



Waro Nakahara
1896-1976

OBITUARY

Dr. Waro Nakahara

Dr. Waro Nakahara, President of the National Cancer Center, Tokyo, died of a heart attack in the early morning of January 21, 1976.

A man unique in many aspects, he was an eminent leader of the Japanese Cancer Association for the past few decades. In the 1920's he introduced biochemistry to cancer research in Japan. He was free from the Japanese tradition that cancer research was almost exclusively the realm of pathologists with medical degrees. He conducted laboratory experiments continuously during his long research life of more than 50 years. He enjoyed being in his laboratory and in his office and was readily available at any time to his colleagues who wanted to discuss scientific matters.

Although he did not travel extensively, he had an international perspective, which led him to encourage and actively promote international cooperation in cancer research. The results of these efforts included the contribution of Japan to the activities of the International Union against Cancer and the establishment of a United States-Japan Cancer Cooperative Program. He also was a leader in the participation of the Japanese Government in the International Agency for Research on Cancer, Lyon, France, in 1971.

Waro Nakahara was born in Tottori Prefecture, Japan, in 1896. After graduation from a high school in Tokyo, he entered Cornell University, Ithaca, New York. His major at Cornell was in biology and he obtained his Ph.D. in 1918. He started his research career at the Rockefeller Institute, under Dr. J. B. Murphy, in tumor immunology. Research life during his younger days at this active Institute in the United States played an important role in molding his personality, essential aspects of which can be expressed as love of freedom, faithfulness, and self-command.

In 1925, he returned to Japan and was given a joint appointment at the Institute for Infectious Diseases of the Tokyo Imperial University and at the Institute of Physics and Chemistry, both of which were the most active research centers in Japan at that time. He was appointed Chief of the Pathology Division, Cancer Institute, Japanese Foundation for Cancer Research, in 1934. Among his many studies on cancer biochemistry were some pioneering experiments on cytochromes and on glutathione in chemically induced and in Rous sarcoma virus-induced tumors. In the 1940's, he found that the feeding of liver powder to rats depressed hepatocarcinogenesis caused by azo dyes. This was an important discovery, showing that the carcinogenic process is influenced tremendously by nutritional conditions.

In 1947 Dr. Nakahara was appointed Director of the Cancer Institute, Japanese Foundation for Cancer Research. During and after World War II, under very restricted conditions for research, he studied a factor in tumor tissue, the injection of which into mice resulted in a decrease of liver catalase. He designated this principle as toxohormone. The injection of crude toxohormone fractions additionally pro-

duced thymus involution in mice. Later, many related fractions from tumor tissues were isolated; when injected, they were shown to depress serum iron levels and to produce an immunosuppressive state in animals. Dr. Nakahara's review entitled "The Newer Concept of Cancer Toxin," appeared in 1958 (*Advances in Cancer Research*, 5: 157-177, 1958). In the 1950's, he worked on chemical carcinogenesis and discovered a potent carcinogen, 4-nitroquinoline 1-oxide (4NQO). Studies of many 4NQO derivatives revealed that the presence of both the 4-nitro and the 1-oxide groups is essential for carcinogenicity. During this period, Dr. Nakahara proved that 4NQO and aromatic hydrocarbons had a cumulative effect on the skin of mice. He described his views on carcinogenesis in a review entitled "Critique of Carcinogenic Mechanism" (*Progress in Experimental Tumor Research*, 2: 158-202, 1961). There are many advantages in using 4NQO in studies on the molecular mechanism of carcinogenesis. The enzyme system for the activation of 4NQO is present in microbial as well as in mammalian cells, and 4NQO produces mutations efficiently in many microbial systems. With the availability of this carcinogen for the past 20 years, there has been long-standing and close collaboration between microbial geneticists and chemical carcinogen researchers in Japan.

In 1962 when the National Cancer Center was established as a governmental organization for the conquest of cancer, Dr. Nakahara was appointed Director of the Research Institute at the age of 65. He bravely appointed young but not well-known and well-established scientists as Division Chiefs. A very invigorating scientific atmosphere, in which constructive criticisms were freely allowed, was developed in the Institute. Dr. Nakahara himself worked on cancer chemotherapy for the past decade. His emphasis was on the use of autochthonous tumors, spontaneous and chemically induced, instead of transplantable tumors. Experiments on an autochthonous system are quite tedious, but he persevered because human cancer is autochthonous and he felt someone should work in this difficult field. His experiments continued until the end of 1975. He last recorded, on December 27, in his laboratory notebook his precise description of the tumors of his animals. He suffered his first heart attack on January 3, 1976, and was admitted to the National Cancer Center Hospital. During his hospitalization he was recovering steadily, was very lucid, and talked of his own experiments and of the future of the National Cancer Center. His sudden death was unexpected.

Dr. Nakahara recollected his whole research life in "A Pilgrim's Progress in Cancer Research, 1918 to 1974: Autobiographical Essay" (*CANCER RESEARCH*, 34: 1767-1774, 1974). His knowledge of fundamental and clinical oncology was quite broad because he had experience in many types of cancer research and thus was an ideal leader for this field. He encouraged scientists who were not directly in-

volved in cancer research but who could contribute much to modern molecular biology. Some of them eventually became cancer researchers.

He was very strict with himself, but quite warm towards people surrounding him. He was a liberal and did not differentiate among people according to their social positions. He donated his collection of butterflies from all over the world to the National Museum of Sciences. He was also a specialist in the classification of *Hemerobiidae*, a family of tiny insects with four transparent wings. He had a strong interest in history, philosophy, and poetry. On his desk at home, repeatedly read books, including *Faust* by Goethe and *Chinese Poems* by Li Po, were found after his death. He composed Japanese Waka, short poems consisting of 31 Japanese phonetic letters. His poems reflected the mind of a scientist and were unique hybrids between science and literature.

He was a member of the Japan Academy, the New York

Takashi Sugimura, *Director*
National Cancer Center Research Institute
Chuo-ku, Tokyo, Japan

Academy of Science, and an honorary member of the American Association for Cancer Research. He received many prizes, including that of the Japan Academy. He was President of the Japanese Cancer Association from 1949 to 1952. As the Editor-in-Chief from 1948 to 1963, he contributed much to the publication of *Gann*, the official journal of the Japanese Cancer Association.

He was advisor to the Princess Takamatsu Cancer Research Fund, and during the past 6 years he organized 6 International Symposia sponsored by the fund, which serves as a medium for international understanding in various fields of cancer research.

His funeral service was held at the Aoyama Funeral Hall in Tokyo on February 4, under the auspices of the National Cancer Center. More than 600 people placed white carnations before his portrait. His ashes were interred on April 4 in the Tama Cemetery, located in the western suburbs of Tokyo. His wife, Berenice Dorothy Nakahara, his relatives, his colleagues, and his friends watched the interment under cherry blossoms in full bloom. The image of Dr. Waro Nakahara as a samurai fighting against cancer was imprinted in their minds.