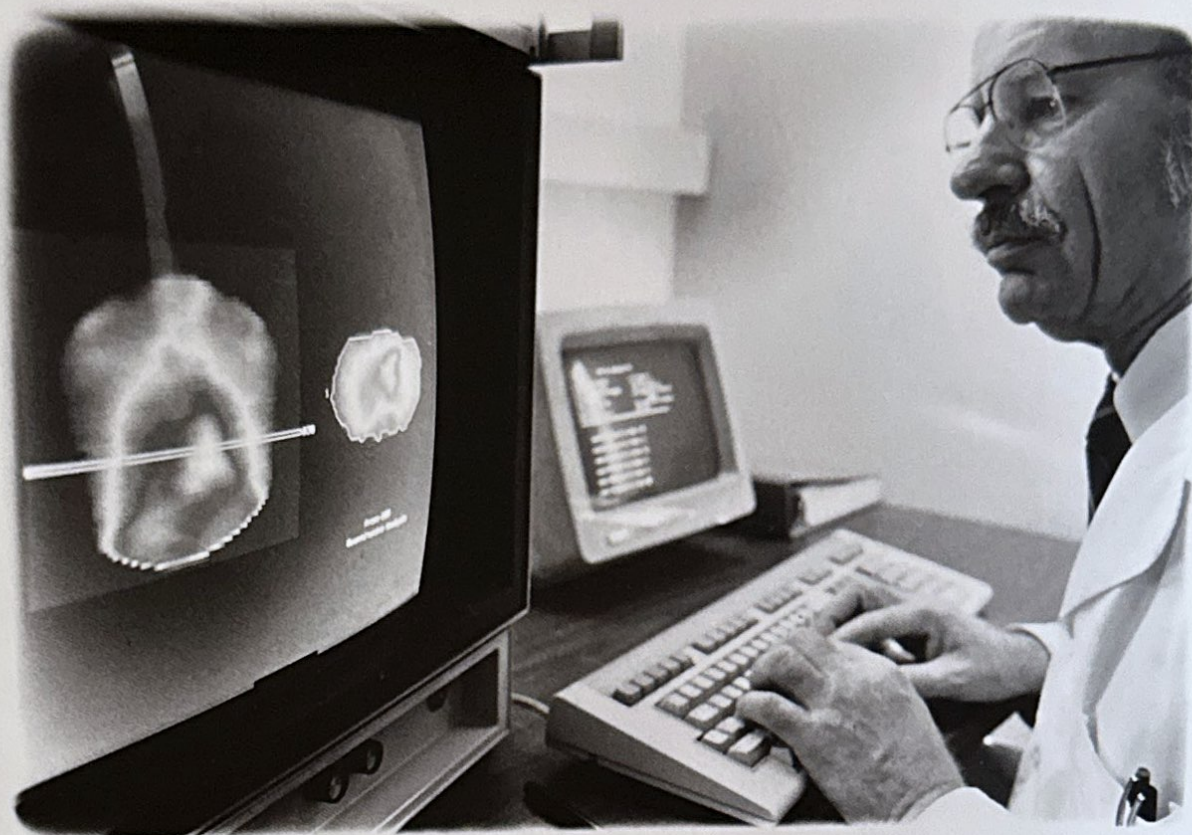
Cutting off the supply of polyamines shown to destroy large cell lung cancer cells, may offer new avenues for treatment.

New drug regimen for Acute Lymphocytic Leukemia in children boosts 4-year remission rate from 50% to 94%.

New treatment delivers radioactive "seeds" into the airways via bronchoscope, extending life for inoperable lung cancer patients.



Our multidisciplinary breast cancer program focuses on early detection, more effective treatments and prevention of the disease. Recent clinical studies using a high-dose, multi-drug regimen look very promising for patients at high risk of recurrence. For women with advanced breast cancer, use of chemotherapy followed by bone marrow transplantation shows great potential. The Center's Breast Surveillance Service provides early detection and prevention counseling to women at high risk of developing breast cancer.



Social workers play a vital role in helping patients come to terms with disease and assisting with plans for life after cancer treatment. Individual counseling and a variety of support groups are available for patients and their families.

Radiolabeled-antibody dosimetry and computerized tumor volumetrics help radiation oncologists precisely measure the size and placement of tumors. Because these technologies allow for more targeted treatment, effectiveness against the cancer is increased while damage to healthy tissue is reduced.

Radiolabeled antibody shown effective against treatment-refractory Hodgkin's disease.

Human alpha-interferon shown to inhibit replication of the AIDS virus.

Topoisomerase inhibitors induce programmed cell death in leukemia cells.

Looking Ahead The 1980s and 1989 in particular have been years of tremendous growth in our understanding of cancer. In the coming decade, we expect to be at the forefront of a more rational biologic basis for effectively treating, even preventing, cancer. But along with advances comes the complexity of precisely evaluating new therapies and finding better ways of predicting outcomes for our patients.

Because it provides a bridge between laboratory and clinic, The Johns Hopkins Oncology Center is uniquely positioned to contribute in the years ahead. We enter the 1990s with genuine excitement about the prospects for our programs of healing and discovery.

The Center's Child Life Playrooms provide welcome relief from hospital routine. Structured and unstructured play—along with group projects, parties and the chance to interact with other children—interject a touch of normalcy in the medical environment.



Patient Care

Outpatient visits	24,819
Pediatric Outpatient Visits	3,319
Radiation Treatment Visits	29,819
Hospital admissions	2,402
Hospital patient days	23,768
Average length of patient stay (days)	9.89
Hospital beds	84

Employees

Faculty (full-time)	80
Nurses	179
Employees	582

Research

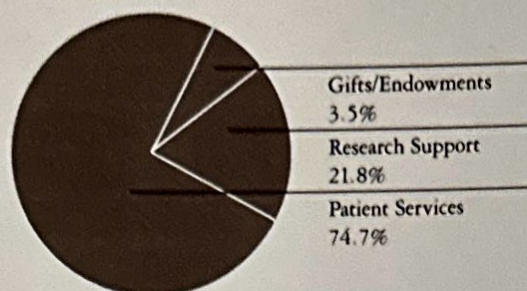
Funded research grants	140
External research support	\$13,000,000

Professional Education and Teaching

Clinical and Research Fellows	59
Residents	98
Interns	42
Medical students	17
Allied health	
Radiation Therapy	11
Nursing	30
Social Work	4

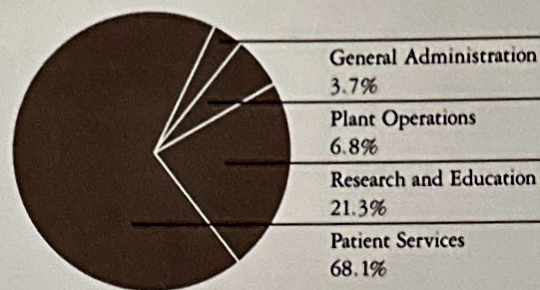
Sources of Funds for Operations

FY89 Operating Budget: \$61.6 million



Expenditures of Funds

FY89 Expenditures: \$61.6 million



Albert H. Owens, Jr., M.D.
Director

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We are deeply grateful to the thousands of donors who supported the programs of The Johns Hopkins Oncology Center during the 1989 fiscal year. Gifts to the Oncology Center are critical to our continued leadership in patient care, research and teaching.

For further information about the Center and gift opportunities, please contact:

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