Rajiv Kumar
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Department of Biotechnology
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Education

Ph.D. (2008-2014)

Area of research	**:** Plant molecular biology and proteomics
Thesis title	**:** Study of dehydration-responsive phosphoproteome of nuclear fraction in chickpea (*Cicer arietinum* L.)
Supervisor	**:** Dr. Niranjan Chakraborty
Institution	**:** National Institute of Plant Genome Research, New Delhi, India

M.Sc. (2006-2008)

Subject	**:** Biotechnology
Institution	**:** School of Biotechnology, Devi Ahilya Vishwavidyalaya, Indore, India

B. Sc. (2001-2004)

Subject	**:** Zoology (Hons.)
Institution	**:** Pandit Ugam Pandey College, Motihari, Bihar, India

Research career:

August 8, 2014-15th December 2015	**:** Post Doctoral research, School of Life Sciences, Jawaharlal Nehru University, New Delhi, India
16th Dec. 2015- 15th Dec. 2019	**:** Scientist, CSIR- Institute of Himalayan Bioresource Technology, Palampur HP, India
16th Dec. 2019- Present	: Senior Scientist, CSIR- Institute of Himalayan Bioresource Technology, Palampur, HP, India

Area of research

Plant adaptation is an evolutionary process that increased survival and reproduction in a newly encountered climate condition. Understanding the molecular mechanistic knowledge of adaptation to environmental stress has important implications in evolutionary ecology. The adaptation process underlies transcriptional, translational, metabolic and epigenetic control during the developmental process. Research in our lab focusing on comprehensive mapping of transcriptome, proteome, metabolome and epigenome of medicinal plants that will be helpful for understanding the multilayered control of adaptation process.

Research Projects

1. PAN-India multicentric study on NeuroCYSTicercosis (NCC): Unravelling its metabolomics and proteoMICS architecture to enable its diagnosis and understand epilepsy (CYST-OMICS) by ICMR: 2023-2026 (**Principal Investigator**)
2. Exploring the molecular mechanism of plant adaptation along an elevational gradient in *Picrorhiza kurroa* a high altitude medicinal plant through proteomics approach by ECR- SERB, DST: 2018-2021 (**Principal Investigator**).
3. Exploration of RBP-RNA interactions to reveal the post-transcriptional regulatory impact and development of related tools and resource server by DBT- IBSD: 2018-2021 **(CO-PI)**
4. Molecular mechanism underlying Apple scar skin viroid-whitefly interaction by CSIR-NCP: 2018-2020 (**CO-PI**).
5. Integrated Next Gen approaches in health, disease and environmental toxicity (INDEPTH) by CSIR: 2016-2017 (**Principal Investigator)**

Awards and Honour

1. Appreciation for the best scientific contribution in CSIR-IHBT for the year 2022-2023
2. Received SERB Early Carrier Research Award 2018
3. Awarded D.S Kothari Postdoctoral Fellowship (2014-2017)
4. Awarded DBT-RA (2014-2019)
5. Qualified for DBT-JRF (2008-2013)
6. Qualified NET-LS in 2008
7. Qualified GATE in Life Science (Percentile: 98.93%) in December 2007
8. Received DBT fellowship for two years (2006-2008) during M.Sc.
9. Qualified in JNU CEEB (2006)

Publication

1. Functional trait correlation network and proteomic analysis reveal multi-factorial adaptation mechanisms to a climatic gradient associated with high-altitude in the Himalayan region, Manglesh Kumari, **Rajiv Kumar***, **Plant Cell and Environment,** 2024 Jan 24. doi: 10.1111/pce.14830. **IF 7.94**
2. *Taenia solium* excretory secretory proteins (ESPs) suppresses TLR4/AKT mediated ROS formation in human macrophages via hsa-miR-125, Naina Arora,Anand K. Keshri,Rimanpreet Kaur,Suraj S. Rawat, **Rajiv Kumar**, Amit Mishra, Amit Prasad , PLOS NEGLECTED TROPICAL DISEASES, Dec 2023. doi.org/10.1371/journal.pntd.0011858 **IF 3.8**
3. Recognition of immune reactive proteins as a potential multiepitope vaccine candidate of Taenia solium cysticerci through proteomic approach. Kaur R, Arora N, Rawat SS, Keshri AK, Singh G, **Kumar R,** J **Cell Biochem. 2023 Sep 12. doi: 10.1002/jcb.30467. IF 4.8**
4. Unique Metabolic Shift Reveals Potential Mechanism of Cold and Freezing Acclimatization, **Rajiv Kumar*, Journal of Plant Growth Regulations, 2023,** 42(1):1-17. DOI: 10.1007/s00344-023-10961-w **IF 4.169**
5. Cold adaptation strategies in plants-An emerging role of epigenetics and antifreeze proteins to engineer cold resilient plant, Satyakam, Gaurav Zinta, Rajesh Kumar Singh, **Rajiv Kumar*, Front Genet. 2022 Aug 25;13:909007. doi: 10.3389/fgene.2022.909007. IF 4.2**
6. Insights from proteomics in kidney disease diagnosis and various in vitro and in vivo experimental models.Vikram Patial*, Garima Dadhich, **Rajiv Kumar*, Sustainable Agriculture Reviews book series, 57, 2022 DOI: 10.1007/978-3-031-07496-7_2**

7. Identification and quantification of eight alkaloids in Aconitum heterophyllum using UHPLC-DAD-QTOF-IMS: A valuable tool for quality control, Ashwani Punia, Robin Joshi* **Rajiv Kumar***, **Phytochemical Analysis**.**2022;1–14, DOI:10.1002/pca.3164. IF 3.02**
8. Nutritional quality evaluation and proteome profile of forage species of Western Himalaya, **Rajiv Kumar***,Robin Joshi, Raman Kumar, Vidyashankar Srivatsan, Satyakam, Amit Chawla, Vikram Patial, Sanjay Kumar, **Grassland Science**, **2021**, **DOI: 10.1111/grs.12357. IF 1.6**
9. Protein-Cloaked Nanoparticles for Enhanced Cellular Association and Controlled Pathophysiology via Immunosurveillance Escape, Aqib Iqbal Dar, Syed M. S. Abidi, Shiwani Randhawa, Robin Joshi, **Rajiv Kumar**, and Amitabha Acharya*****, **ACS Appl. Mater. Interfaces 2021**, https://doi.org/10.1021/acsami.1c20719. IF 9.2
10. In-depth assembly of organ and development dissected Picrorhiza kurroa proteome map using mass spectrometry, Manglesh Kumari, Upendra Kumar Pradhan, Robin Joshi, Ashwani Punia, Ravi Shankar & **Rajiv Kumar***, **BMC Plant Biology** 21: 604, **2021**, https://doi.org/10.1186/s12870-021-03394-8. IF 4.21
11. Evaluating Peptides of *Picrorhiza kurroa* and Their Inhibitory Potential against ACE, DPP-IV, and Oxidative Stress. Shweta Thakur, Jyoti Chhimwal, Robin Joshi, Manglesh Kumari, Yogendra Padwad*, and **Rajiv Kumar* Journal of Proteome Research, 2021,** https://doi.org/10.1021/acs.jproteome.1c00081. IF 4.46
12. Systemic acquired resistance specific proteome of Arabidopsis thaliana. **Rajiv Kumar**, Pragya Barua, Niranjana Chakraborty & Ashis Kumar Nandi. **Plant cell report**. **2020, doi: 10.1007/s00299-020-02583-3. IF 4.57**
13. Metabolic signatures provide novel insights to *Picrorhiza kurroa* adaptation along the altitude in Himalayan region. Manglesh Kumari, Robin Joshi & **Rajiv Kumar***. **Metabolomics. 2020**; 16:77, **doi: 10.1007/s11306-020-01698-8. IF 4.20**
14. Elevated CO2 and temperature influence key proteins and metabolites associated with photosynthesis, antioxidant and carbon metabolism in *Picrorhiza kurroa*. **Rajiv Kumar***, Robin Joshi, Manglesh Kumari, Reema Thakur, Dinesh Kumar*****, Sanjay Kumar*****. **Journal of proteomics. 2020;** 219:103755, **doi: 10.1016/j.jprot.2020.103755. IF 4.04**
15. Unveiling Taenia solium kinome profile and its potential for new therapeutic targets. Naina Arora, Anand Raj, Farhan Anjum, Rimanpreet kaur, Suraj Singh Rawat, **Rajiv Kumar**, Shweta Triphati, Gagandeep Singh & Amit Prasad. **Expert review of proteomics. 2020;** 17:85-91, **doi: 10.1080/14789450.2020.1719835. IF 3.94**
16. Regulation of color transition in purple tea (*Camellia sinensis*). Manglesh Kumari, Shweta Thakur, Ajay Kumar, Robin Joshi, Prakash Kumar, Ravi Shankar, **Rajiv Kumar***. **Planta. 2020**; 251:35, **doi: 10.1007/s00425-019-03328-7. IF 4.11**
17. Neglected Agent Eminent Disease: Linking Human Helminthic Infection, Inflammation, and Malignancy. Naina Arora, Rimanpreet Kaur, Farhan Anjum, Shweta Tripathi, Amit Mishra, **Rajiv Kumar** and Amit Prasad**. Front. Cell. Infect. Microbiol**. **2019**, https://doi.org/10.3389/fcimb.2019.00402. IF 4.83
18. Usnic acid modifies MRSA drug resistance through down-regulation of proteins involved in peptidoglycan and fatty acid biosynthesis. Sneha Sinha, Vivek Kumar Gupta, Parmanand Kumar1, **Rajiv Kumar**, Robin Joshi, Anirban Pal and Mahendra P. Darokar **FEBS Open Bio. 2019**; 9:2025–2040, **doi: 10.1002/2211-5463.12650. IF 2.69**

19. Adaptive mechanisms of medicinal plants along altitude gradient: contribution of proteomics. **Kumar, R*.** & Kumari, M. **Biologia Plantarum 2018;** 62(4):630-640**, DOI: 10.1007/s10535-018-0817-0. IF 1.74**
20. Nuclear phosphoproteome of developing chickpea (*Cicer arietinum* L.) and Protein-Kinase interaction network. **Kumar R,** Kumar A, Subba P, Gayali S, Barua P, Chakraborty S, Chakraborty N. **J Proteomics**. **2014** 13; 105:58-73, **doi: 10.1016/j.jprot.2014.04.002. IF 4.04**
21. Comparative proteomics of dehydration response in the rice nucleus: new insights into the molecular basis of genotype-specific adaptation. Jaiswal DK, Ray D, Choudhary MK, Subba P, Kumar A, Verma J, **Kumar R**, Datta A, Chakraborty S, Chakraborty N. **Proteomics**. **2013**;13(23-24):3478-97, **doi: 10.1002/pmic.201300284. IF 4.0**
22. Characterization of the nuclear proteome of a dehydration-sensitive cultivar of chickpea and comparative proteomic analysis with a tolerant cultivar. Subba P, **Kumar R**, Gayali S, Shekhar S, Parveen S, Pandey A, Datta A, Chakraborty S, Chakraborty N. **Proteomics. 2013,**12-13,1973-92, **doi: 10.1002/pmic.201200380. IF 4.0**
23. Phosphoproteomic Dynamics of Chickpea (*Cicer arietinum* L.) Reveals Shared and Distinct Components of Dehydration Response. Subba P, Barua P, **Kumar R**, Datta A, Soni KK, Chakraborty S, Chakraborty N. **J Proteome Res**. **2013**;12(11):5025-47, **doi: 10.1021/pr400628j. IF 4.46**
24. Analysis of the grass pea proteome and identification of stress-responsive proteins upon exposure to high salinity, low temperature, and abscisic acid treatment. Chattopadhyay A, Subba P, Pandey A, Bhushan D, **Kumar R**, Datta A, Chakraborty S, Chakraborty N. **Photochemistry. 2011**,72,1293-307, **doi: 10.1016/j.phytochem.2011.01.024. IF 4.07**

Referred Papers in Published Conference Proceedings

Metabolic signatures provide novel insights to Picrorhiza kurroa adaptation along the altitude in Himalayan region. Kumari M. Thakur. S, Joshi R. Kumar R: In Proteomic society, India held at ICAR-National Dairy Research Institute Karnal, Haryana, India on 02nd to 4th dec.2019. pp 60.

Plant responses and global significance: Elevated CO_2 and temperature effects on *Picrorhiza kurroa*. Kumar R, Thakur R, Joshi R, Kumar D, Kumar V. S, Kumar S: International conference of proteomics in health and disease held at school of life science, Bhubaneswar, on 30th November -2nd December 2017.

Lab Photo

Year 2016-17

Year 2018-19