

Rajnikant Mishra, Ph.D.

Professor

FIAN, FNESA, FZSI, FABRF

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Phone: +91-9307278478; **E-mail(s):** rmishraa@bhu.ac.in ; rmishraa@yahoo.com**Teaching and Research:**

About~36 years of research and teaching experience in the area of **Biochemistry, Molecular Biology & Bioinformatics.**

Works to understand **Biology of Diseases** associated with **Central Nervous System, Eyes, Spleen, Pancreas and Lymphnodes**. Contribution to understand mechanisms of functions of Paired box family transcription factors (**Pax6 and Pax5**) in **Brain Immunity, Biology of Microglia, Adult Neurogenesis, Neural degeneration, Diabetic Neuropathy/Retinopathy, Parkinson's disease, Ocular defects and Cancer** are well recognized. Also deposited several novel sequences in the GenBank including one of Pseudo gene of p53.

Published more than **75 research articles** in the International and National journals including **chapters in books**. Successfully completed research projects from UGC, DST-SERB, CSIR and DBT. Delivered **invited/plenary lectures** and **chaired sessions** in the National and International scientific meetings. Serves as Examiner/Editorial/Reviewer in various committees of Universities and Scientific journals.

Honours/Awards/Fellow:

- **Fellow of Indian Academy of Neurosciences (FIAN).**
- **Fellow of Zoological Society of India (FZSI)**
- **Fellow of National Environmental Science Academy (FNESA)**
- **Fellow of Asian Biological Research Foundation (FABRF)**
- **Recognition Award of Zoological Society of India (ZSI-Medal)**
- **Distinguished Scientist Award of NESSA (DS-NESA).**
- **Secretary of Association of Gerontology, India (AGI)**
- **Postdoctoral Fellow with honorable mention at U.T.-M.D. Anderson Cancer Center, Houston, Texas, USA.**
- **Young Scientist Project, DST**

Life member of following professional societies,

1. India Academy of Neurosciences
2. Indian Science Congress Association
3. Association of Gerontology, India
4. Society for Neurochemistry India
5. Society of Cell Biology, India
6. Society of Biological Chemists, India
7. Indian Immunologist Society
8. Society of Toxicology, India
9. National Environmental Science Academy
10. Zoological Society of India
11. Asian Biological Research Foundation

Research outcome with implication in Clinical/Applied science:

- Natural immunomodulators may improve mental health by interacting with the CD40L of CD40/CD40L pathway and CSF1R kinase domain of microglia. *Journal of Molecular Modeling*, 28(4), 1-13.(2022)
- PAX5 in differential diagnosis of **Non-Hodgkin's Lymphoma**, *I.J.M.R.* (2016).
- Pax5 and Ataxin-7 as **proteomic markers of lymphoma-affected spleen**, *M.C.B.* (2015), 402.
- β -oxodithioester complexes as **anti-leishmanial effect.**, *New J. Chem.* (2015), 39.
- Chromosomal aberrations as markers of **carcinoma of the gallbladder**, *W.J.S.O.* (2012),10..
- Developed a process for the **diagnosis of myocardial infarction**, *Curr. Sci.* (1999), 76(4).

Contribution to GenBank: Accession numbers (JX065130, JX065131, JX065132, GU808447.1, KP738730, KP739198, KP739197, KP739196, HM031390, HM031391, HM031392, KT314217, KT314218, KT314219, KT314220, KT314221, KT314222

Edited Book: "Mutagenesis" InTech Publication, Year 2012, ISBN Number- 978-953-51-0707-1

Book Chapters:

1. Yadav H, Thapliyal A, Maurya SK and **Mishra R (2026) Ayurvedic Supplements for Healthy Brain and Longevity**, In book: Supplements and Drugs for Healthy Longevity, DOI: [10.1007/978-3-032-11608-6_10](https://doi.org/10.1007/978-3-032-11608-6_10)
2. Ghosh N and **Mishra R (2025) Pax6 in innate immune response and mental health**, In Global Environmental Challenges and Solution, Narendra Publishing House, 141-152. ISBN: 978-93-56518-52-0.
3. Maurya S.K and **Mishra R (2024) Modulation of neuroinflammation by natural molecules**, Natural Molecules in Neuroprotection and Neurotoxicity, 171-197. <https://doi.org/10.1016/B978-0-443-23763-8.00008-7>
4. **Mishra R (2023) PAX6: Master Regulator of Ocular and Mental Health**, In Biology of Human Welfare, Narendra Publishing House, 29-38. ISBN: 978-93-56512-03-0.
5. **Mishra, R. (2020). Paired Box (Pax) Transcription Factors and Aging**. In *Models, Molecules and Mechanisms in Biogerontology* (pp. 109-117). Springer, Singapore.
6. Maurya, S. K., & **Mishra, R. (2019). Importance of bioinformatics in genome Mining of Cyanobacteria for production of bioactive compounds**. In *Cyanobacteria* (pp. 477-506). Academic Press.
7. **Mishra R, (2016) "Expression and regulation of Pax6 in brain of aging mice"**, *Topics in Biomedical Gerontology*, ISBN: 978-981-10-2155-8, Springer Singapore.
8. **Mishra R, (2010) "Gene Targeting"**, *Cellular and Biochemical Science*, ISBN: 9788188237852, I.K. International, New Delhi.

Research paper Publications:

1. Ghosh N and Mishra R, Pax6 (2026) Binds to NF- κ B DNA Motif and Regulates Genes Involved in NF- κ B Activation in the Brains of LPS-Treated Mice, *Molecular Neurobiology* 63 (1), 52.

2. Maurya, S. K., Borgonovo, J. E., Biswal, S., Martínez-Cerdeño, V., Mishra, R., & Muñoz, E. M. (2024). Trends in neuroimmunology: cross-talk between brain-resident and peripheral immune cells in both health and disease. *Frontiers in Immunology*, 15.
<https://doi.org/10.3389/fimmu.2024.1442322>
3. Maurya, S. K., & Mishra, R. (2024). Modulation of neuroinflammation by natural molecules. (pp. 171–197). <https://doi.org/10.1016/b978-0-443-23763-8.00008-7>
4. Kushwah, A. S., Masood, S., Mishra, R., & Banerjee, M. (2024). Genetic and epigenetic alterations in DNA repair genes and treatment outcome of chemoradiotherapy in cervical cancer. *Critical Reviews in Oncology/Hematology*, 194, 104240.
<https://doi.org/10.1016/j.critrevonc.2023.104240>
5. Maurya, R. P., Mishra, R., & Gupta, S. (2023). PAX6 gene and its role in ocular malformations. *IP International Journal of Ocular Oncology and Oculoplasty/IP International Journal of Ocular Oncology and Oculoplasty*, 9(3), 111–112.
<https://doi.org/10.18231/j.ijooo.2023.024>
6. Kushwah, A. S., Srivastava, K., Mishra, R., & Banerjee, M. (2024). Impact of Human Papillomavirus (HPV) Infection on the Treatment Outcome of Concomitant Chemoradiotherapy (CRT) in Cervical Cancer. *Current Cancer Therapy Reviews*, 20(3), 320–326. <https://doi.org/10.2174/1573394719666230807161948>
7. Srivastava, K. and **Mishra, R.** (2023) Pax6 affects Ras-Raf-ERK1/2 in mouse aging brain. *Biogerontology* (10.1007/s10522-023-10044-z).
8. Maurya SK, Gupta S and **Mishra R** (2023) Transcriptional and epigenetic regulation of microglia in maintenance of brain homeostasis and neurodegeneration. *Front. Mol. Neurosci.* 15:1072046. doi:10.3389/fnmol.2022.1072046.
9. Kushwah, A. S., **Mishra, R.**, Srivastava, K., Mishra, S., & Banerjee, M. (2022). Anthropodemographic, clinic-pathological and biochemical risk factors in cervical cancer. *International Journal of Health Sciences*, 6(S8), 3641-3653.
10. Shukla, S., & **Mishra, R.** (2022). Autoregulation of Pax6 in neuronal cells is mediated by Pax6 (5a), Pax6 (Δ PD), SPARC, and p53. *Molecular Biology Reports*, 49(4), 3271-3279.
11. Maurya, S. K., & **Mishra, R.** (2022). Molecular docking studies of natural immunomodulators indicate their interactions with the CD40L of CD40/CD40L pathway and CSF1R kinase domain of microglia. *Journal of Molecular Modeling*, 28(4), 1-13.
12. Maurya, S. K., & **Mishra, R.** (2022). Co-expression and Interaction of Pax6 with Genes and Proteins of Immunological Surveillance in the Brain of Mice. *Neurotoxicity Research*, 1-15.
13. Maurya, S. K., Bhattacharya, A., Shukla, P., & **Mishra, R.** (2022). Insights on Epidemiology, Pathogenesis, Diagnosis and Possible Treatment of COVID-19 Infection. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, 1-9.
14. Maurya, S. K., Bhattacharya, N., Mishra, S., Bhattacharya, A., Banerjee, P., Senapati, S., & **Mishra, R.** (2021). Microglia specific drug targeting using natural products for the regulation of redox imbalance in neurodegeneration. *Frontiers in pharmacology*, 12.
15. Suman, M., & **Rajnikant, M.** (2021). Impact of suitable control on a uniform interpretation of units for arginase assay. *Biochemistry and Biophysics Reports*, 25, 100910.
16. Maurya, S. K., & **Mishra, R.** (2018). Co-localization and interaction of Pax5 with Iba1 in brain of mice. *Cellular and Molecular Neurobiology*, 38(4), 919-927.
17. Shukla, S., & **Mishra, R.** (2018). Level of hydrogen peroxide affects expression and sub-cellular localization of Pax6. *Molecular biology reports*, 45(4), 533-540.
18. Srivastava, K., Tripathi, R., & **Mishra, R.** (2018). Age-dependent alterations in expression and co-localization of Pax6 and Ras-GAP in brain of aging mice. *J. Chem. Neuroanat*, 92, 25-34.
19. **Mishra, R.** (2018). Expression and interaction of Pax6 in brain during aging. *Journal of the Indian Academy of Geriatrics*, 14.

20. Maurya SK and **Mishra R** (2017) Pax6 interacts with Iba1 and shows age-associated alterations in brain of aging mice. *J. Chem Neuroanat.*, **82**, 60-64.
21. Maurya SK and **Mishra R** (2017) Pax6 binds to promoter sequence elements associated with immunological surveillance and energy homeostasis in brain of aging mice, *Ann Neurosci.*, 24:20-25.
22. Mishra S and **Mishra R** (2017) Tolerance of hyperammonemia in brain of *Heteropneustes fossilis* is supported by glutamate-glutamine cycle. *J. Chem. Neuroanat.*, **80**, 11-18.
23. Mishra S and **Mishra R** (2017) Mitochondrial membrane-bound activity of arginase is independent of nitrogen excretion pattern in ureogenic and non-ureogenic vertebrates. *IJEB*.55(2), 74-78.
24. Maurya SK and **Mishra R** (2016) Putative role of Pax5 in immunological surveillance of brain. *J. Sci. Res.*, 60: 43-51.
25. Srivastava K and **Mishra R** (2016) Impact of Pax6 on Ras dependent cell signaling in brain. *J. Sci. Res.*, 60: 31-36.
26. Mishra S and **Mishra R** (2016) KCl-Dependent Release of Mitochondrial Membrane-Bound Arginase Appears to be a Novel Variant of Arginase-II. *Scientifica*. DOI: 10.1155/2016/3675283.
27. Mishra S and **Mishra R** (2016) Biochemical and molecular characterization of mitochondrial membrane-bound arginase in *Heteropneustes fossilis*. *Mol Biol Rep.*, DOI 10.1007/s11033-016-3965-3.
28. Mishra S and **Mishra R** (2015) Molecular Integrity of Mitochondria Alters by Potassium Chloride. *Int. J. Prot. Res.*, DOI 10.1155/2015/647408.
29. Mishra S and **Mishra R** (2015) Impact of Isoforms of Arginase on biology of ammonia and urea metabolism: A promising approach for metabolic therapy of various malignancies. *J. Sci. Res.*, **59**: 31-45.
30. Mishra S, Maurya SK, Srivastava K, Shukla S and **Mishra R** (2015) Pax6 influences expression patterns of genes involved in neuro-degeneration. *Ann Neurosci.*, 22: 226-231.
31. Bharti B, and **Mishra R** (2015) Spleen-specific isoforms of Pax5 and Ataxin-7 as potential proteomic markers of lymphoma-affected spleen. *Mol Cell Biochem.*, 402: 181-191.
32. Shubham K and **Mishra R** (2012) Pax6 interacts with SPARC and TGF- β in murine eyes. *Mol Vis.*, 18:951-6.
33. Tripathi R and **Mishra R** (2012) Aging associated modulation in the expression of Pax6 in mouse brain. *Cell Mol. Neurobiol.*, 32:209-218.
34. Shukla S and **Mishra R** (2012) Predictions on impact of missense mutations on structure function relationship of PAX6 and its alternatively spliced isoform PAX6(5a). *Interdiscip Sci.*, 4(1):54-73.
35. Tripathi R and **Mishra R** (2012) In Silico Analysis of Pax6 Interacting Proteins Indicates Missing Molecular Links in Development of Brain and associated Disease. *International Journal of Biological and Life Sciences* **8**(3): 150-156.
36. Bharti B and **Mishra R** (2011), Isoforms of Pax5 and co-regulation of T- and B-cells associated genes influence phenotypic traits of ascetic cells causing Dalton's Lymphoma. *BBA-Mol. Cell. Res.*, 1813(12):2071-8.
37. Shukla S and **Mishra R** (2011) Functional analysis of missense mutations G36A and G51A in Pax6, and Pax6 (5a) causing ocular anomalies. *Exp. Eye Res.*, 93:40-49.
38. Tripathi R and **Mishra R**, (2010) Interaction of Pax6 with SPARC and p53 in brain of mice indicates Smad3 dependent auto-regulation. *J Mol Neurosci.*, 41(3):397-403.
39. Shukla S, Tripathi R, Bharti B and **Mishra R** (2010) Bioinformatics for Biologists: A concept of digital laboratory. *J. Sci. Res.*, **54**: 115-134.
40. Bharti B and **Mishra R** (2009) A new insight towards proteomic and enzymatic markers of lymphoma. *J. Sci. Res.*, 53: 89-102.
41. Shukla S and **Mishra R** (2009), PAX6 and its isoforms are critical to maintain functional status of brain and eyes. *J. Sci. Res.*, 53: 41-58.

42. Bharti B and **Mishra R** (2008) Lymphoma affects enzyme and protein profile of non-lymphatic tissues in mice. *IJIB.*, 3(3): 175-181.

Collaborative-Research

43. Kushwah A, Srivastava K, Mishra, R and Banerjee M(2023), Impact of Human Papillomavirus (HPV) Infection on the Treatment Outcome of Concomitant Chemoradiotherapy (CRT) in Cervical Cancer, *Current Cancer Therapy Reviews*, DOI:[10.2174/1573394719666230807161948](https://doi.org/10.2174/1573394719666230807161948)
44. Dixit, R., Debnath, A., Mishra, S., **Mishra, R.**, Bhartiya, S. K., Pratap, A., & Shukla, V. K. (2023). A Study of Arginase Expression in Chronic Non-healing Wounds. *The International Journal of Lower Extremity Wounds*, DOI: [10.1177/15347346211012381](https://doi.org/10.1177/15347346211012381)
45. Chandra, P., Dixit, R., Pratap, A., Mishra, S., **Mishra, R.**, & Shukla, V. K. (2021). Analysis of SET and MYND Domain-Containing Protein 3 (SMYD3) Expression in Gallbladder Cancer: a Pilot Study. *Indian Journal of Surgical Oncology*, 12(1), 111-117.
46. Pongsavee, M., & **Mishra, R.** (2021). Potassium Sorbate Induces Oxidative Stress and Genotoxicity in Human Lymphocytes. *Indian Journal of Forensic Medicine & Toxicology*, 15(2).
47. Bharti B, Shukla S, Tripathi R, Mishra S, Kumar M, Pandey M and Mishra R (2016) Level of PAX5 seems critical in differential diagnosis of Non-Hodgkin's Lymphoma. *IJMR.*, 143(Supplement),135-143.
48. Yadav MK, Rajput G, Srivastava K, Singh RK, Mishra R, Drew MGB and Singh N (2015) Anti-leishmanial activity of Ni(II), Pd(II) and Pt(II) β -oxodithioester complexes. *New J. Chem.*, 39, 6358-6366.
49. Mishra M, Tiwari K, Shukla S, **Mishra R**, Singh VP (2014) Synthesis structural investigation, DNA and protein binding study of some 3d-metal complexes with N0-(phenylpyridin-2-yl-methylene)-thiophene-2-carboxylic acid hydrazide. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy.*, 132: 452–464.
50. Kumar V, Mishra RK, Shukla S, **Mishra R**, Singh M, Tiwari I, Thapaliyal K, Upadhyay K K (2013) Synthesis, crystal structure and nuclease activity of a Cu(II) complex having two different co-ordination geometries in the same unit cell. *J. Mol. Str.*, 1047, 66-72.
51. Dixit R, Kumar P, Tripathi R, Basu S, **Mishra R**, Shukla VK (2012) Chromosomal structural analysis in carcinoma of the gallbladder. *World J Surg Oncol.*,10:198.
52. Mishra RK, Upadhyay KK, Shukla S and **Mishra R** (2012) Zinc (II) Directed Triple-Stranded Helicate Incorporating Nine Membered Metallamacrocyclic: Supramolecular Cylinders Mimicking P1 Nuclease. *Chem. Commun.*, 48: 4238-4240.
53. Bharti B, Basu P, **Mishra R** and Singaravel M (2011) Effects of induced Dalton's lymphoma on circadian locomotor activity rhythm of adult male mice, *Biological Rhythm Research.*, 43 (2), 215-223.
54. Basu P, Tripathi R, **Mishra R** and Singaravel M (2011) Effect of Chronic Jet Lag after induction of Dalton's lymphoma in male and female mice, *Biological Rhythm Research.*, 43(3), 331-339.

Post-Doctoral Research

55. Chao LY, **Mishra R**, Strong LC and Saunders GF, (2003), Missense mutations in the DNA binding region and termination codon of PAX6. *Hum. Mut.*, 21: 138-145.
56. Singh S, **Mishra R**, Arango NA, Deng JM, Behringer RR, Saunders GF, (2002), Iris hypoplasia in mice that lack the alternatively spliced Pax6(5a) isoform. *Proc.Natl.Acad.Sci.U.S.A.*, 99 : 6812-6815.
57. **Mishra R**, Gorlov IP, L.Y. Chao, S. Singh, and G.F. Saunders, (2002), PAX6, paired domain influences sequence recognition by the homeodomain. *J. Biol. Chem.*, 277 (51) 49488-49494.
58. Singh S, Chao LY, **Mishra R**, Davies J and Saunders GF (2001) Missense mutation at the C-terminus of PAX6 negatively modulates homeodomain function. *Hum. Mole. Genet.*, 10(9) 911-918.

59. **Mishra R** and Shukla SP (1999) Immunochemical detection of serum LDH-1: An indigenous method in the diagnosis of myocardial infarction. *Current Science*. **76(4)**, 587-590.

Doctoral Research

60. **Mishra R** and Shukla SP, (2003) Endosulfan effects on muscle malate dehydrogenase of the freshwater catfish, *Clarias batrachus*. *Ecotox. Environ. Safety.*, 56: 425-433.
61. **Mishra R** and Shukla SP (1999) Endosulfan- mediated effects on protein composition of catfish mitochondria. *J. Sci. Res*, **49**: 131-136.
62. **Mishra R** and Shukla SP (1997) Impact of endosulfan on lactate dehydrogenase, from the freshwater catfish, *Clarias batrachus*. *Pestic. Biochem. Physiol.*, 57: 425-433.
63. **Mishra R** and Shukla SP (1997), Impact of endosulfan on cytoplasmic and mitochondrial liver malate dehydrogenase, from the freshwater catfish, *Clarias batrachus*. *Comp. Biochem. Physiol.*, 117C: 425-433.
64. **Mishra R** and Shukla SP (1995) Effects of endosulfan on bioenergetic properties of skeletal muscle mitochondria from the freshwater catfish, *Clarias batrachus*. *Comp. Biochem. Physiol.*, 112C (2): 153-161.
65. **Mishra R** and Shukla SP (1994) Effects of endosulfan on bioenergetic properties of liver mitochondria from the fresh water catfish, *Clarias batrachus*. *Pestic. Biochem. Physiol.* **50**: 240-246.