

Dr. Uma Sharma

Professor

Department of NMR,

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GoogleScholar:

<https://scholar.google.com/citations?user=BKc4TYQAAAAJ&hl=en><https://www.researchgate.net/profile/Uma-Sharma-12><https://in.linkedin.com/in/uma-sharma-39984813>**Research areas**

- Metabolic pheno-typing for personalized health care
- Novel MRI and MRS tools for investigating human diseases
- Metabolomics, proteomics and lipidomics of Auto-immune diseases
- Novel MRI and MRS tools for investigating cancer biology
- Animal model of stroke and cancer

Prof. Uma Sharma has more than 28 years of research experience. The multi-parametric MR-based approaches offer to classify patients according to pathology or their responses to treatment, thus providing biomarkers for diagnosis and prognosis, and improving clinical outcomes. Specifically, our major focus has been on understanding the metabolic abnormalities associated with psychiatric diseases, gastrointestinal diseases such as celiac disease, and gluten ataxia etc. We have explored the biological basis of various psychiatry diseases such as major depressive disorder, obsessive-compulsive disorder, etc, and are developing new biomarkers and strategies based on MR neuroimaging and in vivo MRS methods and metabolomics for better patient management. Moreover, various research works have also been carried out with the Pharmacological department in which the therapeutic efficacy of various drugs such as safinamide, and dihydromyricetin have been evaluated in animal models of stroke using various MR imaging methods, MR spectroscopy, and NMR-based metabolomics. We have also been researching to evaluate the beneficial effects and mechanism of action of natural products in the treatment of liver cancer animal models.

Education: (Post-Graduation onwards)

- Ph.D., Biosciences and Biotechnology, 1996, Indian Institute of Technology, Roorkee,
- Topic: Interaction of anticancerous drug daunomycin with nucleic acids.
- M.Sc., Biosciences, 1990, I division, Indian Institute of Technology, Roorkee.

Professional Career: (Details in reverse chronological order)

- **Professor**, Dept. of NMR, AIIMS (July 2022 – Continuing).
- **Additional Professor**, Dept. of NMR, AIIMS (July 2018 – June 2022).
- **Associate Professor**, Dept. of NMR, AIIMS (July 2015-June 2018).
- **Assistant Professor**, Dept. of NMR, AIIMS (May 2012- June 2015).
- **Scientist-III**, Dept. of NMR, AIIMS (Feb. 2008 to May 2012).
- **Scientist-II**, Dept. of NMR, AIIMS (Feb. 2003 to Jan. 2008).
- **CSIR, Pool Officer**, Dept. of NMR (Jan. 2001 to Jan. 2003).
- **Junior Research Officer**, Dept. of NMR (Dec. 1997 to Dec. 2001).

Research Funding

- Funded research projects: She has funded projects as Principal Investigator from Dept. Of Biotechnology, Govt. of India, SERB, Govt. of India, and AIIMS.

Awards & Recognitions

- AIIMS Excellence Research Award 2022.
- AIIMS Excellence Research Award 2020.
- Dr. R. M. Kasliwal Award 2014 from National Academy of Medical Sciences, Govt. of India.
- Member: National Academy of Medical Sciences, India
- NMR Knowledge Base - November 2015: Journal Highlight: Metabolic abnormalities of gastrointestinal mucosa in celiac disease: An in vitro proton NMR spectroscopy study
- 2nd poster award on our work on “in vivo phosphorus MRS study showing improvement in muscle metabolism of DMD patients who were given oral creatine supplementation in the conference of International Society of magnetic Resonance in Medicine (ISMRM) (2009).
- Best poster award in International Conference on Magnetic Resonance in Biological Systems (ICMRBS) meeting in France (2005).
- Outstanding poster award on In vivo proton magnetic resonance spectroscopic (PMRS) evaluation and its histopathological correlation for characterization of soft tissue sarcomas in Sarcoma Meeting Stuttgart (SMS) 2005.

Membership

- Member: National Academy of Medical Sciences, India
- Life Member, Indian Biophysical Society (IBS)
- Life Member, NMR Society of India (NMRS)
- Life Member, Indian Science Congress (ISC)
- Life Member, International Society for Magnetic Resonance in Medicine (ISMRM)
- Member, Molecular Imaging Society of India (MISI)
- Member, Indian Chapter of International Society for Magnetic Resonance in Medicine (ISMRM)
- Member, Executive Council, Indian Biophysical Society (IBS) (2015 – 2016)

Contributions made towards the development of new therapeutic or diagnostic procedures

Recently we developed a new methodology to guide voxel positioning for MRS (in the absence of contrast-enhanced MRI) using the apparent diffusion coefficient (ADC) of water in malignant breast tissues determined using diffusion MRI with the differentiation of viable and necrotic areas of breast cancer. This will be very useful method in India, as most patients belong to poor socioeconomic status and cannot afford the cost of contrast (Sharma et al., Magn. Reson. Imaging 2012; 30, 649-55). We also demonstrated biomarkers of villous atrophy in patients with celiac disease using NMR based metabonomics approach (Sharma U et al. J of Gastroenterol and Hepatology 2015;30:1492-8) would aid in the development of non-invasive procedures for diagnosis and treatment of patients with celiac disease. We also demonstrated use of MR based multi-parametric approach in monitoring chemotherapy response in breast cancer patients (Sharma U et al. Front Oncol. 2018 Aug 15;8:319. doi: 10.3389/fonc.2018.00319. eCollection 2018). Reprints attached.

Summary of Publications

Research Papers in Refereed Journals	115
Chapter in Books	07
Abstracts in Conference Proceedings	170

Selected Publications (Last 5 years)

1. Rawat V, Upadhyay D, Hans G, Pandey S, Sharan P, Sharma U. Unravelling Structural and Metabolic Alterations in the Hippocampus and Anterior Cingulate Cortex Using Integrated MRI and MRS in Major Depressive Disorder. *NMR Biomed.* 2026;39(4):e70261. doi:10.1002/nbm.70261 ***Corresponding Author**

2. Upadhyay D, Das P, Dattagupta S, Makharia GK, Jagannathan NR, Sharma U. Can arginine, glutamate and glutamine serve as surrogates of intestinal mucosal healing in the patients with celiac disease following gluten-free diet? An NMR based metabolomics study. *Magn Reson Imaging*. 2025;121:110421. doi:10.1016/j.mri.2025.110421
Corresponding Author

3. Yadav Y, Anwar M, Sharma H, Jain S, **Sharma U**, Haldar P, Dey Aparajit B, Dey S. Anti-Inflammatory Peptide Prevents A β ₂₅₋₃₅-Induced Inflammation in Rats via Lipoxigenase Inhibition. *Cells*. 2025;14(13):957. Published 2025 Jun 23. doi:10.3390/cells14130957

4. Dhawan B, **Sharma U**, Gupta S. Molecular mechanisms of fibroblast growth factor in hepatocellular carcinoma. *International J of Pharmaceutical Sciences and Research* 2024; 15 (11): 3129-3140.

5. Sharma A, **Sharma U**, Gupta S. The International Journal of Gastroenterology and Hepatology Diseases 2024; XX: 1-18. DOI: [10.2174/0126662906313034241223071431](https://doi.org/10.2174/0126662906313034241223071431)

6. Puri B, **Sharma U**, Gupta S. Recent updates on herbs for hepatocellular carcinoma. *Journal of Chemical Health Risks* 2023; 13 (06) 3567-3580.

7. Challa A, **Sharma U**, Tyagi R, Kumar P, Sood S, Kachhawa G, Jagannathan NR, Gupta S. Predictive Performance of 1 H-NMR Metabolomics-Derived Biomarkers of Bacterial Vaginosis. *Sex Transm Dis*. 2024 Feb 1;51(2):125-127. doi: 10.1097/OLQ.0000000000001897. Epub 2023 Nov 4. PMID: 37934152.

8. Hans G, **Sharma U**, Gupte N, Ganesh R, Patil V, Sharan P. Proton magnetic resonance spectroscopy-based evaluation of metabolic abnormalities in the right dorsolateral prefrontal cortex and caudate nucleus in treatment-naïve patients with obsessive-compulsive disorder. *Indian J Psychiatry*. 2023 Nov;65(11):1151-1157. doi: 10.4103/indianjpsychiatry.indianjpsychiatry_663_23. Epub 2023 Nov 24. PMID: 38249138; PMCID: PMC10795662.

9. Sharma H, Reeta KH, **Sharma U**, Suri V, Singh S. AMPA receptor modulation through sequential treatment with perampanel and aniracetam mitigates post-stroke damage in experimental model of ischemic stroke. *Naunyn Schmiedebergs Arch Pharmacol*. 2023 Dec;396(12):3529-3545. doi: 10.1007/s00210-023-02544-z. Epub 2023 May 25. PMID: 37231168.

10. Sharma H, Reeta KH, **Sharma U**, Suri V. Decanoic acid mitigates ischemia reperfusion injury by modulating neuroprotective, inflammatory and oxidative pathways in middle cerebral artery occlusion model of stroke in rats. *J Stroke Cerebrovasc Dis*. 2023 Aug;32(8):107184. doi: 10.1016/j.jstrokecerebrovasdis.2023.107184. Epub 2023 Jun 3. PMID: 37276786.

11. Sharma N, Upadhyay D, Gautam H, **Sharma U**, Lodha R, Kabra SK, Das BK, Kapil A, Mohan A, Jagannathan NR, Guleria R, Singh UB. Small molecule bio-signature in childhood intra-thoracic tuberculosis identified by metabolomics. *NMR Biomed*. 2023 Mar 30:e4941. doi: 10.1002/nbm.4941. Epub ahead of print. PMID: 36999218.

12. Upadhyay, D., Das, P., Dattagupta, S., Makharia, G. K., Jagannathan, N. R., & **Sharma, U.** (2022). NMR based metabolic profiling of patients with potential celiac disease elucidating early biochemical changes of gluten-sensitivity: A pilot study. *Clinica chimica acta; international journal of clinical chemistry*, 531, 291–301. Advance online publication. <https://doi.org/10.1016/j.cca.2022.04.999> ***Corresponding Author**
13. Vishwa Rawat, Ritu Tyagi, Inder Singh, Prasenjit Das, Achal Kumar Srivastava, Govind K Makharia, **Uma Sharma** (2022). Cerebellar abnormalities on proton MR spectroscopy and Imaging in patients with Gluten Ataxia: A pilot study. *Frontiers in Human Neuroscience* (Impact factor 3.169) (Accepted). ***Corresponding Author**
14. Gupta S, Sharma U. Intraluminal filament middle cerebral artery occlusion model of transient focal cerebral ischemia in rats. 2022; Eds. "Martin, Patel, & Preedy - Handbook of Animal Models in Neurological Disease" to be published by Elsevier. Accepted. ***Corresponding Author**
15. Tyagi R, Kumar P and **Sharma U.** Metabolomics techniques: A brief update. Sep 2021. Pg. no. 1-29. Published in *Epigenetics and Metabolomics*, Eds Paban K Agarawal and Poonam Rana. Series Translational Epigenetics Series, Volume 28. Series Editor, Trygve Tollefsbol. Academic Press, Elsevier. ***Corresponding Author**
16. Joshi B, Singh D, Wasan H, **Sharma U**, Reeta KH. Tideglusib Ameliorates Ischemia/Reperfusion Damage by Inhibiting GSK-3 β and Apoptosis in Rat Model of Ischemic Stroke. *J Stroke Cerebrovasc Dis.* 2022;31(4):106349. doi: 10.1016/j.jstrokecerebrovasdis.2022.106349.
17. Chhabra A, **Sharma U**, Kumar R, Laroiya I, Bhatia A, Chadha V, Vatsa R, Upadhyay D, Kaur K, Bal A, Singh G, Mittal BR, Shukla J. Tc-99m tamoxifen: a novel diagnostic imaging agent for estrogen receptor expressing breast cancer patients. *Diagn Interv Radiol* 2022; DOI 10.5152/dir.2022.201051 ***Corresponding Author**
18. Chhabra A, Shukla J, **Sharma U**, Vatsa R, Bhatia A, Upadhyay D, Mittal BR. Re-188-tricarboxyl tamoxifen as a theranostic radiopharmaceutical for estrogen receptor expressing breast cancers: radiolabeling, characterization and in-vitro cytotoxic assessment. *Nucl Med Commun.* 2021 Jul 1;42(7):738-746.
19. **Sharma U**, Jagannathan NR. MR spectroscopy in breast cancer metabolomics. *Anal Sci Adv.* 2021;1-15. <https://doi.org/10.1002/ansa.202000160>. ***Corresponding Author**

20. Bhushan B, Upadhyay D, **Sharma U**, Jagannathan N, Singh SB, Ganju L. Urine metabolite profiling of Indian Antarctic Expedition members: NMR spectroscopy-based metabolomic investigation. *Heliyon*. 2021 May 25;7(5):e07114. doi: 10.1016/j.heliyon.2021.e07114.
21. Wasan H, Singh D, Joshi B, **Sharma U**, Dinda AK, Reeta KH. Post Stroke Safinamide Treatment Attenuates Neurological Damage by Modulating Autophagy and Apoptosis in Experimental Model of Stroke in Rats. *Mol Neurobiol*. 2021 Aug 28. doi: 10.1007/s12035-021-02523-6.
22. Gupta S, **Sharma U**. Metabolomics of Neurological Disorders in India. *Anal Sci Adv*. 2021: doi.org/10.1002/ansa.202000169 ***Corresponding Author**
23. Wasan H, Singh D, Joshi B, Upadhyay D, **Sharma U**, Dinda AK, Reeta KH. Dihydromyricetin alleviates cerebral ischemia-reperfusion injury by attenuating apoptosis and astrogliosis in peri-infarct cortex. *Neurological Research*, 2021: DOI: 10.1080/01616412.2021.1997010.
24. Tyagi R, Upadhyay D, **Sharma U**. NMR Based Metabolomics Approach and its Clinical Applications. *Chettinad Health City Medical Journal*, 2020; 9(4): DOI: <https://doi.org/10.36503/chcmj> ***Corresponding Author**
25. **Sharma U**, Jagannathan NR. Metabolism of prostate cancer by magnetic resonance spectroscopy (MRS). *Biophys Rev*. 2020 Oct;12(5):1163-1173. doi: 10.1007/s12551-020-00758-6. ***Corresponding Author**
26. Kulshreshtha M, **Sharma U**. Editorial for "Enhanced Mass on Contrast-Enhanced Breast MRI: Differentiation Using a Combination of Dynamic Contrast-Enhanced MRI and Quantitative Evaluation With Synthetic MRI". *J Magn Reson Imaging*. 2021 Feb;53(2):392-393. doi: 10.1002/jmri.27379. ***Corresponding Author**
27. **Sharma U**. Editorial for "Synchronous Breast Cancer: Phenotypic Similarities on MRI". *J Magn Reson Imaging*. 2020; doi:10.1002/jmri.27102. ***Corresponding Author**
28. Upadhyay D, Singh A, Das P, Mehtab J, Dattagupta S, Ahuja V, Makharia GK, Jagannathan NR and **Sharma U**. Abnormalities in metabolic pathways in Celiac disease investigated by the metabolic profiling of small intestinal mucosa, blood plasma and urine by NMR spectroscopy. *NMR Biomed*. 2020;33(8):e4305. ***Corresponding Author**
29. Gupta S, **Sharma U**, Jagannathan NR and Gupta YK. 1H NMR metabolomic profiling revealed neuroprotective effect of lercanidipine in MCAo model of stroke. *Journal of Pharmacy and Pharmacology*, 72 (2020), pp. 816–825.

30. **Sharma U**, Jagannathan NR. Breast Cancer Metabolomics Using NMR. *Methods Mol Biol.* 2019;2037:195-213.
31. **Sharma U**, Jagannathan NR. In vivo MR spectroscopy for breast cancer diagnosis. *BJR Open.* 2019 Jul 2;1(1):20180040. doi: 10.1259/bjro.20180040. PMID: 33178927; PMCID: PMC7592438. ***Corresponding author.**
32. **Sharma U**, Agarwal K, Hari S, Mathur SR, Seenu V, Parshad R, Jagannathan NR. Role of diffusion weighted imaging and magnetic resonance spectroscopy in breast cancer patients with indeterminate dynamic contrast enhanced magnetic resonance imaging findings. *Magn Reson Imaging.* 2019 May 22;61:66-72. doi: 10.1016/j.mri.2019.05.032.
33. Parmar A, Sharan P, Khandelwal SK, Agarwal K, **Sharma U**, Jagannathan NR. Brain neurochemistry in unmedicated Obsessive Compulsive Disorder patients and effects of 12-week escitalopram treatment: A (1) H-magnetic resonance spectroscopy study. *Psychiatry Clin Neurosci.* 2019 Jul;73(7):386-393. doi: 10.1111/pcn.12850.
34. Singh D, Reeta KH, **Sharma U**, Jagannathan NR, Dinda AK, Gupta YK. Neuro-protective effect of monomethyl fumarate on ischemia reperfusion injury in rats: Role of Nrf2/HO1 pathway in peri-infarct region. *Neurochem Int.* 2019 Jun;126:96-108. doi: 10.1016/j.neuint.2019.03.010.
35. Sharma A, **Sharma U**, Jagannathan NR, Ray R, Rajeswari MR. Effect of Doxorubicin on Squamous Cell Carcinoma of Skin: Assessment by MRI Relaxometry at 4.7T. *Cancer Invest.* 2019;37(8):339-354. doi: 10.1080/07357907.2019.1651327.

Research Funding in last 5 yrs

1. **Project Title:** An integrated metabolomics and lipidomics approach for identifying biomarkers for early diagnosis and histological subtyping of the Non-Small-Cell-Lung Cancer. **Funds:** Rs. 1,06,78,305, **Duration:** 2024- 2027, **Funding Agency:** ICMR, Govt. of India
2. **Project Title:** Elucidating pathophysiology of rheumatoid arthritis and identification of biomarkers of response using metabolomics and proteomics. **Funds:** Rs. 44.23 Lacs, **Duration:** 2021- 2024, **Funding Agency:** ICMR, Govt. of India
3. **Project Title:** Elucidating the structural, neurobiological changes and identification of non-invasive biomarkers using magnetic resonance imaging and spectroscopy in major depressive disorder. **Funds:** Rs. 33,08,080/- **Duration:** 2020 to 2023. **Funding Agency:**SERB-DST, Govt. of India

Details of Projects as a Mentor

- 1. DST-SERB Teachers Associateship for Research Excellence (TARE) scheme for the project entitled “Comparison of Cow Colostrum alone and in combination with Cancertame in STAM induced Nonalcoholic Steatohepatitis-associated Hepatocellular Carcinoma in Mice” (2021 to 2024).**
- 2. Women scientist A under the Department of Science and Technology (DST) scheme for the project entitled “Identification of urinary and lipidomic biomarkers for major depressive disorder (MDD) and generalized anxiety disorder (GAD) by combined application of NMR and LC MS-based metabolomics approach” (2023-2026).**