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TRIPLE HELIX: THE STORY OF G.N. RAMACHANDRAN, A DEPRIVED GENIUS

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On purpose: Ramachandran's papers were published in *Nature* after a long delay. | Photo Credit: File Photo

The city of Chennai has produced luminaries in field of science like C.V. Raman, S. Ramanujan and Subramaniam Chandrasekhar. One name which should have figured along with them seems to be forgotten. As we celebrate the birth centenary of G.N. Ramachandran on October 8, 2022, there appears to be very little enthusiasm to remember this giant of the Indian Science. The story of this deprived genius, known as GNR among friends and students who went through painful illness in the last years of his life, needs to be told.

Gopalasamudram Narayana Ramachandran was born to G.R. Narayana Iyer, a Professor of Mathematics at Maharaja's College, Ernakulam. Ramachandran stood first in the Intermediate examination and was admitted to St. Joseph's College in Trichy. In 1942, Ramachandran stood first in the B.Sc (Hons), Physics and was admitted to the Indian Institute of Science (IISc), Bengaluru, to study electrical engineering. Sir C.V. Raman was the director of IISc then. He started visiting Raman's laboratory. Raman discovered Ramachandran's talent and transferred him to the physics department because according to him, "he is too talented to be an electrical engineer". Ramachandran's M.Sc thesis "deserves at least two doctoral degrees", according to his examiner K.S. Krishnan, another giant of Indian science. Subsequently, Ramachandran got his D.Sc. in just three years, in 1947.

After this, Ramachandran received a scholarship to go to the University of Cambridge and work at the Cavendish Laboratory. He received a second doctorate (PhD) for this work in two years. There he came to know the famous scientist, Linus Pauling who discovered the helical structure of the protein (Alpha – Helix).

Ramachandran returned to join IISc as an assistant professor. The story of GNR will remain incomplete without A. Lakshmanaswamy Mudaliar who was the Vice-Chancellor of the University of Madras then. He invited Raman to start a department of experimental physics. Raman, in turn, recommended Ramachandran, describing him "as good as me if not better". GNR and Mudaliar were an ideal combination of patron and genius. In 1952, Prof. J.D. Bernal came to Madras and advised GNR to work on collagen, the protein most of our body is made up of, since there was no accepted structure for this protein at that time. It was a remarkable time when Crick and Watson's discovery of the structure of DNA was just a year away.

Ramachandran and his post doctoral scholar Gopinath Kartha started the experiment of X-ray diffraction with collagen. In just two years (1954), they proposed a structure that Pauling or Crick could not have imagined. This is the famous "triple helix". The paper was published in the journal *Nature*. However, Francis Crick vehemently opposed their discovery and proposed a two-chain helix model of collagen. Ramachandran and Kartha's second paper modifying the structure was also published in *Nature*, but after a long delay because *Nature's* editor sent it to Crick for his opinion. Generally, if two scientists are competitors, it is customary not to show the work of one to the other. But the British editor was eager to help their 'national hero', Francis Crick.

The consequence was that, two months later, Crick published his model, many of whose ideas

were borrowed from Ramachandran's work, but claimed that the GNR's model was flawed. What is most surprising is that Crick's paper was published within a month after sent for publication. *Nature* deliberately wanted to undermine GNR's discovery by delaying his research paper and giving Francis Crick a chance by accelerating his publication with the unfair advantage of going through GNR's manuscript. However, history has revealed that GNR was correct and Crick's structure was totally wrong. In 1968, Linus Pauling himself came to Madras and declared: "Ramachandran and his colleagues described an amazing triple helix. Although I have a little regret in my mind as to why… I did not succeed in thinking like that… I should say that this is a very difficult issue and Ramachandran and his colleagues have come up with a wonderful solution..."

For Ramachandran, Crick's criticism was painful but he responded in an unique way. He along with his students developed a diagram known as 'Ramachandran's plot', which shows all the possible structure of long bio-molecules and thus negating the objections of Crick. Biology would remember him for this work alone.

However, the price he had to pay for this fight and unfair treatment of the powerful scientific lobby abroad was enormous. Ramachandran was diagnosed with paranoid schizophrenia. Dr. Mudaliar used to shield him from others for illness and unusual behaviour but once Mudaliar retired the authorities of Madras University failed to understand his genius. GNR resigned and spent a year in Chicago. Here, GNR created a three-dimensional picture of organic material. He named it Computerised Axial Tomography, in short CAT. In 1977, he was elected a Fellow of the Royal Society of London (FRS). He was also a Fellow of the Indian Academy of Sciences and was also made the Albert Einstein Professor at the centenary of the Academy. The International Union of Crystallography gave him the Ewald Award for outstanding contribution in 1999.

In the meantime, his illness was also increasing. The side effects of long-term psychiatric treatment appeared as Parkinson's disease. His eldest son and daughter were abroad, so his youngest son, Hari took him to Ahmedabad but GNR couldn't settle in Ahmedabad. He also lost his wife. He was shifted to Madras. Just when Hari was preparing to come back as a faculty of IIT Madras, on April 7, 2001, Ramachandran overcame all the sufferings of the world and passed away.

After his death, *The Hindu* had written: "The Prize that Missed the Master". Yes, he did not 'miss' the Nobel Prize, but the Nobel Prize 'missed' a great scientist.

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