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The Cancer Research Institute at Arizona State University

From the Director

Human cancer constitutes some 200 related diseases that continue to cause a catastrophic number of deaths accompanied by tremendous personal and economic disasters. Annual deaths from cancer in the United States are approaching 600,000, corresponding to about 21 percent of total mortality. The total medical costs and economic losses in the United States this year from cancer will be well over $100 billion. That indicates combined medical and economic losses in Arizona of well over $1 billion annually!

Only 48 percent of cancer patients can now be cured, and that number will not increase until more effective and curative anticancer drugs are discovered and developed. Truly important advances in improving human cancer treatment are quite dependent upon discovery of new and curative anticancer drugs.

The Arizona State University Cancer Research Institute research programs are sharply focused on that objective. The ASU-CRI is completely committed to pursuing research directed at the discovery and development of new and more effective anticancer drugs for improving human cancer treatment. Acceleration and expansion of this vigorous research program will very significantly contribute to the eventual control of human cancer. However, this will require continued philanthropic support form our Arizona community, the nation and the world. The ASU-CRI research chemists, biologists, and support staff join me in expressing our grateful thanks and appreciation to everyone willing to assist in this vitally important endeavor.

G. Robert Pettit
Director and Dalton Professor
Medicinal Chemistry & Cancer Research

The Search for Cures

Few people associate the words "cure" and "cancer." Surprisingly enough, however, approximately 100,000 Americans diagnosed with cancer this year will be *cured* thanks to anticancer drug therapy - 100,000 people who could *not* have been saved by surgery or radiation alone.

More than any other factor, the extraordinary progress made during the past two decades toward curing cancer has been due to advances in drug discovery, research and therapy. Today, nearly 50 percent of all cancer victims are curable. Their success stories have spurred scientists in research laboratories and universities across the nation to develop new anticancer drugs. Their hope: to find better treatments and possibly cures for forms of cancer as yet untreatable.

The Cancer Research Institute at Arizona State University, one of the nation's leading university-based anticancer drug discovery programs, has been limited in its search for new anti-cancer drugs, not by the difficulty of scientific problems but by a critical shortage of research facilities and operations support. The recently completed Phase 1 Cancer Research Institute building is a most positive first step in meeting this vital need. A campaign to complete Phase II and III of this desperately needed facility is currently underway.

Looking to Nature

Many of our most effective drugs are products of nature. For instance, digitalis, used in treating heart disease, comes from the foxglove plant. Vincristine, a curative anticancer agent, comes from the vinca plant. Reserpine, used in treating mental illness, also comes from a plant. The new drugs being developed for certain human

viral diseases are based on marine animal (sponges) prototypes.

Dr. G. Robert Pettit, Director of the Cancer Research Institute, and his colleagues are studying marine invertebrates, animals known to be generally free of cancer, as potential sources of naturally occurring anticancer drugs. Preliminary results indicate that certain species of marine life currently under investigation at the ASU-CRI possess constituents which may be useful in treating some forms of cancer. In addition, terrestrial plants and microorganisms are also being studied as potential sources for anticancer drugs which have demonstrated curative properties against experimental solid tumors, such as melanoma and ovarian cancer with the prospect of developing drugs useful against cancer of the lung, colon, breast, brain and pancreas.

Such scientific and medical advances demand research personnel with special talents to find the animal and plant specimens and discover the anticancer constituents, as well as a highly sophisticated research facility to unlock their secrets, for the most potent anticancer agents may literally be hiding under a rock.

ASU's Contributions to Cancer's Cure

Research organic chemists, such as those in our Institute, have provided the drug therapies which can now *cure* 15 types of human cancer. BUT... nearly 200 types exist. The need to pursue discovery of anticancer drugs is overwhelming.

In recent years, ASU's Cancer Research Institute has played a leading role in fortifying the physician's future arsenal of anticancer drugs. Researchers in the ASU-CRI laboratory have discovered several drugs currently being developed by the National Cancer Institute in Bethesda, Maryland. (Generally, only a few

compounds are considered worthy of preclinical development by the NCI from some 20,000 to 50,000 evaluated each year.) While bringing a new drug to clinical trial in the U.S. is a minimum 10-year process, CRI has been able to successfully move six anticancer drugs from discovery through trials and eight additional drugs have been accepted for clinical development.

The ASU Cancer Research Institute is at the forefront of the fight against cancer. For nearly 30 years, professional chemists, biochemists, biologists, and microbiologists have endeavored to discover new anticancer drugs that can be added to the therapeutic arsenal.

Promising new compounds discovered in the ASU Cancer Research Institute from a variety of marine animals and terrestrial plants are now in advanced preclinical development or are already being tested in human cancer patients, including:

BRYOSTATIN 1
Isolated from a marine bryozoa
In phase II human trials

DOLASTATIN 10
Isolated from a sea hare
In phase I human trials

COMBRETASTATIN A-4
Isolated from an African tree
In preclinical development

PANCRATISTATIN
Isolated from an African Amaryllis
In preclinical development

SPONGISTATIN
Isolated from a marine sponge
In preclinical development

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