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COMPETITION DEVELOPING FOR THREE NEW REGIONAL COOPERATIVE GROUP AWARDS; RFA WITHIN TWO MONTHS

NCI is expecting spirited competition for the three new regional cooperative groups which the Div. of Cancer Treatment plans to support starting in 1981. They will be supported through the new cooperative agreement mechanism; the RFA will be published as soon as NIH approves its use by NCI, probably within two months.

The DCT Board of Scientific Counselors approved the concept of regional groups at the Board's last meeting and earmarked $1.5 million to get them started (*The Cancer Letter*, Oct. 10). Whether that will be the final amount allocated to the program depends on NCI's FY 1981 appropriations, still undetermined.

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In Brief

DEVITA RECEIVES GRIFFUEL PRIZE; COMMISSION ON ETHICS TO TAKE UP COMPENSATION QUESTION

MOST AMERICANS traveling to Paris these days return home with severely depleted wallets. NCI Director Vincent DeVita went there last week and came back with $41,000 more than he had when he left. He received the 1980 Griffuel Prize for cancer research from the Assn. for the Development of Research on Cancer, a French voluntary cancer research organization. The Association said DeVita was selected "for his important contribution to the considerable progress recently achieved in the field of cancer chemotherapy," and specifically cited his role in development of the MOPP treatment for Hodgkin's disease. DeVita is the seventh American to win the prize in the 11 years it has been awarded. Others were Joseph Burchenal, Howard Temin, Henry Kaplan, Ludwik Gross, Elizabeth Miller, and Charlotte Friend. . . . **NEXT MEETING** of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research will take up the issue of compensation for subjects injured in research and informed consent. The meeting is scheduled Jan. 9-10 at the Hay-Adams Hotel in Washington. . . . **TED KENNEDY** has decided to assume the role of top ranking Democrat on the Senate Labor & Human Resources Committee, giving up that position on the Judiciary Committee, in the next Congress. That means he also will retain his position on the Health Subcommittee, although relinquishing the chairmanship to the GOP majority. . . . **ROBERT GRAHAM**, who as a member of the Kennedy subcommittee staff did most of the work on the biomedical research authorization bill this year, returned this week to his former position as deputy administrator of the Health Resources Administration. He had been on loan from HRA and his return was not a consequence of the Democrats losing control of the Senate.

NEW, EXISTING ORGANIZATIONS TO SEEK REGIONAL COOPERATIVE GROUP AWARDS

(Continued from page 1)

Jack Killen, program director for regional groups in DCT's Clinical Investigations Branch, said that inquiries about the new program have been pouring in. It appears that a host of new groups are being organized to compete for the three awards, in addition to the already established regional groups which NCI has not funded. The latter include groups in North Carolina, Pennsylvania, New York, Colorado, Illinois, Hawaii and elsewhere.

Two established regional groups have been funded through the regular cooperative group mechanism (R10 grants)—the Northern California Oncology Group and the North Central Cancer Treatment Group.

NCI is anticipating that most of the new groups will be clustered around cancer centers, perhaps in some cases involving recognized comprehensive cancer centers which have regional responsibilities as one of the requirements of that recognition. The new regional awards through the cooperative agreement mechanism will go to the groups' operations offices which will distribute funds as appropriate to their members. Under the R10 mechanism, grants are awarded directly to institutional members of each group as well as to operations offices.

Killen said that the new program probably would permit institutions which are members of existing cooperative groups to compete for a regional operations office award or to be a member of one of the new groups.

The issue of who will review the new applications has not been resolved. The Clinical Cancer Investigation Review Committee has been responsible for cooperative group grants, while the Clinical Trials Review Committee has reviewed DCT's contract supported clinical trials.

NCI intends eventually to switch all clinical trials support, except for phase 1 and phase 2 studies, to cooperative agreements. This probably will entail combining the two review committees, or beefing up the CCIRC so that it can handle the entire load (except, possibly, for the phase 1-2 contracts).

There are presently 24 members of the CCIRC, with two added this year. Dorothy MacFarlane, CCIRC executive secretary, said that after looking over the schedule of groups which will have to be reviewed over the next five years, including the contract groups, CCIRC members felt they could handle the load, perhaps with the help of a few additional members.

The CCIRC agreed at its last meeting to take a look at how it reviews budgets of the groups. A subcommittee chaired by Hugh Davis will do the study, and may develop a set of general guidelines for the committee to consider. Some group members have felt that budgets approved by CCIRC bear no relation to participation or patient accrual.

Present membership of CCIRC is relatively new, with 16 of the 24 having served one year or less. Eight attended their first meeting in November. Terms are for four years, but there was one early resignation and the two which were added started their terms this year. Joseph Simone is chairman, with his term running through July 1982.

SWENBERG SAYS HE DOES NOT REPRESENT INDUSTRY, THAT CIIT IS INDEPENDENT

James Swenberg, chief of pathology for the Chemical Industry Institute of Toxicology, would like to set the record straight. He was identified as "one of the industry representatives" on the National Toxicology Program Board of Scientific Counselors Technical Report Review Committee (***The Cancer Letter,*** Nov. 7).

"I do not represent industry," Swenberg told ***The Cancer Letter.*** "Our number one issue is credibility. Our work is based on good science, and I do my damnedest to keep it that way."

CIIT gets most of its funding from industry, Swenberg acknowledged, but he said the organization takes great pains to maintain its independence. Its reports are closely monitored by an internal group charged with guarding CIIT's integrity and independence from industry influence.

Swenberg cited CIIT's finding that formaldehyde caused nasal cancer in rats. The report was released simultaneously to the press, public and industry, and CIIT has been cooperating with the Consumer Product Safety Commission on development of regulations.

Swenberg pointed out that CIIT could lose its nonprofit status if it did not keep an arms-length relationship with industry.

The NTP Technical Report Review Committee had agreed, at Swenberg's urging, to require NTP staff to separate benign from malignant tumors in report summaries. ***The Cancer Letter*** quoted one observer, who asked not to be identified, as saying that not grouping benign with malignant lesions to achieve statistical significance "is an industry position."

Swenberg said he did not feel it was an industry position, although he was not speaking for the chemical industry himself. He said he agreed that benign tumors should be studied for biological significance but "it is very difficult to make judgment on the health issue" on those tumors alone, particularly if they regress after withdrawal of medication. "I just feel it is not valid to say that a compound is carcinogenic on that basis."

A monograph on the evaluation of the carcinogenic risk of chemicals to humans published by the

International Agency for Research on Cancer supports the view, which has also been the position of the regulatory agencies, that benign tumors should be considered in determining the carcinogenicity of a substance. The monograph states:

"Sometimes in an organ preneoplastic lesions may occur, from one of which a tumor arises which seems to be benign for a time but which ultimately progresses into frank malignancy. Indeed, it is frequently a matter of arbitrary definition, on which expert pathologists may disagree, as to how to designate those tumors that are on the borderline in the continuum between benign and malignant.

"Moreover, it seems that although certain viruses are capable of producing strictly benign lesions with negligible likelihood of progression (e.g. warts), few if any chemicals exist which produce only benign tumors and no malignant tumors in any species.

"Consequently, although in most experiments benign and malignant tumors are still reported separately, the practical difficulties which often arise in categorizing certain tumors as benign or malignant are no longer viewed as seriously as they once were. Chemical agents that markedly increase the incidence of benign tumors are now viewed with almost as much suspicion as potential human hazards as they would have been if the induced tumors had been malignant.

"Likewise, a chemical agent that produces a clear excess of some recognized preneoplastic lesion (e.g. carcinoma in situ) is also viewed with considerable suspicion. Finally, if a marginally significant (e.g. $P = 0.1$) excess of treated animals have tumors in a particular organ, but in addition, there is a highly significant excess of preneoplastic lesions in that organ, then the experiment as a whole offers very strong evidence that the test agent did indeed cause some of the tumors."

NEW PUBLICATIONS

"The Prostate," new quarterly published by Alan R. Liss Inc., 150 Fifth Ave., New York 10011. Avery Sandberg and Gerald Murphy are editors in chief. Will report on all facets of clinical and basic studies involving the prostate and other male accessory sex glands. $55 year.

"If You Find a Lump In Your Breast," by Martha McLean and Jacqueline Struthers. Bull Publishing Co., P.O. Box 208, Palo Alto, Calif., 94302. Paperback, $2.95.

"Biology of Ovarian Cancer," workshop proceedings edited by E.D. Murphy and W.G. Beamer, published by UICC, rue du Conseil-General, 3, CH 1205 Geneva, Switzerland, 16 Swiss francs plus postage.

"Malignancy and the Hemostatic System," monographs of the Mario Negri Institute for Pharmacological Research, edited by Maria Donati, John Davidson, and Silvio Garattini. Raven Press, 1140 Ave. of the Americas, New York 10036, $17.

"Cancer Patient Survival Experience," published by NCI and prepared by Max Myers and Benjamin Hankey of the Div. of Cancer Cause & Prévention. NIH Publication No. 80-2148, available free from the NCI Office of Cancer Communications, Bethesda, Md. 20205.

"Innovations in Cancer Risk Assessment," symposium proceedings edited by Jeffrey Staffa and Myron Mehlman, Pathotox Publishers Inc., 2405 Bond St., Park Forest South, Ill. 60466, $29.

"Medical Complications in Cancer Patients," edited by Jean Klastersky and Maurice Staquet, EORTC monograph, Raven Press, $29.

"Dangers of Smoking—Benefits of Quitting and Relative Risks of Reduced Exposure," booklet available free from the American Cancer Society, 777 Third Ave., New York 10017, or local ACS offices.

"Breast Cancer: A Measure of Progress in Public Understanding," management summary and program recommendations. "Breast Cancer: A Measure of Programs in Public Understanding," 320 page technical report. "The Breast Cancer Digest," information on public education programs on breast cancer. "Information on Public Information Workshops Related to Breast Cancer." All available free from NCI, OCC, Bethesda, Md. 20205.

SURVEY SHOWS UNDERSTANDING OF BREAST CANCER HAS INCREASED IN SEVEN YEARS

A national survey shows that public understanding of breast cancer has increased considerably over the past seven years, NCI has announced.

This improves prospects for a downturn in deaths from breast cancer, said Vincent DeVita, NCI director. But findings from the study also suggest a need for further public education about the disease.

Ninety-six percent of women surveyed had heard of the early detection technique of breast self-examination, compared to 77 percent of women surveyed in 1973. Women who are taught breast self examination by a doctor are more likely to practice it than women who learn the technique in other ways, the survey shows.

About 40 percent of the women surveyed—10 percent more than in 1973—say they use the technique monthly or more often. Both NCI and the American Cancer Society recommend that women practice the technique monthly. Studies suggest that women who practice BSE detect cancer earlier than they otherwise would.

The survey was conducted by Opinion Research Corporation of Princeton in the fall of 1979, using personal interviews among a national probability

sample of 1,580 adult women in the United States and 720 spouses or partners. Additional samples of black and Hispanic women also were interviewed.

The survey found that 76 percent of women say cancer is their most serious health concern. More than half of those women say that breast cancer is the most worrisome of all cancers, compared to 21 percent who said so in 1973. Concern about cancer far exceeded concern about other health problems, such as stress, reported by seven percent, and high blood pressure, reported by six percent.

Women's general knowledge about breast cancer has increased substantially since the 1973 survey, which was conducted by the American Cancer Society. Respondents were more aware of risk factors such as being older, especially over 50, and having a family history of breast cancer. However, 50 percent of the respondents incorrectly believed that a bump or bruise to the breast can cause breast cancer.

The NCI survey showed that 61 percent of the women were aware of x-ray mammography, an increase from the 43 percent aware of mammography in 1973. Few, however, had heard any negative publicity about mammography, such as risk from exposure to x-rays. Nineteen percent of respondents reported having had a mammogram.

SOLOMON GARB'S QUESTIONS AND ANSWERS ABOUT THE NATIONAL CANCER PROGRAM

The Cancer Letter last week began publishing a list of questions and answers compiled by Solomon Garb, chairman of the Citizens' Committee for the Conquest of Cancer. The list started with the topic of cancer treatment; the rest of the questions and answers relating to treatment and treatment research appear below, followed by those on basic research and cancer cause and prevention. Questions and answers on costs and finances and a variety of other subjects will be published next week.

Some answers include opinions which are those of Garb and his fellow committee members; many Cancer Program advocates may disagree with them.

39. Do you mean that there are comprehensive cancer centers that don't have programs to find better anticancer medications?

Yes, some do and some don't.

40. Why not?

There aren't even enough funds available to support properly the main program centered at the Div. of Cancer Treatment of NCI.

41. Is research being done on more effective radiation treatments?

Yes. This kind of research requires large expenditures for highly specialized new equipment and years to build and install the facilities. For years, the funds were just not available. Now, a few projects are showing excellent results, but more time is needed for adequate long term evaluation.

42. What about improved surgical approaches?

These are developing steadily. In combination with radiation and chemotherapy surgery is accomplishing much more than was possible in the past. Cancers that were once considered inoperable can sometimes be shrunk with radiation or chemotherapy, making surgery possible. Also, surgery as an aid to chemotherapy is showing great promise.

43. How?

Chemotherapy is most effective against a small volume of cancer cells. If a patient has a large tumor mass that cannot be completely removed, the surgeon can sometimes remove most of it. Then the chemotherapy becomes much more effective. The surgical procedure is called "debulking."

BASIC RESEARCH

44. Is there a difference between basic research and fundamental research?

They are used synonymously.

45. A number of scientists have complained that basic research is being slighted in the cancer program. Is this true?

In fiscal 1979, NCI spent $504 million or 53 percent of its total budget on basic research. The remaining 47 percent went for research into diagnosis, prevention, better treatments, cancer information, cancer control and cancer statistics.

46. Then why do some scientists complain that basic is being neglected?

Either they don't have the figures or they want more than 53 percent.

47. What about other institutes in NIH? What percentage do they spend on basic research?

We don't have all the figures yet. Thus far, the information obtained from several institutes indicates the following for fiscal 1979:

National Cancer Institute, 53 percent; National Institute of Neurological and Communicative Disorders and Stroke, 50 percent; National Institute on Aging, 53 percent; National Eye Institute, 49 percent; National Institute of Allergy and Infectious Diseases, 63 percent; National Institute of Environmental Health Sciences, 45 percent; National Institute of Arthritis, Metabolism and Digestive Diseases, 59 percent; National Institute of General Medical Sciences, 83 percent; National Heart, Lung and Blood Institute, 49 percent; National Institute of Child Health and Human Development, 45 percent.

48. Do you know how much the government spends on basic research each year?

In fiscal 1979, all government agencies will spend $3.9 billion and in 1980, about $4.3 billion on basic research. NIH will spend about $1.2 billion in 1979 and $1.4 billion in 1980 on basic research.

49. How do those figures compare to the funds spent to find better treatments for cancer?

In fiscal 1979, biomedical basic research (NIH) received $1.2 billion. Cancer treatment research received about $0.22 billion. Of course, for a valid comparison, one ought to compare total treatment and treatment related research in all of NIH to the $1.2 billion figure.

50. Well then, how much does NIH spend on treatment and treatment related research for all diseases compared to basic science research?

Those figures are not available. Our best guess is that somewhat less than $0.5 billion is spent each year in all research designed to get better treatments, compared to $1.2 billion for basic research.

51. Why does basic science research get such a large share of the total?

Historically, NIH has always supported basic research more than any other activity.

52. Do you favor giving all that money to basic research?

If the American people wish to support basic research, we have no objections. All we ask is that, in addition, they

support efforts to find better treatments for our patients who are dying of cancer.

53. Many basic scientists object to the entire concept of directed research. How do you respond?

We have never used the term "directed research." We refer to "coordinated research." Consider a research approach that requires several successive steps by different scientists before it can benefit patients. Under the uncoordinated system before 1971, each scientist in the sequence had to write up and publish his results before the next scientist in the sequence could submit a research grant application. The interval between completing one step in the sequence and starting the next one was usually two or more years, during which there was no progress. This system produced excessive delays. A coordinated research program eliminates most of these delays.

Unfortunately, we do not yet have a fully coordinated system. Because of bureaucratic procedures forced on NCI by higher government agencies, it still takes too long to move along the sequence of research steps. However, there has been substantial improvement since 1971.

54. Couldn't a cure for cancer come from other research?

Anything is possible. In the past a few scientists have found a treatment for one disease while looking for something else. This is called serendipity. However, that is no reason to skimp on cancer research. Biomedical research in areas other than cancer receives over 60 percent of NIH expenditures and over 70 percent of total government biomedical research expenditures. There is ample funding for serendipity to occur.

55. Why not emphasize basic research and wait for a clear understanding of cancer biology?

Actually we do emphasize basic research. That is the largest item in the NCI budget. There is no objection to any amount of basic research as long as there is enough support for research to find better, less toxic treatments for patients who are getting or will get cancer before the basic scientists reach their goals.

56. Why do some scientists oppose the cancer program?

There are various reasons. Some are philosophically opposed. Others are not fully aware of the cancer program's progress. Still others want the funds to go to other areas.

57. A professor of psychiatry at Harvard Medical School has said, "My quarrel with the 'war on cancer' is with some of the assumptions that lay behind it and a political process that led to a decision for the way money should be allocated and dispersed that was against the better judgement of most of the scientists doing fundamental research." How do you respond to that?

There were indeed many scientists doing fundamental research who opposed the concept behind the war on cancer. They felt that all, or almost all of the emphasis should continue to go to fundamental (basic) research, and that no serious effort should go to improving patient treatment until the fundamental research had produced a scientific breakthrough. They could not provide any specific estimate as to when their fundamental breakthrough would take place—in 10 years, or a century, or more.

On the other hand, those of us who care for cancer patients, the patients themselves, and the majority of the American people felt that with about 1,000 people dying daily of cancer, we could not sit idly by and wait for the fundamental scientists to come up with a miracle. We felt that a reasonable effort had to be made to improve the care of cancer patients even if the improvements were less than perfect.

58. Were there improvements?

Absolutely. Today those improvements are saving thousands of lives that would otherwise have been lost, extending useful and comfortable life, and relieving agony.

59. To do this, how much was taken away from the support of fundamental research?

Nothing. In fiscal 1979, fundamental (basic) research received about 300 to 400 percent more support than in 1971 when the Cancer Act was passed.

60. They why does the Harvard psychiatry professor object to the way the money was "allocated and dispersed?"

We don't know.

61. What about the "political process" that the Harvard psychiatry professor quarrels with? What was that process?

It was a sharp departure from the earlier political processes. For decades, a relatively small group of fundamental scientists in some of the more prestigious universities made the key decisions on research priorities. The American people, the doctors treating patients, and even Congress had little voice in the final decisions. In 1971, that was changed. Although some of the fundamental scientists in the prestigious universities strongly opposed the Cancer Act, there was overwhelming support from ordinary citizens. For every letter opposing the Act, 100 to 1,000 reached Congress supporting it and the Cancer Act of 1971 passed by an overwhelming vote.

62. When the National Program for the Conquest of Cancer was developed, were fundamental scientists consulted?

Absolutely. The U.S. Senate's National Panel of Consultants on the Conquest of Cancer solicited the opinions of all scientists engaged in research related to cancer, and received and studied written or verbal testimony from 289 such witnesses.

CANCER CAUSES AND PREVENTION

63. Haven't the greatest medical advances come from prevention rather than treatment?

Some have come from prevention, some from treatment and some from both. We support prevention, but at the same time recognize that there are times when one can't prevent a disease, and treatment is the only hope.

64. Which serious diseases are not preventable, but can be cured or controlled by treatment?

Addison's disease, appendicitis, most asthmas, congenital heart disease, Cushings disease, diabetes, glaucoma, hemophilia, hypertension, hyperparathyroidism, hyperthyroidism, lupus, pernicious anemia, pituitary insufficiency, pneumonia, ulcerative colitis, and many others.

65. Which diseases need both prevention and treatment?

Tuberculosis is one example. The causative agent has been known for almost a century. A vaccine is available in Europe, but has not been widely used in the U.S. because of inadequate effectiveness and/or excessive toxicity. Attempts to prevent tuberculosis by public health measures were only partially successful. The combination of prevention and treatment, however, has greatly diminished the threat of tuberculosis. Other examples are meningitis, syphilis, gonorrhea and pneumonia.

66. Isn't it true that cancer is caused by man's interference with nature?

Not necessarily. What could be more natural than the foreskin that all males are born with? Those who retain their foreskins have a significant incidence of cancer of the penis. In New Guinea, cancer of the penis is the commonest cancer in man. Arabs who are circumcised at age 13 have a low incidence of cancer of the penis. In Jews who are circumcised in infancy, cancer of the penis is virtually unknown. Here, interference with nature protects.

The most potent carcinogen known is aflatoxin, a naturally occurring material in a mold that naturally grows on peanuts and some grains. Other molds, fungi, and plants are also carcinogenic. In primitive societies, where food storage technology is undeveloped most stored foods probably are contaminated and cause many cancers. In the U.S., all brands of peanut butter tested recently showed measurable levels of aflatoxin. Let's hope the levels are too low to cause harm.

On the other hand, some chemicals added to the environ-

ment are definitely carcinogenic. Carcinogens are all around us.

67. Why can't you use prevention first to reduce cancer incidence and then concentrate on curing those cancers that can't be prevented?

That's what we would like to do. If smoking were abolished this would be practical. However, cigarette usage is still increasing. As long as people smoke, prevention can only have a minor effect.

68. Why hasn't NCI told the American people about dangerous industrial carcinogens such as asbestos, vinyl chloride, and benzene?

They have. NCI has published seven volumes of tables, in over 3,000 pages giving the key information. These volumes clearly show the carcinogenic properties of asbestos, vinyl chloride, benzene and hundreds of other materials. These volumes are available in most medical school libraries and have been for years. Unfortunately, some of the more vocal critics of NCI just didn't bother to find out what had already been done before they made their accusations.

69. Why can't we concentrate on preventing cancer instead of emphasizing cures?

We can prevent some cancers—those due to smoking, exposure to too much sun, exposure to benzene, vinyl chloride, etc. That, however, is the responsibility of regulatory agencies, not NCI which has no enforcement authority. The problem in prevention is twofold. First, even when we know exactly a major cause of cancer in Americans—tobacco—the nation seems unable or unwilling to control it. Second, many other cancers are apparently caused by multiple factors that interact in a particular sequence. Animal studies do not reveal the human pattern. Accordingly, we don't know the causes of childhood leukemia, or cancers of the breast, prostate, stomach, pancreas, uterus, ovary, testis, or brain. It may take hundreds of years to find their causes, since generations of people must be studied.

The concept of preventing all cancers is attractive—even seductive. Because of that, two decades and hundreds of millions were spent on a futile search for a cancer vaccine. We now know that such a vaccine is virtually an impossibility.

Even if there were a way to remove all carcinogens from the environment, there are still 50 to 60 million Americans who have already been exposed and who are already destined to get cancer. Are they to be ignored? Only better treatments can help them. Therefore, we need both prevention and treatment programs.

70. Why is so little being spent to prevent cancer?

Much, much more is being spent to prevent cancer than the reports claim. The prevention of cancer is the responsibility of several federal agencies. One, of course, is NCI. Others include the Food & Drug Administration which is responsible for keeping carcinogens out of foods, the Environmental Protection Agency which is responsible for eliminating or reducing environmental carcinogens, the Nuclear Regulatory Commission which is supposed to monitor and protect us from radioactive contamination, OSHA which is supposed to protect workers against carcinogens, the National Institute of Environmental Health Sciences which conducts extensive research on environmental causes of cancer, and the National Institute of Occupational Safety & Health which conducts research on occupational cancers and their prevention.

If the amounts spent by all these agencies on the prevention of cancer are added up, they come to much more than is spent to find better treatments for this disease. Cancer prevention is not being neglected insofar as funds are concerned.

71. Can't we prevent most cancers by better diet?

Some cancers can be prevented by avoiding certain foods. Some groups in the United States, such as Seventh Day Adventists have a lower incidence of cancer than others and this is believed to be related to their avoidance of meat and certain other foods and drinks. Still, cancer is a major health problem even for Seventh Day Adventists. It is noteworthy that the Seventh Day Adventists are among the strongest supporters of the National Cancer Program.

Some contend that cancer can be prevented by eating more of certain foods high in vitamins. Perhaps so, but several generations of people will have to be studied in order to test the validity of this concept. A century or more would be needed.

72. What causes cancer?

There are many causes. Sunlight causes basal cell cancers and melanomas of the skin. X-radiation, and cosmic radiation can trigger a variety of cancers. Chemicals such as vinyl chloride, and benzene cause cancers. So do some kinds of rock dust, including asbestos. Some natural foods such as betel nut, cycad nut, bracken fern and perhaps others cause cancer. There is suggestive evidence that ordinary beef can cause cancer of the colon. Processed beef (corned and/or pickled) is also suspect. There is a suspicious link between ingestion of dairy foods and breast cancer.

Wood dust causes cancer of the nose and sinuses. Tobacco smoke produces cancer of the lung and helps produce cancers of the esophagus, bladder and possibly pancreas. Certain types of trauma such as severe burns can produce cancer years later.

All sorts of microorganisms can produce cancer. Viruses produce some cancers in animals and probably humans. The schistosome (bladder fluke) produces bladder cancer. Molds produce the most potent carcinogens known and these molds infest peanuts and some stored grains.

At least one autoimmune disease, ulcerative colitis, predisposes to cancer. Retention of the normal foreskin may lead to cancer of the penis.

These are only a few examples. Even more complex are the interactions. Two agents, neither dangerous alone, can be highly carcinogenic if the person is exposed to both.

73. What about a cancer vaccine?

Years ago, some scientists found that viruses could produce cancer in animals. They hoped that they could find a single virus or a small group of viruses that cause human cancer, and make a vaccine. Other scientists doubted this. Now, further research has shown that a cancer vaccine is completely impractical for several reasons.

74. Does that mean cancer virus research should be abandoned?

No. There are some hints from careful clinical observations and from basic research that ordinary viruses, not usually considered carcinogenic might cause cancer under some circumstances. Perhaps an ordinary virus plus a chemical carcinogen together can cause cancer when neither alone will. Perhaps the timing of two virus infections may be crucial. Perhaps other factors may be important. We don't know yet.

75. What is the basis for saying that 90 percent of cancers are caused by the environment?

Some scientists observed that the incidence of various cancers differs from country to country. They then made a composite of the lowest cancer incidence figures. Next, they added together and weighted all these lowest figures. The mythical country that has a cancer incidence equal in each segment to the lowest cancer incidence in the world would then have a cancer incidence of about 10 percent of the U.S. incidence.

The next step in the reasoning was to assume that the difference in cancer incidence between each nation was due to a difference in environment. Therefore, they concluded that since the ideal, mythical nation would have only 10 percent of the U.S. cancer incidence, the different or 90 percent must be due to the environment of the U.S.

76. Do all scientists accept this logic?

No.

77. What is your opinion of the proportion of cancers caused by environmental factors?

That depends entirely on how you define environment. If you use a broad definition, that includes the viruses, bacteria, molds, background radiation, sunlight, etc. in the environment you could say that 100 percent of all diseases are caused by the environment. However, that isn't a useful concept. It makes more sense to ask what proportion of cancers are caused by factors that are reasonably subject to human control.

78. Well, then, what proportion of cancers are caused by factors that are subject to human control?

In theory, about 50 percent. However, that includes smoking. Although in theory smoking is completely subject to human control, in fact, we have not controlled it.

79. Has anyone proven by experiment that 90 percent of cancers are caused by the environment?

No. That would be impossible since there is no way to design a suitable control.

80. Does it happen that a nation with a low level of one kind of cancer has a high level of another kind?

Yes. Often. Japan has a low level of breast cancer and a high level of stomach cancer. The U.S. has a high level of breast cancer and a low level of stomach cancer.

81. What proportion of cancers come from workplace exposure?

There are differing opinions, ranging from five percent to about 33 percent. Since people spend about 21 percent of their time at work, and since there is no evidence that workplaces are safer than other places, a reasonable estimate is that about 21 percent of cancers come from workplace exposure. For some occupations, the risk is much higher than for others.

82. How dangerous is low-level radiation?

There are differing opinions. Some scientists believe that it poses only minimal dangers while others believe that the dangers are substantial. It is doubtful if this can be resolved since a properly controlled experiment is impossible.

83. Why?

We cannot design a controlled experiment in which any animal would be free from some low-level background radiation. From the depths of the earth to the outer reaches of space there is significant, measurable background radiation.

84. Has the American Cancer Society neglected prevention?

No. In terms of cancers prevented, the American Cancer Society programs of research support and education relating to smoking alone have probably prevented more cancers than the efforts of any other group or agency. Approximately 80 percent of American Cancer Society research funds are used for cause and prevention research.

85. What is the attitude toward prevention of those who are working for better, less toxic treatments?

Both treatment research and prevention research are underfunded. Both should receive more funds. Prevention research should be made more efficient and effective.

86. Do you mean that prevention research is inefficient and ineffective?

To a large extent.

87. Why?

There are several reasons. The major reason for the inefficiency and ineffectiveness of prevention research has been the fractionation of the effort among a multitude of federal agencies.

88. Which agencies?

Cancer prevention research is conducted and sponsored not only by NCI, but also by the National Institute of Environmental Health Sciences, the National Institute of Occupational Safety & Health, the Food & Drug Administration, the Nuclear Regulatory Commission, the Environmental Protection Agency, and probably others. The enforcement of regulations pertaining to cancer prevention is handled by some of these plus another group of agencies.

89. Which changes are recommended?

The research programs at least should be consolidated and turned over to a single agency.

90. Do you mean the National Cancer Institute?

No. The National Institute of Environmental Health Sciences. Its name should eventually be changed to the National Institute for Preventive Medicine and Environmental Health Sciences and it should conduct and/or sponsor all prevention research.

91. Why would this help?

There are two main reasons. First, cancer is not the only illness caused by environmental agents. As things stand today, if some material, old or new, is suspected of causing human disease, its testing may become the responsibility of many federal agencies. That is extremely wasteful of time, money, and sometimes lives. For example, one group might inject rats and observe them for two years to see if cancer develops. Another group might inject other rats and observe them for fertility changes. Another group might inject still other rats and study them for neurological changes, etc. To some extent, they would report results back and forth, but that is an inefficient, unreliable way to do things. Instead, a single agency should be responsible for the testing and reporting of all undesirable effects.

A second reason that has been largely ignored is that an action taken to protect against one illness might bring on another. Therefore, fractionation of preventive measures causes confusion and may worsen matters.

92. Is that just theory, or has it happened that measures recommended to prevent one illness have brought on others?

It's not just theory. It has happened. In the 1930s and 1940s, research pointed to nutritional factors that made people more susceptible to tuberculosis. Therefore, physicians, in order to help prevent tuberculosis advised a high intake of milk, butter, cream, eggs, meat, and cheese. Then it was learned that these foods help cause heart attacks. Probably more lives were lost through heart attacks caused by this diet than were saved from TB. Next, to help prevent heart attacks, people were again advised to change their diets and eat less meat. As one substitute, broiled fish was recommended. In 1979, there were reports that broiled fish may cause cancer.

Prevention research must be placed on a sound footing, so people can live long, healthy productive lives. Until the fractionation of prevention research is replaced by a sound, unified approach, this sort of confusion will continue to make prevention more rhetoric than actuality.

93. Isn't there an arrangement for coordination of cancer prevention research among federal agencies under the leadership of the National Institute of Environmental Health Sciences?

Yes, but it is only a stopgap measure. It doesn't begin to solve the problem. The time has come for clear lines of responsibility and authority. If we really feel that prevention is important, we should have an institute devoted entirely to disease prevention and directly doing the needed prevention research.

94. How much extra would this cost?

We can't give dollar amounts at this time, but it would probably cost about a dollar extra per year per person.

95. If we were able to start an effective cancer prevention program tomorrow, how long would it take before the cancer death rate dropped?

We should see the beginning of a decline in 20 years, and a major drop in 50 years.

96. Why so long?

If a person is exposed to a carcinogen in 1980, the probable time for most cancers to develop is 20 to 50 years later.

97. How much of a drop in cancer death rate could we expect in 20 to 50 years if we had a highly effective prevention research program?

That depends on the degree of use of the information. We already know enough to prevent 20 to 40 percent of all cancers, but people and the government aren't using that information.

98. Do you refer to smoking?

Yes.

99. Aside from smoking, how much of a reduction in cancer could we expect in 20 to 50 years if we start a first class cancer prevention research program now?

One can only guess. Probably a reduction of 20 to 30 percent is realistic.

100. Why so little if 90 percent of cancers are caused by environment? Why can't we reduce cancers by 90 percent?

Many of the environmental causes of cancer are beyond human control. One example is background radiation. Some comes in the form of radiation from the sun and from the cosmos. Other background radiation comes from the earth, from the bricks making up houses, etc.

Other environmental carcinogs include molds and perhaps other microscopic forms of plant life. We cannot eliminate them from the environment completely. Sunlight is another cause of cancer.

Viruses are definitely a cause of some cancers and may yet be shown to be the main cause of many cancers. We can't control these viruses.

Some carcinogens that have already contaminated the environment are nondestructible and will be around for millions of years. Asbestos is a prime example. If all use of asbestos were stopped tomorrow, asbestos exposure would continue for many thousands of years. Millions of tons of asbestos have been dumped in the Great Lakes. Thousands of tons have been finely powdered and dispersed all over the nation from brake drums. In some states, rock containing asbestos was used to make roads and the entire area for hundreds of yards on each side is contaminated.

These are just a few examples of the complexities of cancer prevention. Also, the estimate of 20 to 30 percent reduction in cancer rates in 20 years through prevention is aside from smoking. If we prevent smoking and take all other feasible preventive measures, we could probably reduce cancer incidence by 50 percent in 20 years. From recent experience, however, it seems doubtful if we will be able to prevent smoking.

101. Does that mean that cancer cannot be conquered solely by prevention?

Yes.

102. Does that mean that prevention is not important?

No, not at all. Even if we could cure almost all cancers, prevention would still be of great importance. We need prevention and treatment.

103. How long after exposure to a cancer causing agent does cancer occur?

That varies with the agent, the degree of exposure, and the individual. A few cancers, such as those in children, probably start within a few months or years after exposure to the causative agent. Unfortunately, the causative agents are generally unknown. The common cancers of adults probably develop about 20 to 50 years after initial exposure to the cause(s).

104. Do you think a chemical should be tested for carcinogenicity before it is put into a manufacturing process to which workers are exposed?

Absolutely.

105. Whose responsibility should that be?

Everyone's, the government, the company, the workers.

106. How serious is workplace exposure to carcinogens?

For some of the persons exposed, it is likely to be the most serious thing in their lives. There may be arguments about the degree to which workplace exposure affects national cancer statistics, but there should be no argument about the right of a worker to a healthy workplace. We recommend an effective, coordinated national program to eliminate workplace exposure to all known and probable carcinogens.

107. What can be done in the meantime to avoid getting cancer from working in industry?

There are some general rules that may be helpful.

1. Insist on enforcement of all existing regulations that prevent worker exposure to dangerous chemicals.
2. Assume that excessive dust (more than settles in a home) is likely to be dangerous no matter what the dust consists of. Insist on adequate ventilation and filtration of the workplace air.
3. Assume that an odorous chemical to which one may be exposed for months or years is likely to be dangerous in some manner. Ventilation and filtration of the workplace air are important.
4. A worker who might be exposed to hazardous dusts or chemicals should, in addition to other precautions, shower and change clothes at the plant and not take work clothes home, even to be washed. The company should provide and launder work clothes.
5. Avoid smoking. That increases the risk of some other carcinogens manyfold.
6. Have a clean place to eat.
7. Avoid getting oils on skin or clothing.

108. Can an individual do things to reduce the chances of getting cancer besides workplace precautions?

One can reduce the likelihood of getting cancer by about one third by adopting a more healthy life style. Some religious groups, such as Mormons and Seventh Day Adventists, have reduced levels of cancer because of their living patterns.

109. What are some of the details?

There are four main actions that seem to be effective:

1. Avoid smoking.
2. Avoid alcoholic drinks.
3. Minimize eating meat.
4. Avoid sunburn.

110. Are there other things one can do about lifestyle?

That's more difficult to answer. There are theoretical reasons to avoid a number of things, but we cannot be sure that they are effective in practice. Here are a few.

1. Avoid molds, either in food or in air.
2. Avoid asbestos.
3. Avoid breathing gasoline, diesel or chemical fumes.
4. Avoid charcoal broiled and other broiled foods.
5. Reduce or avoid fermented foods such as sauerkraut.
6. Reduce or avoid exposure to chemicals. Unfortunately, we will not know for decades how effective these and other actions are.

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