

T. Ramakrishnan (1922–2008)

Tekkepat Ramakrishnan (formerly, Indian Institute of Science (IISc), Bangalore) passed away on 15 February 2008 at Bangalore. He was suffering from Parkinson's disease for the past few years and the syndrome had reached an advanced state prior to his demise. The cause of his death was pneumonia and the end was peaceful. In the sad demise of Ramakrishnan, the country has lost an excellent scientist with great vision.

Ramakrishnan was the son of late K. Karunakaran Nair, who was a professor of Zoology and had retired as the principal of the prestigious Maharaja's College at Ernakulam. Brought up by his strict disciplinarian father (he had lost his mother at a very young age), Ramakrishnan was an extremely studious and disciplined individual. He completed his undergraduate degree in chemistry from Maharaja's College (then affiliated to Madras University), securing distinction in all three parts (English, Sanskrit and the subjects). Ramakrishnan obtained M Sc degree from Madras University by research carried out at the Department of Biochemistry, IISc. Later, he received the Commonwealth Fellowship to pursue his doctoral research at the University of British Columbia, Vancouver, Canada.

Ramakrishnan returned to India after obtaining Ph D degree and joined as a lecturer in the erstwhile Pharmacology Laboratory (presently the Microbiology and Cell Biology Department) at IISc in 1957, following a one-year stint as a post-doctoral fellow of INSA. TR, as Ramakrishnan was affectionately referred to by his associates and colleagues, started pioneering work on *Mycobacterium tuberculosis*, the causative organism for tuberculosis (TB). By far, his largest scientific contributions have been on the metabolism and molecular biology of *M. tuberculosis*, for which TR has been internationally recognized. In the initial years, his research group was exploring the major metabolic differences between the virulent and avirulent strains of *M. tuberculosis*. His major contention was that the failure of avirulent strains to cause infection in the host should correlate with the metabolic differences between them. The operations of all the metabolic pathways involved in the breakdown of carbohydrates were docu-

mented in mycobacteria by his team and several of the enzymes in these pathways have been purified and characterized. The enzyme isocitrate lyase, which provides a link between the carbohydrate and lipid metabolism, from mycobacteria was first reported by his group, and currently this enzyme has found an important place as a potential drug target. TR's research group worked on other metabolic pathways, including purine and pyrimidine biosynthesis, amino-acid biosynthesis and catabolism, and nucleic acid and protein synthesis in mycobacteria. All these analyses were from the point of view of understanding the mechanisms of action of known antitubercular drugs as well as for identifying potential targets for drug action and the development of drug resistance by the bacterium.



A particularly notable contribution from TR's group was the isolation of a transducing mycobacteriophage, the first ever reported transducing phage for mycobacteria. This discovery had opened up the possibilities of carrying out genetic analysis of mycobacteria, which was till then considered to be nonamenable to genetic studies. This phage has been subsequently exploited by his other associates in a major way to understand the unique susceptibility of mycobacteria to the potent drug, isoniazid.

TR was a great academician and a visionary, and was way ahead of his times. He was the first scientist to initiate molecular biology research at IISc, notwithstanding

the opposition posed by conventionalists. He also introduced a formal teaching and training programme in microbial genetics and molecular biology at IISc. Towards this goal, he organized two international laboratory workshops in the emerging areas of molecular genetics with support from UNESCO and invited some of the most leading international scientists in that area to conduct the workshop.

TR was courageous to start research activities on the tubercle bacillus at a time when it was not considered to be a fashionable area and the containment facilities for working with pathogenic organisms at best were primitive. He had realized the importance of TB as a public health problem in this country. In fact, when the Centre for Genetic Engineering was established at IISc in the 1980s, it was unanimously agreed that a thrust area of research at this centre would be on mycobacteria, making use of the more powerful experimental tools that became available through the advances in recombinant DNA research.

TR also initiated for the first time at IISc, an animal tissue culture laboratory for carrying out research on animal viruses. He managed to get Warren Levinson from the University of California, USA, to spend his sabbatical year at the Microbiology Department in order to set up the virology laboratory. The initial studies were on Rinderpest virus, an important pathogen of veterinary significance in India and Rous sarcoma virus, as an experimental model system. TR also brought the Rotavirus system to the department after a brief sabbatical stint in Australia. This activity served as the core for nucleating the molecular virology programme, a thrust area of research in the Department of Microbiology and Cell Biology at present.

Around the same time as he initiated work on molecular virology and animal cell culture, TR also set up a plant tissue culture facility in association with C. S. Vaidyanathan. This activity also became a major area of research in the department in subsequent years.

TR was a strict disciplinarian, which he enforced on his students and associates, and pursued his own activities in a disciplined manner. He was highly academic and studied scientific literature

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with passion. He had guided more than 20 students for their Ph D degree, before he officially retired from the department in 1982. With his foresight, TR was undoubtedly instrumental in developing the Department of Microbiology and Cell Biology to its current status. He had received international grants from the Nuffield Foundation, Watmull Foundation and Rockefeller Foundation with which he equipped the department and selflessly extended the facilities to all other colleagues. TR pursued his scientific interests even after his official retirement by

continuing his association with the Department of Microbiology and Cell Biology and the Indian Academy of Sciences, Bangalore. He has published nearly 100 research papers during his career. He has been a fellow of Indian Academy of Sciences and Indian National Science Academy, New Delhi.

Ramakrishnan's wife Devi passed away in November 2007 due to cancer and her demise was a severe blow to him, since she was a great strength and support. He is survived by two sons and a daughter. In Ramakrishnan's demise

we have lost a good friend and an excellent scientist. TR will be remembered for a long time for his scientific contributions, especially for his pioneering work on mycobacteria.

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Jacob Chandy (1910–2007)

Jacob Chandy, well known in the field of neuroscience, died on 23 June 2007. His contributions to the field, particularly the efforts to promote training and teaching of neuroscience, shall remain fresh in our memories.

Jacob Chandy, son of a clergyman, was born on 23 January 1910. After graduating from the Madras Medical College, he practised at American Mission Hospital in Bahrain. During the Second World War, he decided to further his education in USA. He had his training in neurosurgery at Montreal Neurological Institute under Wilder Penfield.

Jacob Chandy returned to India in the latter part of 1949 and started the Department of Neurological Sciences at C.M.C. Hospital, Vellore. This was the first department of neurological sciences in India. The department attracted a lot of talent and soon bloomed into a premier centre of training and teaching in neurosciences, where postgraduate training in neurology, neurosurgery and allied sciences started in the 1960s. Students and postgraduates in neurosurgery and neurology from the department later

started many centres in India and held important positions abroad.

In 1951, Jacob Chandy became the founder-president of the Neurological Society of India and was helped by B. Ramamoorthy, Baldev Singh and S. T. Narasimham. The seeds sown by these



stalwarts have now given roots to subspecialty societies for neuro trauma, paediatric neurosurgery, cerebro-vascular surgery, and stereo toxic and functional neurosurgery.

The academic pursuits of Jacob Chandy attracted worldwide attention. He was honoured by the American Col-

lege of Surgeons, WHO and World Council of Churches. He was a Fellow of the Indian Academy of Sciences, Bangalore. In 1989, the World Federation of Neurosurgical Societies felicitated him by bestowing the 'Medal of Honour'. The Government of India honoured him with the Padma Bhushan.

Jacob Chandy worked tirelessly to make the Department of Neurosciences at C.M.C. Hospital, Vellore a place of repute.

After his retirement he became an emeritus Professor of Neurosurgery at the Kerala Medical College. He pursued teaching until his 68th year, when he was diagnosed with prostate cancer. He continued his efforts in the service of the sick. The end came rather suddenly when he was 97 years old. Jacob Chandy's wife also died six months later.

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