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Fields of Interest

I have been fascinated by helicases and their role in various diseases for a long time. I recently published a report on the dual functionality of DEAD-box helicases-41 (DDX41) in innate immunity, as well as how a mutation in DDX41 (R525H) causes MDS/AML illness. My current work focuses on using advanced techniques like CRISPR-Cas9, proximity and self-labelling, mass spectrometry, and high-throughput microscopy to gain a better understanding of the direct role of helicases in kidney disease, exosome biogenesis, and miRNA packaging in exosomes and use it as a non-invasive biomarker in clinical use.

Professional History and Achievements

After completing my Ph.D. in Molecular Medicine and Biotechnology at SGPGIMS in Lucknow, I underwent 7.5 years of postdoctoral training at the University of Saskatchewan in Canada and the University of Utah in the USA. Throughout my research career, I have worked extensively on kidney diseases, the biochemical properties of helicases, and the molecular and cellular mechanisms underlying inflammatory diseases. I am also an author or co-author of several peer-reviewed publications.
My Master's program is sponsored by JNU-CBEE, and I have qualified for GATE, NET-LS, and ICMR-JRF, which also supported my Ph.D. I was honored to receive the Best Global Research Award on Innate Autoimmunity and Cancer from Dialogue India on August 6, 2022, presented by General (Dr.) V. K. Singh (Retd.), the Union Minister for Civil Aviation, Government of India. Additionally, I received a travel grant to attend the Keystone Symposium in Taipei, Taiwan, in 2019, won the Best Poster Award from PSFaM in 2019, and obtained the Publication Fund Award, among other accolades. Recently, on the day of the departmental foundation ceremony for Molecular Medicine & Biotechnology at SGPGIMS, I was recognized as the best teacher based on students' votes. My contributions to kidney diseases and innate immunity have been widely recognized and featured in both national and international media.

Educational History

Ph.D. (2011-2016):	**To study the Statin Modulation of Histone deacetylases in Diabetic Nephropathy.** Department of Molecular Medicine & Biotechnology, Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow- 226014, India
Supervisor:	**Prof. Swasti Tiwari**
M. Sc. (2006 – 2008):	**Industrial Biotechnology** BRD School of Biosciences S.P. University, V.V. Nagar, Gujarat-388120, India

Publications

1. Aggarwal A, Yang S, Lacey Winstone, Arna AB, , **Singh RS** Vizeacoumar FJ and Wu Y. MDS/AML associated DDX41 helicase facilitates homologous recombination repair by resolving R-loops (**Under review in Nucleic Acids Research - NAR-03463-Q-2024**)
2. Mishra DD 1, Sahoo B, **Singh RS**, Behera MR, Tiwari S. Potential biomarkers for non-invasive diagnosis of non-diabetic kidney disease in Type 2 diabetes mellitus patients (**Journal of Diabetic Research**_revison submitted)
3. Al-Rabadi, L.F., Storey, A., Larsen, C.P., Hassen, S.I., Revelo, M.P., **Singh, R.S.,** Lazar-Molnar, E., Jain, D., Ibrahim, A., Darras, F. and Salam, R., De novo Membranous Nephropathy in Renal Allografts is Associated With Protocadherin FAT1. **Kidney International Reports, 2025**, **10(1), pp.247-251.**
4. Nirala BK, Shishodia G, Kumar P, **Singh RS**. Long non-coding RNAs: A Trained Immunity perspective. Gene Protein Disease, 2024. **(corresponding authors)**
5. Wu Yuliang, Arna AB, Patel HK, **Singh RS**, Vizeacoumar FS, Freywald A, Vizeacoumar FJ. Synthetic Lethal Interactions of DEAD/H-box Helicases as Targets for Cancer Therapy **(Front. Oncol., 26 January 2023, Volume 12 - 2022, IF: 6.2)**
6. **Singh RS**, Vidhyasagar V, Yang S, Arna AB, Yadav M, Aggarwal A, Aguilera AN, Shinriki S, Bhanumathy KK, Pandey K, Aizhang Xu, Rapin N, Bosch M, John D, Xiang J, Vizeacoumar FJ, Zhou Y, Misra V, Matsui, Ross SR, and Wu Y. DDX41 is required for cGAS-STING activation against DNA virus infection **(Cell Reports. 2022 May 24;39(8):110856) (IF: 10)**
7. **Singh RS**, Arna AB, Dong H, Yadav M, Aggarwal A, Wu Y. Structure-function analysis of DEAD-box helicase DDX43. **Methods. 2022. (IF: 3.64)**
8. **Singh RS**, Singh AK, Shukla KK, Tripathi AK. COVID-19 pandemic: Evidence from clinical studies. **Journal of Community and Public Health Nursing 2020 Spetember 6 (4):251**
9. Devi S, Kim JJ, Singh AP, Kumar S, Dubey AK, Singh SK, **Singh RS**, Kumar V. Environmental pollutants-induced disruption to protein clearance machinery generates proteotoxicity. **J. Pers. Med. 2021, 11(2),69.(IF:4.78) (share corresponding author)**
10. Yadav, M; **Singh, RS**; Hogan, D; Vidhyasagar, V; Yang, S; Chung, I; Kusalik, A; Dmitriev, O; Cygler; Yuliang; W.The KH domain facilitates the substrate specificity and unwinding processivity of DDX43 helicase. **Journal of Biological Chemistry. 2020 Nov 16:jbc-RA120. (IF:4.4)**
11. **Singh RS**, Gautam J, Pradhan A, Chaudhary DK, Trivedi R, and Tiwari S. Benefits of Cholesterol-lowering on bone microarchitecture in hypercholesteremic diabetic rats **(accepted in Journal of molecular biology and therapeutics)**
12. Kumar P, Godbole NM, Chaturvedi CP, **Singh RS**, George N, Upadhyay A, Anjum B, Godbole MM, Sinha RA. Mechanisms involved in epigenetic down-regulation of Gfap under maternal hypothyroidism. **Biochemical and biophysical research communications. 2018 Jul 20;502(3):375-81. (IF:2.7)**
13. Vidhyasagar V, He Y, Guo M, Talwar T, **Singh RS**, Yadav M, Katselis G,Vizeacoumar FJ, Lukong E, Wu Y. Biochemical characterization of INTS3 and C9ORF80, two subunits of hNABP1/2 heterotrimeric complex in nucleic acid binding. **Biochemical Journal. 2017 Nov 17: BCJ20170351. (IF:4.4)**
14. Tanu T, Vidhyasagar V, Qing J, Guo M, Kariem A, Lu Y, **Singh RS**, Lukong KE, Wu Y. The DEAD-box Protein DDX43 (HAGE) Is a Dual RNA-DNA Helicase and Has a K-homology Domain Required for Full Nucleic Acid Unwinding Activity. **Journal of Biological Chemistry. 2017 May 3: jbc-M117. (IF:4.6)**
15. **Singh RS**, Chaudhary DK, Mohan A, Kumar P, Chaturvedi CP, Ecelbarger CM, Godbole MM, Tiwari S. Greater efficacy of atorvastatin versus a non-statin lipid-lowering agent against renal injury: potential role as a histone deacetylase inhibitor. **Scientific reports. 2016;6. (IF:5.3)**
16. Singh P, Bast F, **Singh RS**. Natural Compounds Targeting Transforming Growth Factor-Î²: In Silico and In Vitro Study. **Electronic Journal of Biology. 2016 Dec 9;13(1). (IF:2.8)**
17. Singh P, **Singh RS**, Rani A, Bast F. Homology modeling of chemokine CCR7, molecular docking, and in vitro studies evidenced plausible immunotherapeutic anticancer natural compounds. **Medicinal Chemistry Research. 2016 Oct 1;25(10):2410-24. (IF:1.5)**

18. Mohan A, **Singh RS**, Kumari M, Garg D, Upadhyay A, Ecelbarger CM, Tripathy S, Tiwari S. Urinary exosomal microRNA-451-5p is a potential early biomarker of diabetic nephropathy in rats. **PloS one. 2016 Apr 21;11(4): e0154055. (IF:3.5)**
19. Gautam J, Choudhary D, Khedgikar V, Kushwaha P, **Singh RS**, Singh D, Tiwari S, Trivedi R. Micro-architectural changes in cancellous bone differ in female and male C57BL/6 mice with high-fat diet-induced low bone mineral density. **British Journal of Nutrition. 2014 May;111(10):1811-21. (IF:3.5)**
20. Tiwari S, **Singh RS**, Li L, Tsukerman S, Godbole M, Pandey G, Ecelbarger CM. Deletion of the insulin receptor in the proximal tubule promotes hyperglycemia. **Journal of the American Society of Nephrology. 2013 May 30: JASN-2012060628. (IF:9.7).**