

Veronica Rodrigues (1953–2010)

Veronica Rodrigues, Senior Professor at the Tata Institute of Fundamental Research at its Department of Biological Sciences, Mumbai and its National Centre for Biological Sciences, Bangalore died on 10 November 2010.

Veronica was a leading developmental neurobiologist who, in a career of 34 years in research, made major contributions and influenced the scientific directions of many. Her research started with the study of chemosensory behaviour in the fruitfly *Drosophila*. Her group pioneered contributions to the understanding of cells that constitute the chemosensory detection and coding system of the fly is put in place and functions in the mature animal. Her recent work contributed to examining the ways in which activity of nerve cells sculpt their form, function and survival. Her collaborators have gone on to establish and occupy positions in research and teaching all over the world. The culture of excellence that they strive to establish is a testimony to her training and influence. Through her research accomplishments, collegiality and mentorship, Veronica leaves a legacy and a void.

In the 1970s a band of accomplished phage and bacterial geneticists, in the hubris of their successes in unravelling the secrets of the strands of life, turned to understanding how the brain works. Seymour Benzer led one such tendency and was arguably the founder of neurogenetics, the study of how genes put in place animal behaviour. Each of Benzer's stellar collaborators took a behavioural trait and began its genetic analysis in the animal that has become the test-tube for studying animal development and behaviour: The fruitfly *Drosophila melanogaster*. Obaid Siddiqi, the founder and head of the Molecular Biology Unit at the Tata Institute of Fundamental Research (TIFR) worked with Benzer at Caltech and returned from his sabbatical to work on two projects, the genetics of nerve conduction and that of chemosensation.

Obaid rapidly established facilities for fly genetics and electrophysiology at TIFR and began exploring the new frontier of research in neurobiology. His new directions attracted a few brave collaborators and many puzzled watchers from the side. Veronica had completed her

BA in Microbiology at the Trinity College Dublin and applied to work at TIFR on bacterial conjugation. On arriving in Bombay in 1976, Veronica discovered that Obaid's research priorities had shifted. Sniffing out various possibilities for research, her instinct and Obaid's sophisticated nudge led her into the 'smell and taste' project.



Veronica was a 'natural' in this uncharted terrain. Obaid and she made a dream team. The best of intellectual debates in the world of neurogenetics and *Drosophila* permeated the laboratory through Obaid's influence and, later, through P. Babu's. Satpal Singh, followed by K. S. Krishnan and Tadmiri Venkatesh, led in fermenting the pot of this debate. Veronica quietly, and fully imbibed this heady brew and participated in its making. Drunk with the satisfaction of debate, many students and faculty, naturally, could not distinguish discussion with doing. Veronica, ever one to hold her intellectual drink, always linked thought and action to make excellent science. This ability to get things done, no matter what else was going on, was a quality which would be her imprimatur all her life.

Success and recognition came early, but there were major conceptual and experimental barriers which were overcome. The first was the standardization of olfactory and gustatory behavioural tests in the fly. The idea behind the tests was usually deceptively simple, indeed that was their strength: Given a choice of odour or contact chemical stimulus, how does the fly behave? Veronica and Obaid endlessly discussed and devised tests and went down to the workshop or glass-blowing section with their designs (the figure shows the Y-maze, with flies choosing the arm with an attractive odour). The next challenge was to use the fly's choice to screen for mutants

defective in response to smell and taste cues. This required large-scale isolation of mutants and their amplification to generate hundreds of strains, each with all the animals carrying one genetic defect. The final challenge was the genetic mapping of the mutations onto the chromosomes of the fly. The isolation and characterization of olfactory mutants in *Drosophila* was completed in only a little over a year of Veronica's joining as a student and the consequent paper is a classic.

In 1979, Siddiqi and Babu organized an international meeting in Bombay that brought rising stars and future leaders of *Drosophila* developmental biology to TIFR. Veronica, the only student to speak, was a hit. Trained by Obaid, Veronica had a style all her own. Her restrained elegance, the sophisticated unwrapping of meticulous data and the refusal to unduly speculate was an early example from her of scientific communication at its best. This ability to communicate only became better with time.

Veronica left Bombay in 1982 to the Max-Planck Institute for Biologische Kybernetik in Tübingen, Germany. She was welcomed readily by her mentors Karl Götz and Erich Buchner. In the Mecca of quantitative fly behaviour, Veronica again trod new territory when she used uptake of a radioactively labelled glucose analogue to determine the areas of the fly brain which were active



upon odour stimulation of the antennal sense organs. This important work was prescient of later molecular approaches that allowed mapping of odour coding in the antennal lobe.

Returning to TIFR in 1984, Veronica and her fledgling lab began to examine the neural basis of chemosensation using behavioural assays. Veronica realized that relying solely on this approach would result in interesting, speculative, but not a cellular understanding. This was a time when the typhoon of molecular approaches was sweeping biology followed by another, that of genetic and cellular methods, which allowed the rapid isolation of mutants, mapping of genes, the isolation of their DNA and the cellular localization of their products. As always happens when hit by the onslaught of transforming techniques, religious wars erupt. Ex-revolutionaries, formerly champions of new approaches in their own time, dismiss 'mere techniques' as no substitute for thinking. Opposing the old, the iconoclasts scream evangelically about how solutions to long-standing problems will miraculously appear by adopting the new methods. Silent in the din, Veronica realized that a thoughtful

but more mechanistic approach to developmental neurobiology was now possible and took this direction without trumpeting it. On one front Veronica built a close scientific collaboration with Bill Chia at the Institute of Molecular and Cell Biology in Singapore. This made her an expert and productive molecular biologist in record time. On another front, in Bombay, she used newly emerging genetic and molecular approaches to chart out the development of the chemosensory organs of the fly. Her international reputation, as a developmental neurobiologist was soon secure. The next phase of her laboratory's research delved into the principles underlying the organization of the brain and its handling of olfactory information. Over the past decade, research from her group has also made substantive contributions to our understanding how regional specialization in the olfactory lobe of the brain takes place. Her range of approaches goes from anatomy, at cellular levels of resolution, all the way to behaviour in groups of animals. Her range of collaborators go from the novice who had never been in a laboratory to some of the leading maestros in the field.

Stitching together a lifetime of science, her final composition is seen when the composer is gone. Veronica's research assembles, note by note, page by page, into a simple but beautiful symphony in developmental neurobiology. Her scientific journey deserves far more than this brief and superficial account, but that can and will be documented in detail soon. However, the spirit of the principled, caring, fun-loving, elegant Goan from Nairobi, who imbibed the soul of TIFR in the days when it had it in plenty, amplified it and gave it back many times over, whenever it was in danger of losing it, is hard to capture. Except, perhaps, when the merry meet in the bars of Bombay, Bangalore, Singapore and Dublin and her friends across the world celebrate her rich life.

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A. B. Joshi (1916–2010)

Atmaram Bhairav Joshi, an eminent plant geneticist fondly addressed as ABJ, passed away on 3 July 2010. His contributions to the overall growth of Indian agriculture and to the science of genetics and plant breeding were recognized nationally and internationally. He was awarded the Padma Shri in 1976, Norman Borlaug Award in 1976 and B. D. Tilk Lecture Award of the Indian National Science Academy (INSA) in 1984. He was a Fellow of INSA, National Academy of Agricultural Sciences, Indian Academy of Sciences, Maharashtra Academy of Science, Indian Society of Genetics, and Plant Breeding and Indian Society of Plant Genetic Resources. He has been recognized as India's foremost agricultural scientist, educationist and administrator.

Joshi was born on 17 November 1916 in Jabalpur, Madhya Pradesh, to Bhavanibai and Bhairav Balwant Joshi. He undertook primary education at Raipur

and completed his BSc and MSc degrees in Botany from Nagpur University in 1937 and 1945 respectively. He obtained Associateship in Agricultural Botany at Indian Agricultural Research



Institute (IARI) in 1939. This foundation motivated him to pursue his doctoral degree at the University of Cambridge, London under the world-renowned geneticist H. W. Howard (1947–1950). He returned to his alma mater in 1950 as an Assistant Scientist in the Division of Botany (now Division of Genetics) and became the first Dean of its Post-Graduate School in 1958 and the first Project Coordinator of the All India Coordinated Wheat Improvement Project (1960–1966). Between 1966 and 1972 he served as the Deputy Director General (Crop Science) in the Indian Council of Agricultural Research (ICAR).

After a brief stint in Egypt as the Project Manager, FAO/UNDP Project on Improvement of Field Crop Productivity (1971–72) he assumed the charge of Director, IARI (1971–1977). On his superannuation from the service of ICAR, he served as the Vice-Chancellor of Mahatma Phule Krishi Vidyapeeth,