

## PROFESSOR BIRENDRA BIJOY BISWAS

(1928-2018)



In all spheres of the human society, some people are born with the inherent quality of leading people from the very beginning of their life, the academia being no exception. Prof. B. B. Biswas was one such person in the scientific society who led his peers throughout and inspired them for achieving the desired goal in their own field of work. He had a long-time association with the Bose Institute in various academic capacities in the Departments of Chemistry and Botany prior to his establishing the Department of Biochemistry as its founder Chairman. A former Director of the Bose Institute, Prof. B. B. Biswas passed away on June 09, 2018 after a year long illness.

Born on March 01, 1928 in a developed village named Baniyachang in Sylhet of undivided Bengal, Prof. Biswas had his school education from the local high school and was taught by extremely dedicated teachers who inspired young Biswas in his quest for knowledge. He passed the Matriculation examination from the same school. Although he was keenly interested to study Mathematics, his father Dr. Binode Behari Biswas being a physician, encouraged his son to pursue higher education in Medical Sciences and Biswas took admission in the Medical College of Dacca. However, the post independence disturbances in 1947 forced Biswas to leave Dacca for higher studies in Calcutta. In Calcutta, Biswas joined the Presidency College with Honours in Botany (and not Mathematics – his first choice) with Chemistry and Physiology as subsidiary subjects. This dramatic twist ( “misfortune” as he once called it) made Biswas a “Botanist with a difference” and a “Complete Biologist” rather than either a physician or a

mathematician. After his B. Sc. (1950), he passed the M. Sc. examination in Botany (1952) from the Calcutta University.

He never liked Botany as a subject of study either in the college or university days, although he took great interest in the science of heredity or physiological processes in plants. With deep interest in chemical and molecular basis of heredity, he joined Prof. R. N. Singh at the Banaras Hindu University after his M. Sc. where he learnt the techniques of isolation and *in vitro* culture of blue green algae. After a brief spell at the Banaras Hindu University, in 1954 he came to Bose Institute to join Prof. D.M. Bose, the then Director of Bose Institute, as a researcher in a newly launched Atomic Energy Commission project dealing with use of radio-isotopes as tracers in biological research. His pioneering work on nucleic acids in blue green algae was the result of such investigations, Prof. D.M. Bose being a great inspiration in such work. His interest in studying the nucleic acid biochemistry guided him for post-doctoral research abroad after his Ph. D. in USA he worked in the laboratories of Prof. Jack Myers (Texas) and Prof. Richard Abrams (Pittsburgh) where he discovered the RNA polymerase from animal sources alongwith other groups and later on a second spell worked on plant ribosomes.

Dr. B. B. Biswas joined the Department of Chemistry, Bose Institute in 1961 as a Research Fellow (as was called those days, equivalent to the position of Lecturer) and then as Reader-in-Charge of the Plant Biochemistry Laboratory (the previous Radiochemical Laboratory of the Department

of Chemistry ) in the Department of Botany and then served as the Professor of Botany. In 1974, the Plant Biochemistry Laboratory along with two other units of the Institute formed the new Department of Biochemistry and Prof. Biswas took the responsibility of its first Chairmanship. In its initial phase, Prof. Biswas reorganized the research programme substantially and recruited a number of new Faculty members in various fields to suit the programme thus designed. Subsequently, he assumed the office of the Director, Bose Institute in April, 1985 and served in that capacity upto February, 1990. As the Director, he was instrumental in initiating 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 of the Calcutta University as an Emeritus Scientist and continued his research and teaching.

In his first phase of research career, Prof. Biswas contributed on studies of nucleic acids of blue green algae and analyzed the base composition of DNA from *Nostoc muscorum* and *Anacystis nidulans*. He is one of those scientists who discovered RNA polymerase as well as methylation of RNA while working with Prof. Richard Abrams in USA. He is one of the proponents that chloroplast has its own DNA, an RNA synthesizing system, ribosomes different from the cytoplasmic ribosomes and also established GGG codons for an 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. A plant growth substance, IAA (Indoleacetic acid) was shown to act as modulator of transcription through a receptor protein. By using colchicine to isolate tubulin RNA from the plant, B-tubulin cDNA was cloned and sequenced. Another promising area of investigation Prof. Biswas and his group carried out for several years is 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 inositol hexakis-phosphate, known to plant biologist 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 investigations, several new enzymes viz, phosphoinositol kinase, Inositol hexaphosphate –GDP phosphotransferase and *myo*-inositol 1-phosphate dehydrogenase, were discovered and studied thoroughly. Corollary to this metabolic cycle an intermediary phytase product i.e.  $\text{Ins}(2,4,5)\text{P}_3$  had been implicated in  $\text{Ca}^{2+}$  mobilization in plant cells elucidating a new concept in  $\text{Ca}^{2+}$  homeostasis and signal transduction pathway in plant cells. With a distinctly original outlook towards research in plant biology, Prof. Biswas combined in his work an intuitive and analytical approach.

Prof. Biswas's 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 the Bose Institute. With a keen interest in interdisciplinary research he combined in his work an intuitive and analytical approach which earned him recognitions and laurels from the National and International scientific community. Some of the National recognitions received by him are *Shanti Swarup Bhatnagar Prize* (1972), *Sreenivasaya Memorial Award*, SBCI (1974), and elected Fellowships from the Indian Academy of Sciences (1977) and the Indian National Science Academy (1978).

Apart from his scientific research and guidance, Prof. Biswas was actively involved in a number of Scientific Organizations. Notable among them was the Indian Photobiology Society and the Indian Science News Association (ISNA) in both he served as the President for quite a number of years.

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

[ A part of this write up was based on personal interviews with Prof. Biswas in 1995 and with Dr. Bipin Bihari Biswas, his younger brother more recently, both undertaken by the author ] □

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