THE CANCER LETTER
RESEARCH EDUCATION CONTROL

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## NCI STAFF RECOMMENDS MOVING COOPERATIVE GROUPS INTO DCT, INCREASE FUNDING, SWITCH EMPHASIS

NCI senior staff members hammered out a consensus (more or less) on reorganization of treatment activities when they spent most of a two-day retreat last week discussing the problem.

Here's how the staff proposes to deal with the Cooperative Clinical Cancer Research Program, ***The Cancer Letter*** has learned:

• The cooperative groups will be moved into the Div. of Cancer Treatment. DCT Director Vincent DeVita will have full authority to

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*In Brief*

### EIGHT SITE VISITS AT PROSPECTIVE COMPREHENSIVE CENTERS SCHEDULED FOR NCAB MEMBERS IN '75, '76

**NYU, UCLA** will be the first prospective comprehensive cancer centers to be site visited by members of the National Cancer Advisory Board under the new policy calling for more participation by the Board in the comprehensive center review process. NYU and UCLA probably will be the next two centers approved for comprehensive designation. Two other top prospects—Univ. of New Mexico and Ohio State Univ.—will be site visited by Board members later this years. Others scheduled for review next year are the Cleveland Clinic-Case Western Center, Boston Univ., the Michigan Cancer Foundation in Detroit, and the Univ. of Arizona. It isn't likely that all will make it, but the next comprehensive centers after NYU and UCLA almost certainly will come from that list. . . . **NCI ADVISORY** group members were urged by Director Frank Rauscher to take a more active role in defending the Cancer Program. Asked by NCAB member Lyndon Lee if he was getting the kind of help he needs from advisory groups, Rauscher said "Yes, on technical and scientific matters. But with the public, in responding to inaccurate criticism, no. If I respond, it makes us look defensive. It would be much more effective if you people who know the facts would help with the response." . . . **A NEW** international publication, *Cancer Letters*, (not to be confused and no connection with ***The Cancer Letter***) will be available soon. It will include short manuscripts "to facilitate the rapid publication of research results" from 11 subject areas, according to its publishers, the Dutch organization Elsevier/Excerpta Medica/North-Holland. Philippe Shubik and D. Clayson of the Eppley Institute are co-managing editors; T.L. Dao of Roswell Park, Robert Gallo of NCI and Gordon Zubrod of Miami Comprehensive Center are on the editorial board. Subscription price is $40.50 for six bi-monthly issues per year. Write to the publisher, P.O. Box 211, Amsterdam. . . . **SURVEY** conducted by the *Mainliner* magazine published by United Airlines found that Roswell Park was rated the top cancer treatment center by MDs, medical school deans, health agency executives and government officials interviewed by the magazine.

## RAUSCHER PROBABLY WILL MOVE GROUPS; RFPs TO BE SCREENED FOR DUPLICATION

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coordinate research carried on by the groups with DCT contract programs.

- Cooperative groups will continue to be funded by grants, with the Div. of Cancer Research Resources & Centers continuing to administer the grants, oversee peer review, process applications, etc. The operation will be similar to the grants program in the Div. of Cancer Control & Rehabilitation, in which DCRR&C administers the grants.
- Funds for the cooperative groups will be increased—from $2 to $5 million in fiscal 1976, depending on the appropriations NCI gets. The program originally was budgeted for nearly $23 million in FY 1976.

Emphasis will be switched from a primarily chemotherapy program with advanced disease patients to a multidisciplinary approach for patients with early disease.

Recommendations coming out of the Potomac Conference, which was made up for the most part of cooperative group members, will not be ignored in the reorganization, although the conferees did ask that the groups remain in DCRR&C. Their recommendations included the change in emphasis to the multidisciplinary approach, continued funding through the grants mechanism, and more money and staff for the program.

NCI will go to great lengths to assure the cooperative groups that DCT will not attempt to dominate them and control every aspect of clinical research. DCT will be committed to the enhancement of the clinical cooperative research program and to the job of making NCI's grant and contract supported treatment research complement each other.

NCI Director Frank Rauscher previously had indicated he would not make any final decisions on the cooperative groups until Fall and would present his reorganization plan to the National Cancer Advisory Board at its November meeting.

That schedule still may be followed, but recommendations from the senior staff members carry a lot of weight with Rauscher. Getting their concurrence in moving the groups into DCT was perhaps the most difficult hurdle Rauscher had to overcome in effecting a reorganization.

The President's Cancer Panel will hear a presentation on all NCI clinical research at its August meeting. And the NCAB meeting in October also will be devoted primarily to clinical research along with environmental carcinogenesis.

Rauscher may not wait until those meetings to announce the reorganization. If he can obtain the concurrence of the Panel and key NCAB members, he may move right away so that an early start can be made on program changes.

NCI staff also came up with a plan to prevent unwanted duplication and overlap among contract programs of the various divisions and between contracts and grants.

Some criticism has been heard recently from investigators who say their grants have been rejected on the grounds the proposed work was not needed, only to see the same work turn up in a contract RFP announcement, and vice versa.

NCI executives feel most of the criticism is unwarranted and that a careful reading of the complete RFP, rather than just the announcement, usually reveals substantial differences in apparently similar projects.

Senior staff members suggested that the NCI executive committee act as a clearinghouse for RFPs at its weekly meetings. Division directors will be responsible for bringing potentially overlapping RFPs to those meetings, where they can be analyzed by all divisions.

## SPECIALIZED CENTERS CATEGORY OKAYED FOR ENVIRONMENTAL CARCINOGENESIS

The National Cancer Advisory Board approved the recommendation of its Subcommittee on Environmental Carcinogenesis that planning grants be made available as soon as possible for development of new specialized centers for study of environmental causes of cancer.

NCI will start immediately accepting letters of intent for the program. Planning grants probably will range from $25-40,000.

Subcommittee Chairman Philippe Shubik presented specific recommendations to the Board for the new centers, which he said would form a "pivitol point" in an expanded program:

A. There be between 5 and 10 centers established in addition to those in existence. It is believed that this program would cost from $20 to 30 million at the end of the second year of operation. The centers should be multidisciplinary and represent a range of different activities required in this field. The specialized centers should by no means be identical but rather represent the various special needs of the field; for example, they should be varied to include centers dealing with special groups of carcinogens, special modes of exposure, epidemiology, information sources, analytical chemistry, and so forth. Each should, we believe, have a basic and developmental research component related to the specific task to be undertaken.

B. The mechanism for establishing these centers was discussed at length by the subcommittee, its consultants and staff members. Although no hard and fast rules were determined, it is suggested that –

1. Specialized centers should be organized, but this should not involve designation by NCAB.

2. Support should be varied and provided through core grants, program-project grants, CREG and con-

tract mechanisms, and project grants.

3. Ad hoc review groups should be constituted to review the program.

4. The initial action to be taken by NCAB should be to recommend the provision of planning grants to implement this program. If such planning grants could be announced immediately, one might hopefully be starting the program by the beginning of 1976.

The vote to establish planning grants was not unanimous. Frank Dixon, of Scripps Clinic & Research Foundation, suggested that planning could be accomplished under ordinary research grants. "Invite people into the field, give them a grant and a year to do the planning," Dixon said. Explaining his vote against the motion, Dixon said, "I'm not against the work, but when there is a pot of money available, it always gets spent. I'm just against the planning grants."

Harold Amos, of Harvard, also voted against the motion, warning that "We should be very cautious and not try to do too much in what is not a yet well-defined area. I think we should be cautious about giving blanket approval to this program."

Other recommendations of the subcommittee dealt with increased funds for environmental carcinogenesis, patient questionnaires at comprehensive centers, increased emphasis on epidemiology and training of epidemiologists, and review of grant applications. Those recommendations follow:

**BUDGET**

A key question concerns the budgetary apportionment to environmental carcinogenesis. At the last meeting of the Board this subcommittee reported that a figure of approximately 10 per cent of the National Cancer Program's budget appeared to be devoted to this area and that this was, in our view, inadequate. At the last meeting of the subcommittee the budget was presented to the group and although some efforts had been made to clarify the issue no final view was obtained.

A primary problem is that a clear definition of "environmental carcinogenesis" was not available nor were adequate data on budget breakdowns available to ensure that a proper apportionment was being made. Dr. Peters of the Div. of Cancer Cause & Prevention agreed that data would be made available to the subcommittee prior to the next NCAB meeting of budgetary apportionment that would make it possible to determine the true state of affairs.

**QUESTIONNAIRES FOR COMPREHENSIVE CANCER CENTERS**

The introduction of questionnaires on a routine basis at comprehensive cancer centers that could provide information on possible environmental causes of cancer was discussed at the last NCAB meeting. The suggestion was received with some enthusiasm and a recommendation that the centers pursue this suggestion adopted. At the last meeting of the subcommittee opposing views on this matter were presented by the consultants and staff members of NCI. It would seem only prudent to request that a group of epidemiologists examine this approach before it is undertaken and the subcommittee will arrange that this be done.

**EPIDEMIOLOGY**

It has been clear that epidemiology requires considerable attention, and some of the problems involved were discussed at previous NCAB meetings. We would like to reiterate some of these points and supplement them.

A. There is a considerable lack of trained epidemiologists.

B. The organization of "epidemiology" within NCI would appear to merit attention. There is currently an area of field statistics and studies in DCC&P with branches in biometry and epidemiology. It would seem to the subcommittee that these two latter disciplines are separate enough and important enough to merit separate areas and considerable enlargement. Whereas biometry activities cover a wide range of problems, not only in NCI but apparently in NIH including the end results program, etc., the epidemiology program is understaffed to meet obvious program needs. It must be stated that the small number of epidemiologists in DCC&P have been so efficient that an impression is provided that all the fine work done must have required a much larger staff; it has all been due to their devotion and immense productivity.

The subcommittee does not feel that it can tell the director of NCI how to implement these suggestions. It merely wishes to point to an area encompassing both the inhouse and extramural programs that seem to be particularly underfunded and understaffed. There is no question that this area can yield results in practical terms far in excess of those produced so far, and it is our view that this can be achieved without undue difficulty.

**REVIEW**

The subcommittee was gratified to learn that the Div. of Research Grants had responded rapidly to its request that a study section be organized to deal with grants pertinent to environmental cancer problems. A study section has been organized on a temporary basis and has reviewed a series of applications that are before this board at the present meeting. DRG is behaving in an understandably cautious manner before committing itself to the establishment of a new study section, and, in particular, wishes to asses the probable work load that would be encountered. Dr. Domanski of the grants office of NCI has provided DRG with additional data pertinent to this matter.

"I have personally reviewed a series of 'pink sheets' pertinent to this issue and have noted with some concern several applications that have been disapproved that I believe would have received favorable attention by a study section with expertise not presently available," Shubik said. "There are several applications pertinent to issues of considerable national concern

that have been dismissed that I believe should be reconsidered. These concern matters involving potential hazard from new energy sources and from certain water pollutants, among other matters.

"I have drawn the particular applications in question to the attention of those involved in the grants area. It would seem clear that there are a number of competent investigators in the academic community ready to undertake studies in this area who have been repeatedly discouraged from doing so by the absence of adequate review groups.

"As matters stand," Shubik continued, "I believe that the present policy of the Board to review only those pink sheets from applications that have been approved denies the applicants the privilege that I believe was inherently built into our grants program of a dual review. However, more important than this, I believe, is the fact that by not examining at least the pink sheets of rejected applications, the NCAB is not providing the categorical input to the grants program that I believe is demanded by the nature of the divisions of NIH. The list of disapproved grant applications is forwarded to members of this board with a note stating that they are 'for information only.' I believe this to be quite misleading and they imply that members of this Board are powerless to intervene in the instance of a disapproved application.

"I must confess that I feel most remiss at not having reviewed many of the disapproved applications during my term on the Board. I feel this all the more strongly having reviewed a series of disapprovals on this occasion and having found several that I believe have merit in this program. I do not maintain that these are necessarily applications of enormous merit as basic science. I do, however, believe that they represent important studies in the area of public health of better-than-average merit."

The subcommittee has already provided the DRG with a list of disciplines that it believes should be represented on a carcinogenesis study section that hopefully will eventually be appointed on a permanent basis. The expanded program in environmental carcinogenesis will require considerable collaboration with the grants groups, and it is hoped that cooperation between those concerned and the subcommittee can be maintained at a high level.

There are a number of issues in environmental carcinogenesis that are controversial and concern the scientific basis for decisions that involve important public health issues. Among these are the relationship of mutagenicity tests in bacterial and other submammalian species to carcinogenicity in man and the classification of different types of carcinogens. In recent months various claims have been made that certain commonly used chemicals are mutagenic in bacterial systems and that this finding has relevance to human cancer control. This suggestion is controversial and the subcommittee plans to convene an expert group to examine this matter and report upon it.

## ZINDER IMPLEMENTATION 2 YEARS AWAY, AMOS SAYS IN REPORT ON PROGRESS

Progress being made in the implementation of the Zinder Report on NCI's Virus Cancer Program was presented to the National Cancer Advisory Board by Harold Amos, chairman of a subcommittee overseeing the implementation.

"We are about two years too soon," Amos said regarding the effects of the Zinder Report on VCP. But his report noted a number of organizational changes NCI made to comply with recommendations.

The Zinder Committee, organized in the wake of growing criticism and the way NCI operated it as a combined intramural and contract effort, suggested that:

- VCP remain an integrated program.
- The program continue to provide standardized reagents, viruses, cells and animals in addition to providing certain supportive testing programs for investigators.
- There are certain kinds of developmental research and clinical and animal screening programs that could never compete in study sections and which can only be supported by an integrated (including contracts) program.
- A steering committee should be appointed to provide overall administrative leadership.
- All working groups should be reconstituted with more than half the members of each consisting of non-NCI personnel, with the authority to rate priorities and participate in program direction.
- 10% of NCI's budget continue to be allocated to the program.

Amos' report to NCAB:

"The advisory committee to the director and senior staff of the Virus Cancer Program has been appointed. The committee is an excellent selection for scientific strength and commitment drawn entirely from the outside scientific community; Frank Putnam, chairman of the Biochemistry Dept. at the Univ. of Indiana (Bloomington), has accepted the chairmanship of that committee. The committee is charged with scrutinizing the VCP on a continuing basis with the role of advising the VCP with respect to balance, to new areas of potential interest, and to program opportunities within specific targets as well as in the most basic aspects of the virus-cancer question.

"Two multidisciplinary highly science-oriented committees (A & B) have been appointed to review all contract applications and assign priorities for guidance of the director and the segment chairmen. The committees (about 20-25 members on each) are made up entirely of non-NCI members. The segment chairmen and project officers attend all meetings of the committees to assist in the evaluation and review of the contracts under consideration. The review meetings are conducted much as are study sections with the important difference that only 6-8 applications are handled by the Committee of 8 or 10 per

day. A non-NCI member of the committee presents the proposal as in study section. After discussion the non-NCI members assign a priority by individual evaluation. At the time of review either of a new or of a renewal contract, the scientific advisory committee can recommend a two-year review period if it considers the conditions appropriate. The director and staff take that advice into consideration in their final decisions.

"Both scientific review committees have been functioning for several months. It is anticipated that each committee will meet four or more times a year.

"The application form for contracts and instructions for its completion are in the process of being revised by the Research Contracts Branch. The applications will in the future resemble much more grant applications and will in fact use the same forms for both new and renewal applications. The semiannual progress reports have been extensively revised and continue to be required. Thus the extension of the contract period to 2 or 3 years does not threaten the monitoring of progress.

"The question of the appropriate mechanism for funding aspects of the research effort is under serious review at several levels. of NCI. There are clearly classes of proposals that are easily fitted to a particular funding mechanism and others that for specific features of the individual request and its relationship to other activities of the VCP cannot be so readily categorized. The newly created CREG (Cancer Research Emphasis Grant) proposal will provide an alternative mechanism for certain current contracts as well as inviting investigator-initiated approaches to a broadly defined area. The VCP has taken the initiative in reviewing its contracts for the appropriateness of the funding mechanism."

Amos' report included a description of a cluster of activities currently funded by contract, as an example of a set of related projects that could be funded by grants "but would probably become a less effective operation if moved from the contract plan."

"Jeffrey Schlom reported on an example of how interaction among several contractors within the Virus Cancer Program has helped move the breast cancer virus segment toward the goal of developing a vaccine to prevent spontaneous mammary cancer.

"Following reports from the laboratory of Dan Moore (Institute for Medical Research, Camden) that vaccination with formalinized preparations of whole mouse mammary tumor virus (MMTV) protect mice against the development of spontaneous mammary carcinoma, several investigators–R. Cardiff, Univ. of California (Davis), D. Bolognesi, Duke Univ., and D. Fine, Frederick Cancer Research Center–were asked to focus their attention on the purification and isolation of MMTV proteins and the preparation of specific diagnostic reagents against them.

"This was possible because MMTV from the milk of the RIII strain mice (Meloy Laboratories) and from C3H mouse cell cultures–a recent development of methods for large scale production in vitro (Frederick) –was being produced in quantities to provide sufficient materials for these studies. In addition, the cell culture system provides opportunities to radiolabel virus particles so that investigations on host-virus interactions may be intensively pursued. Cardiff, Bolognesi and Fine have already made good progress in defining specific subvirion components which will be tested for their effectiveness in stimulating resistance to tumors in mice. This approach is important because the use of whole virus preparations may not be acceptable for widespread use in humans. Along these lines Frensdorff (Tel Aviv Univ.) and Bolognesi are already testing a glycoprotein of MMTV to determine whether this purified material would be protective.

"These collaborative exchanges combined with distribution of efforts among several laboratories directed to a specific objective is one of the hallmarks of the Virus Cancer Program. We believe this approach is most effective in obtaining information basic to the control of human cancer."

## PRESIDENT SIGNS BILL FOR INTERIM FINANCING; NCI SET AT $725 MILLION

President Ford signed the continuing resolution which provides for interim financing of federal agencies and their programs until the regular appropriations bills are passed for the new fiscal year, which started July 1.

There had been some speculation that Ford would veto the resolution, since it mandates spending on levels based on appropriations bills which have passed the House or Senate but have not yet been completed. In most cases, particularly for health programs, these levels are considerably higher than those requested in the President's budget.

The HEW appropriations bill passed the House last week by an overwhelming 368-39 margin. This established a level of $725 million for NCI, which now becomes the "floor" for NCI appropriations in FY 1976. The Administration will have to release money to NCI at that level.

## ADRIAMYCIN FACT SHEET DESCRIBING ITS EFFECTS, DOSAGES AVAILABLE

A "fact sheet" on adriamycin, approved last August by FDA as a prescription drug for use in cancer therapy, has been sent out by NCI Director Frank Rauscher to an extensive mailing list that includes thousands of participants in the National Cancer Program.

The fact sheet follows (with some editing):

The new drug is an anthracycline antibiotic that has activity against a number of solid tumors as well as against the lymphomas and acute leukemias. Developed in the late 1960's by the Farmitalia Pharmaceutical Co. of Milan, Italy, adriamycin is derived

from the fermentation products of a soil fungus, *streptomyces peucetius* of the variety *caesius.*

The anticancer effect is achieved at the cellular level by blocking the synthesis of RNA copies of DNA. This blockage is due to the binding of the drug to DNA. The RNA copies normally would direct the synthesis of protein, the building material essential for cell growth.

Early clinical trials of adriamycin began in 1969 under the direction of Gianni Bonadonna at Milan's Instituto Nazionale per lo Studio e la Cura dei Tumori. Using adriamycin alone, Bonadonna has treated more than 550 patients with advanced cancers and has observed drug-induced shrinkage in tumors ranging from non-Hodgkin's lymphoma to lung cancer.

In American trials, conducted since 1970 as part of the Cancer Therapy Evaluation Program of NCI, adriamycin has produced significant responses (defined as shrinkage of measurable tumors by at least 50%) in patients suffering from advanced, therapy-resistant cancers. Ten forms of cancer have been treated effectively with adriamycin: breast cancer, soft-tissue and osteogenic sarcomas, cancers of the bladder, lung, thyroid, and ovary, Wilms' tumor, neuroblastoma, Hodgkin's and non-Hodgkin's lymphomas and acute leukemias.

Several other tumors may respond to adriamycin, but the evidence so far is not strong enough to make a definitive statement. These are cancers of the stomach, prostate, cervix, liver, head and neck, and multiple myeloma. Tumors showing no response to the drug include adenocarcinoma of the large bowel, malignant melanoma and kidney cancer.

Trials of the drug in patients with osteogenic sarcoma are one of the highlights of U.S. studies. Eighty per cent of patients with this form of bone cancer die from lung metasteses within 18 months following radical surgical amputation of the primary tumor. Adriamycin has produced tumor regressions in 41% of patients with metasteses from osteosarcoma. In contrast, other drugs have produced response rates of only 15 to 19%.

Encouraged by these findings, 10 hospitals, members of the Acute Leukemia Group B, began administering adriamycin to osteosarcoma patients immediately after surgery to prevent the development of pulmonary metastases. Thirteen patients who followed the protocol exactly are free of evident disease 1+ to 23+ months after the start of adriamycin. These early data indicate that the drug is able to delay the appearance of lung metastases.

Although adriamycin is able to shrink many types of tumors, the duration of the drug response is often disappointingly short. For this reason, physicians are now combining adriamycin with other drugs. The combination of cyclophosphamide, adriamycin and 5-fluorouracil, for example, has produced better responses against advanced breast cancer than had adriamycin alone. Other drug combinations for lung cancer, lymphomas and soft tissue sarcomas are being tested.

Like other cell-destroying drugs, adriamycin has some toxicity for normal rapidly-dividing cells and must be administered with care. Side effects include loss of scalp and body hair in virtually every treated patient, swelling and possible ulceration of the tissues lining the mouth and esophagus, depression of white blood cell counts, mild nausea and/or vomiting, and cardiac irregularities.

Cardiac irregularities are potentially the most serious side effect. They can occur in two unrelated forms. One is a non-specific electrocardiographic change that is temporary and does not appear to be related to drug dose or schedule. This non-specific change causes little problem. In contrast, a drug-induced deterioration of the heart muscle that may lead to congestive heart failure is a dose-related and irreversible change. Physicians have found that limiting the total drug dose to 550 milligrams per square meter ($mg/m^2$) of body surface or less can largely eliminate this problem. However, this total drug dose should be lowered in patients who have had previous radiation therapy to the chest area and in patients who have abnormal liver function.

Adriamycin is administered by rapid intravenous infusion; the drug is inactive when given orally. From clinical experience, physicians recommend a single dose of 60 to 75 $mg/m^2$ repeated every 21 days until a total dose of 550 $mg/m^2$ is reached. Because of the toxicities associated with adriamycin therapy, the drug should be administered under the supervision of a specialist qualified in the use of anticancer drugs.

Adriamycin is distributed in the U.S. by Adria Laboratories, Wilmington, Del. A full course of drug (550 $mg/m^2$) costs from $800 to $2,000, depending on the patient's height and weight.

Additional information on adriamycin may be obtained from John Penta, M.D., drug liaison & distribution section, Bldg 37, Rm 6E28, NCI, Bethesda, Md. 20014; telephone 301-496-6511.

## TOBACCO RESEARCH COUNCIL AWARDS SIX NEW GRANTS, CONTINUES 27 OTHERS

Six new scientific studies related to smoking and health have been announced by the Council for Tobacco Research.

Funds also were provided for continuation of 27 other studies previously approved, raising the council's total allocation for grants to nearly $32 million since 1954.

The newly funded studies include research into:

The effect of Vitamin A on normal and precancerous respiratory tissue.

The possible interaction of endogenous viruses and chemicals in cancer induction.

The effects of nicotine on gestation in rats.

Cardiac mechanoreceptors and the release of renin, a substance in the kidney involved in the regulation of blood pressure.

Carbon monoxide and retinal metabolism and function.

Recipients of new grants:

G.J. Gleich, Mayo Clinic, "Hypersensitivity to antigens from tobacco as a factor in the pathogenesis of chronic bronchitis."

Alphonse A. Ingenito, Albany Medical College, "Action of carbon monoxide and tobacco smoke on retinal metabolism and function."

Jay A. Levy, Univ. of California (San Francisco), "Development of a model in vitro for studying carcinomas. Study of possible interplay of endogenous viruses and chemicals in co-carcinogenesis."

J. Andrew Mitchell, Wayne State Univ., "A study of the effects of nicotine on gestation in the rat with particular reference to implantation and the time of onset of parturition."

Marc. D. Thames, Mayo Clinic, "Cardiac mechanoreceptors and renin release."

George Wolf, MIT, "The effect of vitamin A on glycoprotein synthesis in normal and precancerous respiratory epithelium."

***Contract Awards***

## MILLION DOLLAR AWARDS PACE CONTRACTS AS NCI RUSHES TO BEAT FY DEADLINE

Four contract awards of more than $1 million each were included in a torrent of announcements this week as NCI rushed to get all its 1975 money committed before midnight, June 30, the end of the fiscal year.

M.D. Anderson received a three-year contract totaling $1,479,717 for pharmacologic studies of antitumor agents; Litton Bionetics received a contract modification worth $1,410,419 to continue efforts to develop new prognostic and therapeutics modalities based on basic studies on cell transformation and on transformed cells; Dow Chemical Co. received an award of $1,345,595 for preparation of bulk chemicals and drugs; and Southern Research Institute received a three-year contract totaling $1,079,317 for pharmacology of combinations of potential antileukemia drugs.

Other awards:

**Title:** Continuation of toxicology of antineoplastic agents study
**Contractor:** Colorado State Univ., $157,068.

**Title:** Investigations on the effect of exogenous estrogens on the occurrence and natural history of breast cancer
**Contractor:** Univ. of Toronto, $74,300.

**Title:** Seventh International Symposium on Comparative Leukemia Research
**Contractor:** International Assn. for Comparative Research on Leukemia & Related Diseases, $50,000.

**Title:** Continuation of a study of the effects of anticancer agents on reproduction
**Contractor:** Dow Chemical Co., $411,781.

**Title:** Preparation of catalogue of public information and professional cancer education materials
**Contractor:** Small Business Administration, $194,031

**Title:** Investigation of concomitant effects of radiation and adriamycin on production of cardiomyopathies
**Contractor:** Univ. of Utah, $134,060.

**Title:** Investigate immunobiologic responses of the cat to feline oncornaviruses
**Contractor:** Ohio State Univ., $208,920.

**Title:** Conduct immunological studies on breast carcinoma
**Contractor:** Univ. of Texas, $92,422.

**Title:** Conduct an epidemiological investigation of cancer in Utah
**Contractor:** Univ. of Utah, $279,299.

**Title:** Continue study of the role of prolactin in breast cancer
**Contractor:** Case Western Reserve Univ., $84,900.

**Title:** Continuation of studies on role of prostaglandins in mammary gland neoplasia.
**Contractor:** Massachusetts General Hospital, $52,000.

**Title:** Continued study of the effect of nucleic acid preparation on the biological properties of mammary carcinomas
**Contractor:** Sloan-Kettering, $75,000.

**Title:** Continue identification of cell types in cultures of normal and neoplastic breast tissues
**Contractor:** Children's Hospital Medical Center, Oakland, Calif., $100,000.

**Title:** Continuation of study of preneoplastic lesions of the human mammary gland
**Contractor:** Univ. of California (Davis), $174,900.

**Title:** Continuation of studies on the cell kinetics of breast cancer
**Contractor:** New York Univ., $110,000.

**Title:** Breast Cancer Family Resources
**Contractor:** Creighton Univ., $61,500.

**Title:** Continue studies of the biochemical means by which effector molecules bind to mammary cell surfaces and influence cellular biochemistry
**Contractor:** Oklahoma State Univ., $112,000.

**Title:** Continue study of ultrasound mammography
**Contractor:** Albert Einstein College of Medicine, $186,000.

**Title:** Continuation of the response of the embryonic mammary gland to androgenic hormones
**Contractor:** Institut for molekularbiologie, Salzburg, Austria, $43,000.

**Title:** Conduct a combined study of the possible association of dietary factors and non-contraceptive exogenous estrogens with breast cancer
**Contractor:** Univ. of Hawaii, $100,000.

**Title:** Continuation of the development and application of chromatographic techniques for biomedical markers
**Contractor:** Univ. of Missouri, $173,264.

**Title:** Phase I studies of new anticancer agents
**Contractor:** Memorial Hospital, N.Y., $161,700.

**Title:** Collection, fractionation and purification of plant extracts
**Contractor:** Univ. of Arizona, $120,200.

**Title:** Pharmacology study of anti-leukemic and other anti-cancer drugs
**Contractor:** Southern Research Institute, $41,413.

**Title:** Therapy of patients with gastric carcinoma
**Contractor:** Mayo Foundation, $122,045.

**Title:** A study of potential antitumor agents from microbial origin
**Contractor:** Microbial Chemistry Research Foundation, Tokyo, $55,000.

**Title:** Hyperplastic a lveolar nodule system as an antitumor screen
**Contractor:** Baylor College of Medicine, $33,000.

**Title:** Preparation and purification of actinomycin analogs via directed biosynthesis
**Contractor:** Georgetown Univ., $69,162.

**Title:** Development and production of solid dosage forms
**Contractor:** Phillips Roxane Laboratories, $73,206.

**Title:** Continuation of the drug research and development chemical information system
**Contractor:** Chemical Abstracts Service, $401,667.

**Title:** Development of new in vivo tumor systems with potential predictive value in the selection of drugs
**Contractor:** Mason Research Institute, $833,080.

**Title:** Quantitation of physiological reflux in pancreatic duct of primates
**Contractor:** Univ. of Utah, $298,149.

**Title:** Factors having potential influences on physiological reflux in the pancreatic duct
**Contractor:** Mayo Foundation, $326,000.

**Title:** Study of the etiology of medallablastoma and other brain tumors
**Contractor:** Children's Hospital, Cincinnati, $71,279.

**Title:** Therapy of patients with pancreatic carcinoma
**Contractor:** UCLA, $212,565.

## SOLE SOURCE NEGOTIATIONS

***Proposals are listed here for information purposes only. RFPs are not available***

**Title:** Immunological and biochemical studies of mammalian viral oncology
**Contractor:** Meloy Laboratories

**Title:** Studies of type C RNA tumor viruses
**Contractor:** Microbiological Associates

**Title:** NCP analysis of subject content of FY '75 grants and contracts awarded by NCI
**Contractor:** Smithsonian Science Information Exchange

**Title:** Television series on health "Feeling Good"
**Contractor:** Children's Television Workshop, New York

**Title:** Synergistic interaction of hormones and neutron radiation on mammary gland carcinogenesis
**Contractor:** Organization for Health Research, The Netherlands

**Title:** Criteria of in vitro transformation of virus and chemical carcinogens
**Contractor:** Biotech Research Institute, Rockville, Md.

**Title:** Metabolic studies on tobacco smoke constituents
**Contractor:** Huntingdon Research Center, Baltimore, Md.

**Title:** Standardization of aryl hydrocarbon hydroxylase assay as a screening method to determine smoking hazards in man
**Contractor:** Microbiological Associates

**Title:** Preparation and examination of experimental biological material
**Contractor:** Litton Bionetics

**Title:** Transplasental carcinogenesis in erythrocelus patas
**Contractor:** Meloy Laboratories

**Title:** Histogenesis of guinea pig pancreatic adenocarcinoma
**Contractor:** Univ. of Kansas

**Title:** Induction of adenocarcinoma of the prostate
**Contractor:** Hazleton Laboratories

**Title:** Synthetic nitroso derivatives for concentrating carcinogens in pancreas and enhanced delivery of compounds to the pancreas in rats
**Contractor:** Dartmouth Medical School

**Title:** Carcinogenesis by radiation plus estrogen
**Contractor:** Alton Ochsner Medical Foundation, New Orleans

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