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"My work has actually been the consequence really of keeping company far better than myself. My students, post docs, my collaborators in India and abroad have all been superb and have been a great stimulus to make science happen, to make good biology happen and also to make doing science fun and I'm really grateful to all of them."

K. VijayRaghavan

Professor, National Centre for Biological Sciences, Bangalore and Secretary, Department of Biotechnology, Government of India, New Delhi

- B.Tech. in Chemical Engineering from the Indian Institute of Technology, Kanpur
- M.Tech. in Chemical Engineering from the Indian Institute of Technology, Kanpur
- Ph.D. in Molecular Biology from the Tata Institute of Fundamental Research, Mumbai
- Research Fellow and Senior Research Fellow at the California Institute of Technology, Pasadena

Professor VijayRaghavan is being recognized for his many contributions as an outstanding developmental geneticist and neurobiologist. His elegant work with Drosophila has revealed important principles and mechanisms that control the assembly and wiring of nerves and muscles during development, and he has recently begun to define how these neuromuscular circuits direct specific locomotor behaviors.

Unlocking the secrets of Hox genes

Most animals begin life as a mass of undifferentiated cells called embryos that then undergo specialization to form various organs and appendages. But what determines which section of the embryo forms which body part? What is it that determines if a fly becomes a fly or a mouse becomes a mouse?

Hox genes are genetic materials that determine the specialization of an embryo along the antero-posterior or the head-tail axis. These genes are in a sense the master code that unlocks the potential of the embryo. They implement the 'body plan' of an animal.

Once an embryo has differentiated into discrete segments, the Hox genes determine the structures formed at each segment. For example, antennae, wings, legs, vertebrae, etc., are formed at the direction of the Hox genes. These genes are so powerful that even small differences could bring about dramatic evolutionary changes.

Prof. VijayRaghavan's work defines how these powerful Hox genes function to create connections between the nerves and muscles and direct simple motor behaviors. He has used the fruit fly, Drosophila melanogaster, as the model for his study.

Through his work on the development of sensory and motor organs in the fruit fly, Prof. VijayRaghavan sheds new light on the way target muscles develop their specific biomechanical connections through cell differentiation and division.

Using the tools and concepts from the fields of genetics, molecular biology, microscopy, developmental biology and behavioral biology, Prof. VijayRaghavan and his team are trying to unlock the secrets of this powerful genetic material.