Perspective

Obituary: Madhu Sudan Kanungo, PhD (1927–2011)

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Professor Madhu Sudan Kanungo, the preeminent gerontologist of India, passed away on July 26, 2011, at his home at the Banaras Hindu University, Varanasi. At the time of his death, he held the Chair of University Emeritus Professor for Life.

Professor Kanungo was born in Orissa, India, on April 1, 1927. After an MSc degree from Lucknow University, India, he obtained a PhD in Physiology from the University of Illinois–Urbana, in 1959 with Professor C. Ladd Prosser, the doyen of comparative physiology and the 42nd President of the American Physiological Society. On his return, Dr. Kanungo joined the Utkal University, Orissa, and later the Banaras Hindu University. He served the Banaras Hindu University for more than 40 years as full professor, and at different times as the Head of the Department of Zoology and the Dean of the Faculty of Sciences. He established his “Biochemistry Laboratory” in the Department of Zoology.

The Biochemistry Laboratory

The Biochemistry Laboratory was the center of his research work and of the numerous Masters and PhD students that he supervised. Thirty-two students obtained their PhD degree with him. The laboratory was a state of the art facility with an associated cold room, a dark room, and an animal facility. Professor Kanungo ensured continuous funding for his laboratory from national and international sources.

As in any U.S. laboratory, the students in PhD program with Dr. Kanungo explored new topics in aging research, developed methodologies, washed their own glassware, prepared reagents, and many a time designed equipment for use in their experiments. Dr. Kanungo was a dedicated teacher in animal physiology, biochemistry and molecular biology, and later neurobiology. In the pre-Internet days, Professor Kanungo would instruct students on the basics of library usage. Dr. Kanungo would track his own current journal readings on a “ready-reference card” to stay abreast of literature by year, month, volume, and issue of publication. He would request reprints and have them cataloged for ready reference in the laboratory. The laboratory had a rich collection of research journals and relevant textbooks. At Banaras Hindu University, he founded and was the coordinator of the “Brain Research Center.”

Aging Research

Dr. Kanungo introduced gerontology to India in the late 1960s. He once recounted that the spark of gerontology was lit in him after watching the continued influx of old people into the holy city of Varanasi to await their “the end of life.” With his interest in homeostasis, he pursued basic research in aging that could now be divided into three phases. The first phase (1962–1977) mostly on biochemical alterations in the enzymatic pathways and metabolism; the second phase (1977–1988) focused on DNA biosynthesis and transcription and posttranslational modifications; and the third phase (1988–2011) predominated in epigenetic phenomena of DNA methylation, specific messenger RNAs and proteins, and transcription factors.

In 1975, he proposed the “Gene Regulation Theory of Aging” (1) that argued that cellular differentiation, development, and aging were a result of the sequential activation and suppression of a network of genes in our cells. As a consequence, the cumulative allostatic load leads to homeostasis and promotes aging. Professor Kanungo did spend some of his later research effort in identifying interventional factors for restoring homeostasis and youthful vigor in the aging systems.
Dr. Kanungo and colleagues published more than 139 research articles on biology of aging, and he himself authored 2 books: “Biochemistry of Ageing” (Academic Press, UK, 1980; translated into Russian) and “Genes and Aging” (Cambridge University Press, UK, 1994).

**Awards and Recognitions**
Dr. Kanungo has been recognized with innumerable awards and fellowships. In 2005, the Government of India bestowed upon him the high civilian honor of Padma Shri. He was most proud of the Shanti Swarup Bhatnagar Prize (1971) from the Council of Scientific and Industrial Research, Jawaharlal Nehru Fellowship (1987–1989), Indian National Science Academy Golden Jubilee Commemoration Medal (1992), and Sir Shriram Memorial Oration medal of National Academy of Medical Sciences, India (1998). He was an elected fellow of all three Indian National Academies of Sciences. He was member of the International Council of Gerontology (1984–1989), expert member of the Committee of World Health Organization on Health of Elderly Persons (1989), and on the editorial board of several international journals on aging.

**Building the Scientific Infrastructure in India**
Dr. Kanungo served on several committees of the India University Grants Commission, Council of Scientific and Industrial Research, Department of Science and Technology, Department of Biotechnology, Indian National Science Academy, Indian Council of Medical Research, Union Public Service Commission, and Indian Council of Agricultural Research. He was the Founder Director (honorary) of the Institute of Life Sciences in Orissa.

He was the Founder, President, and Patron of Association of Gerontology, India. As an active member of the India Government National Council for Older Persons (1999–2011), he initiated the policy of National Initiative for Care of Elderly.

**The Man**
Professor Kanungo was an ambitious but compassionate and a disciplined man. He taught us the rigor of critical thinking, data analysis, fruitful discussions, and successful networking. Professor Kanungo enjoyed brisk walks on the campus and played the games of cricket and tennis. He is survived by his wife Sarat Kanungo, three sons, and four grand children. Sarat was a source of great strength and inspiration for him and for the Biochemistry Laboratory. All members of the Kanungo laboratory enjoyed her hospitality. At all times, he was “Dr. Kanungo” to his students and staff.

India has lost a preeminent gerontologist, a researcher in biochemistry and molecular biology, and an exemplary inspirational teacher. We miss him.

**Reference**