

The Diet, Nutrition, and Cancer Program of the NCI National Cancer Program¹

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Summary

In November 1974, in response to a mandate in the revised National Cancer Act of 1974, a plan was introduced for the formation of a Diet, Nutrition, and Cancer Program. Dr. Frank J. Rauscher, Director of the National Cancer Institute, selected a group of scientists who defined the goals of the program and recommended the appointment of a program director and of an advisory committee. These recommendations were accepted, and an Advisory Committee, reflecting a cross-section of scientific expertise, has been selected. To recommend a well-balanced program, it will be necessary for the Advisory Committee to assess the current state of the art of nutrition in cancer etiology and therapy and to be apprised of current opportunities, needs, and resources. Toward this end, a literature survey project has been initiated and two specialized workshops have been held.

The revised National Cancer Act of 1974 states that:

In carrying out the National Cancer Program, the Director of the National Cancer Institute shall: collect, analyze and disseminate information respecting nutrition programs for cancer patients and the relationship between nutrition and cancer, useful in the prevention, diagnosis and treatment of cancer.

In pursuance of this mandate, Dr. Frank J. Rauscher, Director of the National Cancer Institute (NCI), selected a group of NCI scientists who defined the goals of this program and recommended the appointment of a program director with coordinating and full budget authority. It was also recommended that this director operate under the guidance of an advisory group that provides broad program recommendations including budget allocations, evaluates data gathered by the program, and helps formulate public information statements. The recommendations of such an advisory group will include basic and applied research, and the Diet, Nutrition, and Cancer Program will utilize both the contract and the grant mechanisms.

An Advisory Committee² was selected and chartered, and

the members reflect a cross-section of scientific expertise in epidemiology, experimental carcinogenesis, animal nutrition, human clinical nutrition, biochemistry of nutrition, and clinical oncology. They also represent the federal government, the academic community, industry, the American Cancer Society, and other interested Groups. The 1st meeting of the Advisory Committee was held on August 19 to 20, 1975.

In order to recommend a well-balanced program, it will be necessary for the Advisory Committee to assess the current state of the art in its entirety and to be apprised of current opportunities, needs, and resources.

To accomplish this, a literature survey project in diet, nutrition, and cancer has been initiated to provide an initial and a continuing evaluation of current scientific knowledge and future developments. This project will publish critical reviews of scientific information in needed areas for the benefit of the Advisory Committee, the Program, and the community at large. Two specialized workshops were also sponsored for a firsthand assessment of the state of the art, and these workshops were attended by several members of the Advisory Committee in anticipation of their activities. The 1st workshop, on Nutrition and Cancer Therapy, was held in Bethesda on March 26, 1975. The 2nd workshop, on Nutrition and Cancer Causation, was jointly sponsored by the NCI and the American Cancer Society and was held on May 19 to 21, 1975, in Florida.

Nutrition and Cancer Etiology

Nutrition in man or animals proceeds from dietary intake, digestion, and metabolism of food to the release of cellular nutrients into the general circulation. Research on nutrition, however, has proceeded in the opposite direction, namely, it has been easier, less costly, and more convenient to study cellular nutrition in a laboratory setting than to study the dietary aspects of nutrition. The study of metabolism and digestive processes at the animal level is more difficult than cellular nutrition studies but it is still feasible in terms of cost. The most difficult and least popular approach for the individual scientist involves the rather

¹ Text of a presentation to the National Cancer Advisory Board, July 16, 1975. Included in the Proceedings of the Conference on Nutrition in the Causation of Cancer, held May 19 to 22, 1975, Key Biscayne, Fla.

² Comprised of Gerald Wogan (Chairman), Elaine Adams, William Darby, Stanley Dudrick, Peggy C. Fry, Larry Garfinkel, Gio B. Gori

(Executive Secretary), Willis A. Gortner, Richard A. Greenberg, Harold Sandstead, Athanasios Theologides, William G. Thurman, Myron Winick, and Ernst L. Wynder. Harold Amos is Liaison for the National Cancer Advisory Board and Jonathan E. Rhoads is an Ex-Officio member.

complex logistics and design constraints that dietary and epidemiological surveys require.

Significant information is available on the normal nutritional requirements and functions at the cellular level. However, much remains to be clarified with regard to differential nutritional requirements of specialized cells and the toxic, carcinogenic, or otherwise negative effects of unbalanced nutrient availability. The same can be said for the processes of digestion and transformation of nutrients, before their release into the circulation, and cellular uptake. Knowledge is most lacking, however, in the area of dietary mechanisms, and intensive and at the same time basic and elementary approaches are needed.

For instance, it is fashionable to talk of dietary excesses and deficiencies when, in fact, a solid scientific understanding of what constitutes a normal human diet is not available. Too often normalcy has been assumed or defined on the basis of isolated experimental findings, empirical estimates, traditional eating habits and values, cultural trends, food availability, and agricultural realities, if not on marketing grounds alone. Studies of the nutritional sequence in animals indicate that cellular requirements are fairly stable among the higher species, namely, cells from different animals appear to have a similar need for a rather uniform set of nutrient building blocks. Where animal species differ markedly is in their ability to produce these building blocks from their dietary intakes, in their digestive processes, and in their selection of food intake.

Dietary intake and digestive differences have an evolutionary background, and the evolutionary record of man must be consulted if the range of normal human dietary intake is to be understood. From an evolutionary point of view, modern man is still outfitted with a body that over millions of years has adapted to Stone Age conditions, when the foods available were very different from our modern diet and the caloric consumption probably far exceeded the demands of our sedentary habits. An examination of the adaptive mechanisms that have determined the present anatomy, digestive metabolism, and cellular nutrition in man would help define the range of dietary intake that man has evolved to consider as natural under different climatic, ecological, and somatic conditions. Obviously, this knowledge will require careful interpretation and it may only suggest ranges of normalcy, but it is a necessary 1st step.

Comparative studies in different species will also help in understanding the evolutionary background of normal dietary requirements in man. Once a rational approximation of normalcy ranges for human diet is available, then it may be significant to talk of excesses and deficiencies, of accidental or intentional contaminants. This information, coupled with epidemiological studies, dietary surveys, and exploratory studies in animals, can help define the significance and eventually the carcinogenic potential of altered dietary intake in man. Areas to be considered are the impact of diet on hormonal balance, on digestive secretions, and on the composition of and the substrates available to the enteric flora. Investigations should also be conducted on the interaction of diet and carcinogenic and toxic stimuli that

may intervene on cellular and genetic stability, on the immune status, and on the detoxification and reproductive competence of the individual.

Nutrition and Cancer Therapy

The knowledge of nutrition in cancer therapy is at a similar stage of development. Much needs to be done, but new therapies with promise of immediate help to the cancer patient are available, as our workshops have indicated. The intelligent modification of nutrition in the cancer patient requires some basic knowledge that laboratory and human studies can provide. First, the host and its tumor must be viewed as competitors for the same available nutrients. Knowledge in this field would help clarify the precursors of cachexia; taste impairment, depression of appetite, toxic effects, and nutrient requirements can be exploited to starve the tumor and feed the host differentially. The causes of impaired food intake, for example, those associated with toxic tumor effects or digestive and anatomical alterations produced by surgery, chemotherapy, and radiotherapy, must also be investigated. In addition, other areas requiring study are nutrient depletion by therapy, and synergistic or antagonist phenomena between diet and therapy.

There is a general consensus that a nutritionally balanced patient has a better chance of successful therapy. Most cancer patients lose interest in food largely, we believe, because of a deterioration in taste perception. Currently, hyperalimentation is a major focus of interest, and rapid advances are likely to occur under a coordinated and intensive effort. For the patient with a functional gastrointestinal tract and who is not yet severely debilitated, a behavioral approach to hyperalimentation appears desirable. This would require a better knowledge of taste physiology and its modification in the cancer patient, a deeper understanding of food technology and flavoring, and a greater grasp of psychological or hypnotic techniques that may induce the patient to increase food intake. For the patient with impaired gastrointestinal functions, the head and neck patient, the stomach surgery patient, and the patient with severe radiation enteritis, artificial i.v. hyperalimentation is the preferred approach.

Further development in this area is necessary to define the formulation of nutrient solutions and to reduce their cost, to improve the hardware, to reduce the chance of sepsis, and to devise portable infusion units that could be mass produced at reasonable cost for the use of ambulatory patients. All of this will require clinical trials to establish the efficacy of these techniques in the various forms of therapy available today, and it appears that a number of competent scientists are ready to initiate these studies.

Another significant activity of the program is the compilation and distribution of dietary information helpful in the prevention and in the therapy of cancer. An example of this activity is a pamphlet dealing with the problems of feeding the young cancer patient, prepared by the Public Information Office and the Division of Cancer Control of the NCI.

This pamphlet answers a plea by the Candlelighters³ and is a first attempt at alleviating a singularly cruel problem that so many parents face daily. It will be followed by similar publications dealing with the specialized needs of other cancer patients.

Conclusions

Finally, a word regarding how the program will process ideas into research efforts. Input will consist of the coordinated needs of the NCI Divisions, and the recommendations of the Advisory Committee. The Committee will interact with specific consultants and with workshops that the program will sponsor. The Committee will canvass existing research opportunities and will select priorities for

the program. This selection process will be a major effort, because the danger of creating a diffused program is very real if one considers the variety and vastness of interest in nutrition today. The program will be coordinated with other NIH Institutes and other federal and local agencies, and, rather than become an all-encompassing nutrition study, it will focus on cancer-related problems and will attempt to stimulate other organizations to produce information relevant to nutrition at large. It is expected that grant and contract funds will be utilized in this program, although the 1976 budget will probably not exceed \$6 million. This is understandable at this initial stage, since the National Cancer Program deals continuously with promising ideas, and the nutrition program will have to compete for attention. In the final analysis, the recommendations of the Advisory Committee and the inventiveness of the program will determine its level of funding relative to other important and timely efforts, but a surge of new findings, epidemiological and clinical, guarantees that diet and nutrition will have increasing significance to all who are interested in the final control of cancer.

³ The Candlelighters are a volunteer organization of parents of children affected by cancer. They have a continuing impact in focusing political, public, and scientific attention on this specific problem. Their main headquarters are located at 123 C Street, S.E., Washington, D. C. 20003.

Cancer Research

The Journal of Cancer Research (1916–1930) | The American Journal of Cancer (1931–1940)

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Cancer Res 1975;35:3545-3547.

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