Birendra Bijoy Biswas (1928–2018)

Prof. B. B. Biswas, the founder Chairman of the Department of Biochemistry and former Director of Bose Institute, Kolkata, passed away on 9 June 2018 after a year-long illness.

Born on 1 March 1928 in a developed village named Baniyachang in Sylhet of undivided Bengal, Biswas studied at the local high school and was greatly influenced by dedicated teachers who tried to quench his thirst for knowledge. After passing the Matriculation examination, his physician father Benode Behari Biswas encouraged him to pursue medical education and Biswas took admission in the Medical College of Dacca. However, post-independence political disturbances forced him to leave Dacca. Biswas came to Calcutta for higher studies and joined the Presidency College for an Honours degree in botany, with chemistry and physiology as subsidiary subjects, an area of not much interest to him in comparison to mathematics – his first choice or medical sciences. This dramatic twist ('misfortune' as he once called it) made Biswas a 'complete biologist' or a 'botanist with a difference', rather than a mathematician or a physician. After his B Sc (1950), he passed the M Sc examination in botany (1952) from the University of Calcutta.

Although Biswas never liked botany as a subject of study as taught in those days, either in the college or University, he developed a keen interest in the science of heredity or the physiological processes in plants which encompass several physical or chemical processes. With deep interest in molecular basis of heredity, he joined R. N. Singh at Banaras Hindu University (BHU) after his M Sc, where he learnt the techniques of isolation and *in vitro* culture of blue-green algae for studying the hereditary nucleic acids. After a brief stint at BHU, in 1954 Biswas joined Bose Institute as a researcher in the newly launched Atomic Energy Commission project dealing with the use of radioisotopes as tracers in biological research, supervised by D. M. Bose, the then Director of Bose Institute. Under great inspirational guidance and encouragement of Bose, Biswas' pioneering work on nucleic acids in blue-green algae took good shape, where he analysed the base composition of DNA from *Nostoc muscorum* and *Anacystis nidulans*. His interest in studying the nucleic acid biochemistry guided him for postdoctoral research abroad. In USA, he worked in the laboratories of Jack Myers (Texas) and Richard Abrams (Pittsburgh) where he discovered RNA polymerase from animal sources along with other groups and later worked on plant ribosomes.

On his return from USA in 1961, Biswas joined the Department of Chemistry, Bose Institute as a Research Fellow (equivalent to the position of a lecturer) and then as Reader-in-Charge of the Plant Biochemistry Laboratory (earlier the Radiochemical Laboratory of the Department of Chemistry) in the Department of Botany and was later promoted as Professor of Botany. In 1974, the Plant Biochemistry Laboratory along with two other units of the Institute formed the new Department of Biochemistry and Biswas took the responsibility of its first Chairmanship. In its initial phase, he reorganized the research programme substantially and recruited a number of new faculty members in various fields to suit the programme thus designed. Subsequently, he became Director of Bose Institute in April 1985, and served in that capacity up to February 1990. As the Director, he initiated a number of new programmes and facilities such as DBT-Post Doctoral Training, Bioinformatics Centre (DIC to start with) and several other research programmes in the Institute. Following his retirement from the Bose Institute, he joined the Department of Biophysics and Molecular Biology at the University of Calcutta as an Emeritus Scientist and continued his research and teaching.

During his long stay at Bose Institute, two major areas of research were developed in Biswas's laboratory. One area covered his interest in nucleic acids, initiated during his Ph D work and while working with Richard Abrams in USA with the discovery of RNA polymerse as well as methylation of RNA. He was one of the proponents that the chloroplast has its own DNA, an RNA-synthesizing system, characteristic ribosomes different from the cytoplasmic ribosomes and also established GGG codons for the amino acid glycine using poly-G chain synthesized by an isolated enzyme system from the chloroplast. Later three distinct RNA polymerases as well as their regulatory factors from non-histone proteins of chromatin were reported independently from his laboratory using plant nuclear system.

Another promising area of study that Biswas and his group carried out for several years was the metabolism of *myo*-inositol phosphates in plants. During studies of nucleic acid metabolism in germinating mung bean seeds, a highly radiolabelled phosphate compound was identified as insitol hexakis-phospahte, known to plant biologists for long as phytin or phytic acid. As a result of continued study for several decades, a novel metabolic cycle involving *myo*-inositol phosphates and glucose-6-phosphate in plants elucidating the probable pathway of synthesis and degradation of inositol phosphates was established. During these studies, several new enzymes, viz. phosphoinositol kinase, inositol hexaphosphate–GDP phosphotransferase and *myo*-inositol 1-phosphate dehydrogenase were discovered and examined thoroughly. Corollary to this metabolic cycle an intermediary phytase product, i.e. Ins(2,4,5) P_3 had been implicated in Ca^{2+} mobilization in plant cells, elucidating a new concept in Ca^{2+} homeostasis and signal transduction pathway in plant cells. Apart from these two major areas, his group was also involved in studies showing that IAA (indoleacetic acid), a plant growth substance, acts as a modulator of transcription through a receptor protein. Further, using colchicine to isolate tubulin RNA, β-tubulin cDNA from plant was cloned and sequenced.

With a keen interest in interdisciplinary research, Biswas combined in his work an intuitive and analytical approach. Recognitions followed and in 1972, he was awarded the Shanti Swarup Bhatnagar Prize for Biological Sciences. Other recognitions included Sreenivasaya Memorial Award, SBC(I) (1974), and election to the Fellowships of the Indian Academy of Sciences (1977) and Indian National Science Academy (1978). He was later awarded the D Sc (*h.c.*) from Burdwan University.

Biswas' contributions in biological sciences in general and particularly in the discipline of plant molecular biology helped him establish a school of Plant Biochemistry and Molecular Biology at Bose Institute. Apart from his scientific research and guidance, Biswas was actively involved in a number of scientific organizations. Notable among them was the Indian Photobiology Society and Indian Science News Association, wherein he served as the President for several years.

An outspoken personality in matters related to academic affairs, Biswas preferred keeping 'himself within himself' about his personal emotions. An ardent reader of contemporary scientific literature and 'science classics', he was a source of inspiration and encouragement to all those who interacted with him. His colleagues and former Ph D students, who are well placed in the academia in India or abroad, respectfully remember him for his keen interest in their scientific endeavours. His ideals would remain the same to all of us and the fraternity for years to come.

Biswas is survived by his wife, daughter and son and their families.

ARUN LAHIRI MAJUMDER

Division of Plant Biology,
Bose Institute,
Kolkata 700 054, India
e-mail: lahiri@jcbose.ac.in