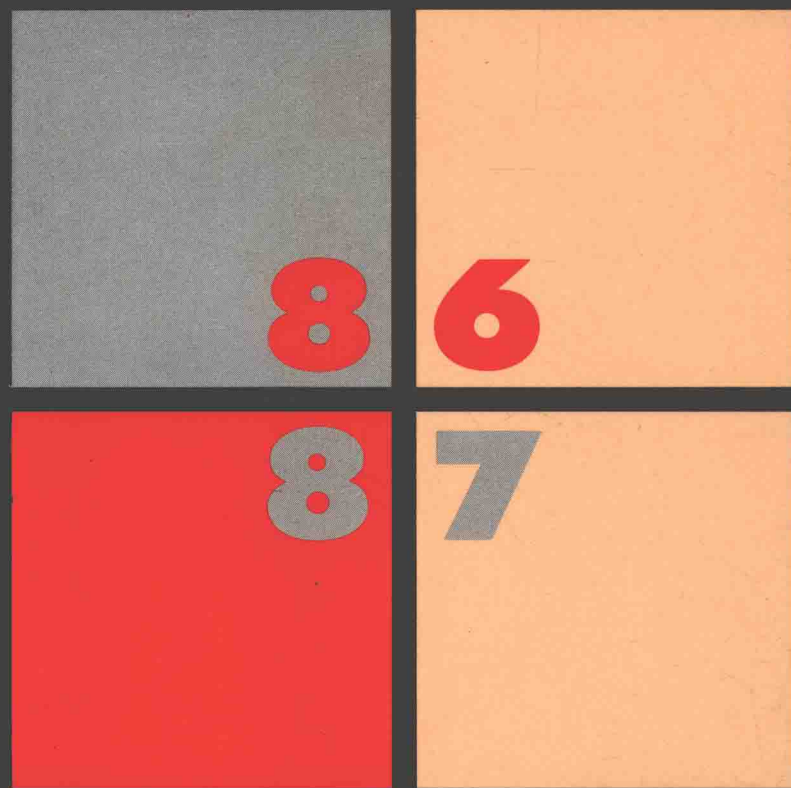


BIENNIAL REPORT



L Y O N



WORLD HEALTH ORGANIZATION



INTERNATIONAL AGENCY FOR RESEARCH ON CANCER

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INTRODUCTION

The Agency's main interests continue to be cancer etiology and the generation and dissemination of information useful for the prevention of human cancer. The maintenance of scientific expertise permits the Agency to identify new findings in basic research, while at the same time assuring its credibility in fulfilling its catalytic and coordinating role at the international level. The Agency monitors how new findings in basic research can be applied in public health and, in particular, in developing approaches to bridging the gap between investigations of genetic factors and studies of environmental factors in the causation of human cancer.

Furthermore, the Agency maintains complete scientific independence and objectivity, assisted by the commitment of its staff and by the continuous support of a large number of scientists all over the world who collaborate readily with the Agency.

It is with great satisfaction that the Agency can now count among its members two states with long-standing records of achievements in cancer research: Finland, which joined in 1986, and Norway, which joined in 1987. This brings the total number of members to 14: Australia, Belgium, Canada, Federal Republic of Germany, Finland, France, Italy, Japan, The Netherlands, Norway, Sweden, the UK, the USA and the USSR.

The last two years have seen considerable expansion of the activities of the Agency, in particular in the area of epidemiology, on the descriptive and analytical sides, as well as in the area of laboratory-based molecular and metabolic epidemiology. Tangible evidence of this increased activity is provided by the number of individual and collective publications of Agency staff or as a result of Agency-sponsored meetings. Additional evidence of the increasing interest that the Agency is eliciting on the international scene is shown by the large number of visiting scientists, fellows, lecturers and visitors who come yearly to Lyon.

With the adoption of a regular system for reviewing the Agency's activities, a number of projects are considered in detail either by a Scientific Council Peer Review Sub-committee, which convenes jointly with external consultants in September, or by the Scientific Council at its plenary session in January of each year. In the two years (June 1985 to June 1987) that have elapsed since the last full *Annual Report*, the following projects were reviewed: the fellowships programme; the project on the formation and repair of DNA alkylation; the development of techniques for detecting exposure to aflatoxins in body fluids; the registry of persons exposed to phenoxyacetic acid herbicides; the manuals of selected methods of analysis of environmental carcinogens; the investigation on drug-related cancers; the proposal for a programme on genetic predisposition to cancer; the project to investigate cervical cancer in relation to male sexual behaviour and papilloma virus infection; a study on passive smoking; assistance to cancer registry systems in developing countries; the investigation of intragastric nitrosation and stomach cancer; studies on laryngeal cancer; studies on workplace exposures; field studies of oesophageal and liver cancer; and investigation of precancerous lesions in stomach cancer.

The Scientific Council also considered several new projects and programme increases that may be implemented should funds become available.

Fig. 1a. New members of the Scientific Council, 1986–1989



Professor L. L. Griciute



Professor R. Monier

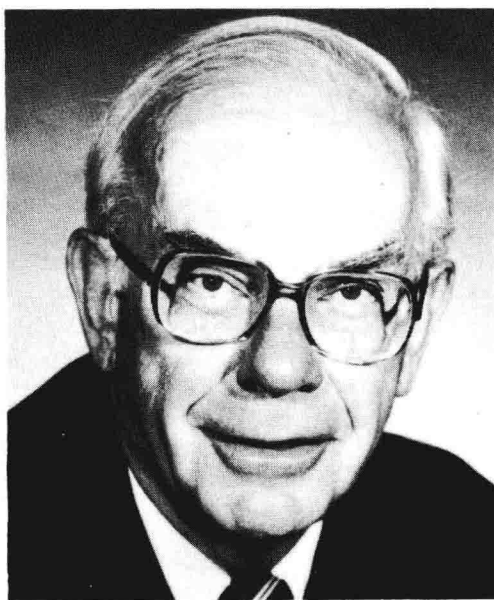


Professor R. Simard

Fig. 1b. New members of the Scientific Council, 1987–1990



Professor F. De Waard



Professor S. Graham

Below, some of the achievements of the past two years are described briefly:

Descriptive epidemiology

The fifth volume of *Cancer Incidence in Five Continents*, covering data from 112 registries all over the world, will be published this year. This volume will contain no data from Africa, since no African registry was able to send in information. This unfortunate event provides convincing evidence of the urgent necessity to extend support to registration facilities in developing countries to prevent their collapse and to improve the quality of the information they provide. At present, the Agency is assisting ten national cancer registries in Africa, South America, Asia and Oceania. The first volume of *Cancer Occurrence in Developing Countries*, containing information from 75 centres in four continents, was published in 1986, and a second edition of this work is envisaged within the next two to three years.

Of particular relevance is an investigation of the international incidence of childhood cancer, a collaborative effort comprising data obtained from 72 registries. A monograph will be published in 1988; the available data indicate that the incidence of several types of childhood cancer varies between different regions of the world more widely than had hitherto been assumed.

The most recent Agency assessment of the global cancer burden indicates that 6.35 million new cancer cases occurred in 1980. Stomach cancer was still the most frequent cancer in 1980, but, since its rates are declining in most countries and the rates for lung cancer are rising persistently, the latter may now be the most frequent type in the world. This survey provides useful indications of priorities for cancer prevention and control in both developed and

developing regions of the world. For instance, the most frequent cancer in developing countries is cervical cancer, which ranks only tenth in the developed countries; colon and rectum is the second most frequent site of cancer in developed countries, but ranks only eighth in other parts of the world.

Occupational and environmental hazards

The large international collaborative study on possible long-term hazards of man-made mineral fibres in production workers, carried out by the IARC with the support of the Joint European Medical Research Board, has been successfully completed. The results were presented at a symposium organized by the World Health Organization Regional Office for Europe in Copenhagen, and have been published. Elucidation of the mechanisms by which fibres of different physical and chemical characteristics exert their carcinogenic effects could permit better assessment of risks, even at low levels of exposure.

Studies are in progress of the possible cancer hazards of exposure to welding fumes, to vinyl chloride, to styrene and to silica. The register of individuals exposed to dioxin-contaminated substances has been completed and is now ready for use in follow-up studies.

Occupational risks of a very particular nature are those to which biological laboratory workers may be exposed. Following the recent occurrence of six cases of cancer in a scientific institute, the Agency was invited to participate in setting up an international study to assess possible excesses in cancer mortality and incidence in laboratory workers. The first step will be to identify any such excesses in research institutes in different countries. A large epidemiological study may be organized, following a feasibility study.

Although it is now generally accepted that passive inhalation of tobacco smoke constitutes a health hazard, as indicated by several epidemiological investigations, an accurate assessment of the risk depends on reliable measurement of exposure levels. The Agency therefore initiated a large, collaborative, methodological study, which is now nearing completion, in 13 centres in ten countries; analysis of the data is currently under way. The methodology developed in this investigation will be used in an international study of lung cancer in nonsmokers.

The first phase of the international collaborative study of second malignancies following cytostatic therapy has been completed. Clear excesses were seen for leukaemia following treatment for Hodgkin's disease and for ovarian cancer, and for non-Hodgkin's lymphoma and lung cancer following treatment for Hodgkin's disease. The collaborative group is now completing data collection for a series of case-control studies of second cancers at a number of sites; statistical analysis will be undertaken to compare the carcinogenic potency of different drugs and other effects. The problem of chemotherapy-induced malignancies was addressed at a symposium held in November 1985, the proceedings of which were published as *IARC Scientific Publications No. 78*.

Within a project aimed at assessing the role of DNA-damaging agents in the etiology of human cancers, the major emphasis is on the possible role of *N*-nitroso compounds. A project of particular interest is the development of methods for measuring DNA damage in chewers of betel quid with and without tobacco. Specific attention is paid to the compounds that are formed in the oral cavity following nitrosation of betel-nut constituents. An important contribution to understanding the role of endogenously-formed carcinogens has been the development of a method for measuring total *N*-nitroso compounds in body fluids and of immunological assays for detecting alkylated DNA base adducts excreted in urine.

The 9th International Meeting on *N*-Nitroso Compounds was held in September 1986 in Baden, Austria, under the patronage of the Austrian Ministry of Health and Environmental Protection, the proceedings of which will be published as *IARC Scientific Publications No. 84*.

IARC Monographs

Four volumes of *Monographs* were prepared during the period under review: on naturally-occurring synthetic food components, furocoumarins and ultraviolet radiation (Volume 40), on some halogenated compounds and pesticides (Volume 41), on silica and some silicate minerals (Volume 42), and on man-made mineral fibres and radon (in press, Volume 43). There was sufficient evidence for carcinogenicity in humans of erionite and talc containing asbestiform fibres, and of radon and its decay products. Two ad-hoc working groups reconsidered the criteria used for evaluating carcinogenicity within the IARC Monographs programme. In addition, in March 1987, an ad-hoc working group reconsidered and updated evaluations of carcinogenicity for all chemicals, groups of chemicals and complex exposures that had been considered in Volumes 1–42 of the *Monographs*. A previous group summarized and brought up to date the results of a broad spectrum of tests for genetic and related effects of selected chemicals included in Volumes 1–42, the outcome of which will appear as Supplement No. 6. The results of the March 1987 meeting will be published as Supplement No. 7.

Site-oriented studies

Studies carried out at the Agency several years ago demonstrated a positive correlation between exposure to aflatoxin and risk of hepatocellular carcinoma. An additional investigation in Swaziland, terminated recently, provides strong evidence for an association between aflatoxin consumption and liver cancer, even when infection with hepatitis B virus is taken into account. Investigations are under way in Thailand, Singapore and Spain to assess the role of the various risk factors for liver cancer—primarily hepatitis B viral infection and aflatoxins, but also parasites, smoking, alcohol, *N*-nitroso compounds and hormones.

The large intervention trial to study the role of hepatitis B virus infection in liver cancer is in progress in the Gambia with the financial support of the Italian Government and the collaboration of the UK Medical Research Council Unit in Fajara. This initiative will also contribute to maintaining and strengthening the expanded programme of immunization against the major childhood diseases in that country. Vaccination was begun in July 1986, and, since no adverse reaction to the vaccines used has been observed to date, the campaign is continuing as planned.

The large, collaborative case-control study in Colombia and Spain on cervical cancer is aimed at establishing to what extent male and female sexual behaviour contributes to the ten-fold differential risk between the two countries, and at verifying the role that human papilloma virus plays in the development of this tumour. Following a successful feasibility study, a full-scale investigation was started in nine provinces in Spain and in Cali, Colombia. Tissue and cell samples will be analysed systematically to determine the presence of human papilloma virus-DNA.

A case-control approach has been proposed to the study of the relationship between hormonal profile and breast cancer incidence in women. The study, which will be carried out among population groups in China and in Chinese and Caucasians in New York City, is based mainly on the 'free oestrogen' hypothesis.

The international study on cancer of the larynx and hypopharynx has been completed. A precise estimate was obtained of the risk of alcohol drinking for cancers at various subsites, and the study permits better understanding of the combined effects of alcohol and tobacco.

The investigation of cancers of the pancreas, bile duct and gall bladder is the most advanced of the several studies within the multi-centre case-control network (SEARCH). Active data collection—the most extensive ever made for pancreatic tumours—ended recently and analysis