

## **Renu Mohan, Ph.D**

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### ***Professional Profile***

***UGC-Assistant Professor (2019 - ),  
Faculty Recharge Programme, University Grants Commission, Govt. of India***  
Interdisciplinary School of Science  
Savitribhai Phule Pune University

***Ramalingaswamy Fellowship:2015-2019  
Department of Biotechnology, Govt. of India***  
Sri Chitra Tirunal Institute for Medical Sciences & Technology  
Poojappura, Thiruvananthapuram.

***SERB Young Scientist:2015(declined)  
Department of Science & Technology, Govt. of India***

***Principal Investigator:*** December 2014 – May 2015  
***BioCare Programme, Department of Biotechnology, Govt. of India***  
TEM Lab, Biomedical Wing,  
Sri Chitra Tirunal Institute for Medical Sciences & Technology  
Poojappura, Thiruvananthapuram.

***Research Associate:*** June 2014 – December 2014  
Inter University Centre for Genomics & Gene Technology,  
University of Kerala, Thiruvananthapuram.

***Post doctoral fellow:*** June 2011-July 2013  
Cellular Dynamics, Department of Cell Biology,  
Faculty of Science, Utrecht University, Utrecht, Netherlands.  
<http://web.science.uu.nl/cellbiology/>

***Post doctoral fellow:*** May 2010-June 2011.  
Microtubule Cytoskeleton and Vesicular Traffic Lab,  
Department of Cell Biology, Erasmus Medical Centre, Rotterdam, Netherlands.  
<http://www.erasmusmc.nl/cellbiology/research/?lang=en>

***Postdoctoral Fellowships:  
European Molecular Biology Organization (EMBO) Long Term Fellowship  
Marie Curie International Incoming Fellowship***

***Project:*** Mechanisms and functions of microtubule plus end tracking proteins in mammalian cells: development of inhibitory strategies

*Supervisor:* Prof. Anna Akhmanova

**PhD:** 2003-2008.

**Thesis Title:** Perturbation of microtubule assembly dynamics-A possible mechanism of antiproliferative activity of sulfonamides, estramustine and conjugated nitroalkenes.

School of Biosciences and Bioengineering, **Indian Institute of Technology, Bombay**, India. <http://www.bio.iitb.ac.in/>

*Guide:* Prof. Dulal Panda

**Post Graduation:** MSc.(Biotechnology), 2000-2002

Department of Biotechnology, University of Kerala, Trivandrum.

**Project Title** –Degradation of fatty acids by methanogens.

(carried out at Department of Biochemical engineering and Biotechnology, Indian Institute of Technology, Delhi.)

**Graduation:** BSc. (Biotechnology), 1997-2000

University of Kerala, Trivandrum.

### ***Research Interests***

Cytoskeleton and associated proteins, protein and cellular dynamics, antitubulin agents and cancer chemotherapy, targeted drug delivery, small molecule inhibitors, 3D invitro culture.

### ***Research expertise***

Design and development of anticancer agents, biophysical and biochemical characterization of protein-protein and protein-ligand interactions, spectroscopy, single molecule analysis, real time imaging (in vitro and in cells), microscopy (TIRF, confocal, fluorescence, DIC, electron microscopy), image analysis, *in vivo* and *in vitro* reconstitution of protein dynamics, 3D in vitro culture, RNAi technology.

### ***Research Experience***

#### **2000-2002**

MSc Biotechnology, Indian Institute of Technology (IIT) Delhi, India

**Project Title:** Degradation of fatty acids by methanogens.

Effluents from diary industry contain heavy chain fatty acids and hydrocarbons which causes environmental toxicity. My study indicated that certain species of methanogenic bacteria can efficiently degrade the heavier hydrocarbons into biodegradable small chain fatty acids.

#### **2003-2008**

*PhD.* Indian Institute of Technology (IIT) Bombay, India.

**Thesis Title:** Perturbation of microtubule assembly dynamics-A possible mechanism of antiproliferative activity of sulfonamides, estramustine and conjugated nitroalkenes.

Antitubulin agents are widely used in cancer therapy because of their ability to arrest the cell cycle progression at mitosis. My PhD work was focused on screening and developing small molecule inhibitors for cancer cell proliferation. During my PhD research, I elucidated the detailed mechanism of anticancer activities of several groups of agents, such as indole sulfonamides, estramustine, conjugated nitroalkenes and palladium carbene complexes. Most of these compounds arrested cancer cell growth at mitosis by modulating microtubules. Palladium carbene complexes were found to be more potent than the benchmark cancer drug cisplatin, and it inhibited tumor cell proliferation by arresting the cell cycle progression at the G2 phase and thus preventing the mitotic entry. My research helped to identify several inhibitors of cancer cell growth and decipher their mechanism of growth inhibition.

### **2010-2013**

*Post doctoral fellow, Cell Biology Department, Utrecht University, Utrecht, Netherlands and Erasmus Medical Centre, Rotterdam, Netherlands.*

Project Title: Mechanisms and functions of microtubule plus end tracking proteins in mammalian cells: development of inhibitory strategies.

Plus-end tracking proteins (+TIPs) are a specialized group of microtubule-associated factors that bind to the growing ends of microtubules. They play important roles in regulating microtubule dynamics, link microtubule ends to cellular structures such as mitotic kinetochores or the cell cortex, recruit signaling factors and participate in microtubule nucleation. My post doctoral research work was focused on understanding the interaction between microtubules and its plus end interacting partners (+TIPs), and to study the +TIP function, using inhibitory strategies, such as microtubule drugs, inhibitory peptides etc. I used high end live microscopic imaging and reconstitution of the microtubule plus end tracking in vitro using purified proteins to study these interactions. Understanding the specific effects of various anticancer agents on microtubule plus end tracking proteins formed a major part of the project and this study to systematically screen a broad range of microtubule-directed drugs for specific effects on microtubule plus end tracking proteins has never been implemented before. Another part of the study focused on developing cell-permeable peptides as markers for plus ends and/or potential inhibitors of plus end tracking.

### **2014**

*Research Associate; Inter University Centre for Genomics and Gene Technology, University of Kerala, Thiruvananthapuram.*

Establish three-dimensional in vitro tumour spheroids using different hydrogels and scaffolds.

### **2015- 2019**

*DBT Ramalingaswamy Fellow, Sri Chitra Tirunal Institute for Medical Sciences & Technology, Poojappura, Thiruvananthapuram.*

Award period: 2015 – 2020, Award amount: Rs. 95.31 Lakhs

Project Title: How actin/Intermediate filament structures within the cell are regulated by changes in microtubule dynamics: Role of microtubule associated proteins and crosslinking proteins in maintaining cytoskeletal networking

### ***Teaching Experience:***

- Guest Lecturer for BSc Biotechnology, Government College Karyavattom (June 2009-August 2009).
- Teaching Assistant for BTech students at IIT Bombay (June 2003-December 2003)

### ***Academic Honors & Awards in Professional Development***

*2017 – UGC Faculty recharge programme*

*2015 - DBT Ramalingaswamy Fellowship, Govt. of India*

*2015 – DST Young Scientist Scheme, Govt. of India*

*2014 – DBT BioCare Programme, Govt. of India*

*2010 - European Molecular Biology Organization (EMBO) Long Term Fellowship*

*2010 - Marie Curie International Incoming Fellowship*

*2009 - Gargi Vishnoi Award for the best PhD thesis (IIT Bombay)*

*2008- Indian science congress association's (ISCA) young scientist award*

*2006- Three cover page articles (Bioorg Med Chem. 2006, vol 14; Org Biomol Chem. 2006, vol 4 & Tissue Engineering Part A 2018).*

*2003- Junior research fellowship from the University Grants Commission*

*2003- Junior research fellowship from Indian Council for Medical Research*

*2002- 3<sup>rd</sup> rank M.Sc . Biotechnology, University of Kerala*

### ***Research publications in referred journals (citations:1589)***

1. **Mohan R\***, Mohan N and Vaikkath D. Hyaluronic acid dictates chondrocyte morphology and migration in composite gels.(Tissue Eng Part A. 2018 Oct;24(19-20):1481-1491,\*Corresponding author) (Impact Factor:3-6)

2. Guesdon A, Bazile F, Buey RM, **Mohan R**, Monier S, Angevin M, Heichette C, Wieneke R, Tampé R, Duchesne L, Akhmanova A, Steinmetz MO and Chrétien D. EB1 interacts with outwardly curved and straight regions of the microtubule lattice. **Nature Cell Biology** 2016, 18(10), 1102-8.(Impact Factor:20.06)
3. **Mohan R\*** and John A. Microtubule Associated Proteins (MAPs) as *direct* cross linkers of actin and microtubule cytoskeleton. **IUBMB Life** 2015 67(6):395-403. (\*Corresponding Author). (Impact Factor:3.1)
4. **Mohan R**, Katrukha E, Doodhi H, Smal I, Meijering E, Kapitein CL, Steinmetz MO, Akhmanova A. End Binding proteins sensitize microtubules to the action of microtubule targeting agents. **Proc Natl Acad Sci USA** 2013; 110(22):8900-5.(Impact Factor:9.6)
5. Jiang K, Hua S, **Mohan R**, Grigoriev I, Yau KH, Liu Q, Katrukha E, Altelaar AFM, Heck AJR, Hoogenraad CC, Akhmanova A. Microtubule minus end stabilization by polymerization driven CAMSAP deposition. **Developmental Cell**, 2014, 28; 3, 2014, Pages 295-309) (Impact Factor:9.6)
6. Asthana J, Kapoor S, **Mohan R**, Panda D. Inhibition of HDAC6 deacetylase activity increases its binding with microtubules and suppresses microtubule dynamic instability in MCF-7 cells. **J Biol Chem**. 2013 (288(31):22516-26) (Impact Factor: 4.1)
7. Buey RM, Sen I, Kortt O, **Mohan R**, Gfeller D, Veprintsev D, Kretzschmar I, Scheuermann J, Neri D, Zoete V, Michielin O, de Pereda JM, Akhmanova A, Volkmer R, Steinmetz MO. Sequence determinants of a microtubule tip localization signal (MtLS).**J Biol Chem**. 2012;287(34):28227-4. (Impact Factor:4.1)
8. Pagano A, Honoré S, **Mohan R**, Berges R, Akhmanova A, Braguer D. Etoposide B inhibits migration of glioblastoma cells by inducing microtubule catastrophes and affecting EB1 accumulation at microtubule plus ends. **Biochem Pharmacol**. 2012;84(4):432-43. (Impact Factor:5.0)
9. Buey RM, **Mohan R**, Leslie K, Walzthoeni T, Missimer JH, Menzel A, Bjelic S, Bargsten K, Grigoriev I, Smal I, Meijering E, Aebbersold R, Akhmanova A, Steinmetz MO. Insights into EB structure and the role of its C-terminal domain in discriminating microtubule tips from lattice. **Mol Biol Cell**. 2011 22(16):2912-23. (Impact Factor:3.5, citations:34)
10. **Mohan R** and Panda D. Kinetic stabilization of Microtubule Dynamics by Estramustine is Associated with Tubulin Acetylation, Spindle Abnormalities and Mitotic Arrest. **Cancer Res**. 2008, 68 (15), 6181-6189. (Impact Factor:9.1)

11. Singh P, Rathinasamy K, **Mohan R**, Panda D. Microtubule assembly dynamics: an attractive target for anticancer drugs. **IUBMB Life**. 2008; 60(6):368-75. Review. (Impact Factor:3.1)
12. Jaiswal R, Beuria TK, **Mohan R**, Mahajan SK, Panda D. Totarol inhibits bacterial cytokinesis by perturbing the assembly dynamics of FtsZ. **Biochemistry**. 2007, 46, 4211-4220. (Impact Factor:3.0)
13. Ray S, **Mohan R**, Singh JK, Samantaray MK, Shaikh MM, Panda D, Ghosh P. Anticancer and antimicrobial metallopharmaceutical agents based on palladium, gold, and silver N-heterocyclic carbene complexes. **J Am Chem Soc**. 2007, 129, 15042-15045. (Impact Factor:14.6)
14. **Mohan R**, Banerjee M, Ray A, Manna T, Wilson L, Owa T, Bhattacharyya B, Panda D. Antimitotic sulfonamides inhibit microtubule assembly dynamics and cancer cell proliferation. **Biochemistry**. 2006, 45, 5440-5449. (Impact Factor:3.0)
15. **Mohan R**, Rastogi N, Namboothiri IN, Mobin SM, Panda D. Synthesis and evaluation of alpha-hydroxymethylated conjugated nitroalkenes for their anticancer activity: inhibition of cell proliferation by targeting microtubules. **Bioorg Med Chem**. 2006, 14, 8073-8085. (Impact Factor:2.8, citations:42)
16. Dadwal M, **Mohan R**, Panda D, Mobin SM, Namboothiri IN. The Morita-Baylis-Hillman adducts of beta-aryl nitroethylenes with other activated alkenes: synthesis and anticancer activity studies. **Chem Commun (Camb)**.2006, 3, 338-340. (Impact Factor:6.1)
17. Rastogi N, **Mohan R**, Panda D, Mobin SM, Namboothiri IN. Synthesis and anticancer activity studies of alpha-aminoalkylated conjugated nitroalkenes. **Org Biomol Chem**. 2006, 4, 3211-3214. (Impact Factor:3.5)

<http://www.ncbi.nlm.nih.gov/pubmed?term=renu%20mohan>

### ***Papers and oral presentations in conference proceeding***

#### **Oral Presentations:**

1. **Mohan, R.**, Namboothiri I.N., and Panda, D. 26<sup>th</sup> Annual Convention of Indian Association for Cancer Research (IACR), Bhuvaneshwar, India, January 2007.
2. **Mohan, R.**, and Panda, D. Motors, Cytoskeleton and Intracellular Transport, organized by TIFR, Mumbai, India, March 2007.
3. **Mohan, R.**, Namboothiri I.N., and Panda, D. 95<sup>th</sup> Annual Meeting of Indian Science Congress Association, Vishakhapatnam, India, January 2008.

4. **Mohan R** and Akhmanova A. International conference on the cytoskeletal dynamics and intracellular trafficking, organized by the Polish-Norwegian Research Agency, Warsaw, Poland, October 2010.
5. **Mohan R** and Akhmanova A. EMBO fellows meeting, Heidelberg, Germany, May 2012
6. **Mohan R**. Dutch meeting on molecular and cellular biophysics, Veldhoven, Netherlands, October 2012.
7. **Mohan R**. One day seminar on integrative biology, University of Kerala, Thiruvananthapuram, February 2018

Poster Presentations:

1. **Mohan R**, Katrukha Y, Grigoriev I and Akhmanova A. EMBO conference on Microtubules-structure, regulation and function, Heidelberg, Germany, May 2012.
2. **Mohan R**, Katrukha Y, Akhmanova A. Annual
3. Meeting of the American Society of Cell Biology, San Francisco, USA, December 2012.

***Seminars/workshops organized:***

1. National seminar and workshop ( five days) on RNAi technology and biomarkers (November 2014).
2. National seminar on Transgenics and crop improvement (July 2014).

***Membership in professional organizations:***

1. Indian society for cell biology
2. Indian Association for cancer research
3. EMBO fellows organizations