

Prof. TK Rajendra

Designation: Professor
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Office No : 020-65101871/70
Qualification : M.Sc., Ph.D.
Area of Specialization: Molecular Genetics, Cell and Developmental
Biology



Research Overview:

Models

1. *Drosophila*
2. Mouse
3. Insect Cell Culture
4. Mamalian Cell Culture

Research Areas

1. Spinal muscular atrophy (SMA)
2. Spinal and bulbar muscular atrophy (SBMA)
3. Cartilage-hair hypoplasia
4. Neuromuscular Development
5. Germline Development & Differentiation
6. Nuclear Organization & Gene expression
7. Control of Transcription Elongation
8. Biology of Non-coding RNAs

The central research theme of the biology of non-coding RNAs in the lab has diversified into varies areas of basic biology having implications on inherited neuromuscular disorders, nuclear order etc., involving several experimental models described above.

Academic Qualifications:

- **Ph.D.** (Cell Biology) (2000) Banaras Hindu University (BHU) Varanasi (under Prof. SC Lakhotia)
Thesis title: *Expression of the non-coding gene, hsr-w, indifferent cell types of Drosophila melanogaster and its role in male germ cell differentiation.*
- **M.Sc.** (Zoology, with specialization in Genetics)(1992) University of Mysore, Karnataka
Thesis title: *Chromosomal Inversion Polymorphism and Populaton Diversity*

Professional Experience:

- 1) **Director (IIAR, September 2013-June 25, 2014):** Indian Institute of Advanced Research (IIAR), Gandhinagar, Gujarat
- 2) **Dean (September 2013-June 23, 2014):** Faculty of Science, University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat
- 3) **Member Secretary, Governing Body (November 2013-June 2014)** University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat
- 4) **Member, Board of Management (November 2013-June 2014)** University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat
- 5) **Member, Academic Council (February 2013-June 2014)** University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat
- 6) **Member, Ph.D. Regulatory Committee (February 2014-June 2014)** University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat
- 7) **Associate Professor (April 2012-July 31, 2014):** Indian Institute of Advanced Research (IIAR), Gandhinagar, Gujarat
- 8) **Controller of Examinations (October 2012-October, 2013)** University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat
- 9) **Research Associate: (2007 to June 2012)** With Greg Matera, Program in Molecular Biology and Biotechnology, Department of Biology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA
- 10) **Post-Doc: (2001 to 2007)** With Greg Matera, Department of Human Genetics, Case Western Reserve University, Cleveland, Ohio, USA
- 11) **Ph.D. (1995-2000).** Under Prof. Lakhotia SC, Cytogenetics Laboratory, Banaras Hindu University, Varanasi, India

Awards and Fellowships

1992: Graduate Aptitude Test in Engineering (GATE)

1996-2000: UGC Research Fellowship

Workshops/ Seminars/ Conferences:

- 1) Organized Training Program for Teachers and Lecturers (TPTL), 25th November to 29nd

November, 2014. University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat

- 2) Co-Organizer, 5 Days Teachers' Training Program in Genetics, Cell & Developmental Biology: Hands-on experiments. 2nd June -6th June, 2014. University of IAR (currently University and Institute of Advanced Research), Gandhinagar, Gujarat

Memberships

Indian Society for Cell Biology (permanent member, since 1998)

Invited Speaker

1. *Drosophila* meeting was held by the Cytogenetics Section, Department of Zoology, Banaras Hindu University, Varanasi-221005, India. Delivered an invited lecture on "Neuromuscular disorders to intra-nuclear organization, transcription elongation and small RNP dynamics". The meeting was held on March 12-13, 2014 in Banaras Hindu University, Varanasi-221005, India.
2. Department of Animal Sciences of the School of Biological Sciences, Central University of Kerala, March 20, 2012, for a National Seminar on "Biotechnological approaches and translational research for human welfare" on "Spinal Muscular Atrophy: Neuromuscular Development in the absence of SMN and its impact on the pathogenesis of SMA".
3. As a resource person in the orientation programme for High School Science Teachers to Speak on "Prokaryotic and Eukaryotic Gene Regulation Mechanisms" on August 5, 2012, sponsored by Department of Science and Technology of Government of Karnataka and held in National Residential School, Thirthahalli Taluk, Konandoor, Shimoga Distt, Karnataka.
4. Government High School, Torehadlu, Sringeri, Karnataka, as a part of National Science Day on "Emerging Trends in Science" on February 28, 2012.
5. Department of Zoology, University of Mysore, May 14, 2010, on "Cross-talk between two distinct nuclear bodies (Cajal Bodies and Histone Locus Bodies) and their significance to functional organization of the nucleus and gene expression".
6. American Society for Cell Biology Annual Conference held in San Francisco, CA on 12 Dec 2005 on the role of snRNPs in Spinal Muscular Atrophy.

Ph. D Students (3 Students)

- 1) Miss. Bhavyata Pandya – Modeling Spinal Muscular Atrophy and understanding the role of SMN in neuromuscular development
- 2) Mr. Hotamsingh Rajput – Spinal and Bulbar Muscular Atrophy
- 3) Mr. Omprakashkumar-Nuclear organization of gene expression

Publications:

1. Nguyen D, Krueger BJ, Sedore SC, Brogie JE, Rogers JT, **Rajendra TK**, Saunders A, Matera AG, Lis JT, Uguen P, Price DH. (2012) The Drosophila 75K snRNP and the essential role of dHEXIM in development. *Nucleic Acids Res.* 40(12):5283-97
2. **Rajendra TK**, Praveen K, Matera AG. 2011 Genetic Analysis of Nuclear Bodies: From Nondeterministic Chaos to Deterministic Order. *Cold Spring Harb Symp Quant Biol.* 2010 75:365-74. Epub 2011 Apr 5.

Note: This article is highlighted for a breakthrough in correlating the relevance nuclear bodies to transcription and processing of histone mRNAs. For details see, Henikoff S. *Cold Spring Harb Symp Quant Biol.* 2011 Apr 18. Further, this work has also come out as a book chapter from the Cold Spring Harbor Publications.

3. Schneider MD, Bains AK, **Rajendra TK**, Dominski Z, Matera AG, Simmonds AJ. 2010. Functional characterization of the Drosophila MRP (mitochondrial RNA processing) RNA gene. *RNA.* 16(11):2120-30. Epub 2010 Sep 20.
4. Gonsalvez GB, **Rajendra TK**, Wen Y, Praveen K, Matera AG. 2010. Sm proteins specify germ cell fate by facilitating oskar mRNA localization. *Development.* 137(14):2341-51.
5. Matera AG, Izaguire-Sierra M, Praveen K, **Rajendra TK**. 2009. Nuclear bodies: random aggregates of sticky proteins or crucibles of macromolecular assembly? *Dev Cell.* 17(5):639-47. **Invited Review.**
6. Liu JL, Wu Z, Nizami Z, Deryusheva S, **Rajendra TK**, Beumer KJ, Gao H, Matera AG, Carroll D, Gall JG. 2009. Coilin is essential for Cajal body organization in Drosophila melanogaster. *Mol Biol Cell.* 20(6):1661-70. Epub 2009 Jan 21.
7. Shpargel KB, Praveen K, **Rajendra TK**, Matera AG. 2009. Gemin3 is an essential gene required for larval motor function and pupation in Drosophila. *Mol Biol Cell.* 20(1):90-101. Epub 2008

Oct 15.

8. Walker MP, **Rajendra TK***, Saieva L, Fuentes JL, Pellizzoni L, Matera AG. 2008. SMN complex localizes to the sarcomeric Z-disc and is a proteolytic target of calpain. *Hum Mol Genet.* 17(21):3399-410. Epub 2008 Aug 8.

***Co-First Author**

9. **Rajendra TK**, Gonsalvez GB, Walker MP, Shpargel KB, Salz HK, Matera AG. 2007. A *Drosophila melanogaster* model of spinal muscular atrophy reveals a function for SMN in striated muscle. *J Cell Biol.* 176(6):831-41.

Note: This article is highlighted in "in this issue" section as a radically different way of looking at Spinal Muscular Atrophy (SMA), the second most prevalent fatal recessive genetic illness after cystic fibrosis, from the motor neuron centric views to muscle centric paradigm.

10. Gonsalvez GB, **Rajendra TK**, Tian L, Matera AG. 2006. The Sm-protein methyltransferase, *dart5*, is essential for germ-cell specification and maintenance. *Curr Biol.* 2006 Jun 6;16(11):1077-89.

11. **Rajendra TK**, Prasanth KV, Lakhotia SC. 2001. Male sterility associated with overexpression of the noncoding *hsr(omega)* gene in cyst cells of testis of *Drosophila melanogaster*. *J Genet.* 80(2):97-110.

12. Lakhotia SC, **Rajendra TK**, Prasanth KV. 2001. Developmental regulation and complex organization of the promoter of the non-coding *hsr(omega)* gene of *Drosophila melanogaster*. *J Biosci.* 26(1):25-38.

13. Prasanth KV, **Rajendra TK**, Lal AK, Lakhotia SC. 2000. Omega speckles - a novel class of nuclear speckles containing hnRNPs associated with noncoding *hsr-omega* RNA in *Drosophila*. *J Cell Sci.* 113 Pt 19:3485-97.

14. Lakhotia, P. Ray, T. K. **Rajendra** and K. V. Prasanth (1999) The non-coding transcripts of *hsr-omega* gene in *Drosophila*: Do they regulate trafficking and availability of nuclear RNA-processing factors? *Current Science.* 77: 553-563. (Review).