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Research

Dr. Verma broad area of research involves membrane remodeling during membrane-fusion with potential translational interventions in health and disease. His group is presently working on membrane-fusion involved during many key biological processes (virus-infection and development). In context to research focusing virus-pathogenesis his group current work is to understand SARS-CoV-2 membrane-remodeling process during infection and to have molecular insight of COVID-19 disease associated blood disorder. Considering fast transmission rate of emerging SARS-CoV-2 variants with short-lived immunity, his group is also working in the direction to understand how virus re-shapes host immune antibody responses which confer protection with disease severity and possibility of superinfection. To understand SARS-CoV-2 immunity and disease pathobiology of COVID-19; his group is developing arsenal of cell-based and viral surrogate tools with potential to deploy them for robust antiviral therapeutics screening targeting virus entry & spread stage and characterize host factors regulating virus pathogenesis. In context to cellular-shaping during cell-fusion in development, Dr. Verma group is also working at the interface of development and membrane biology to understand membrane-remodeling during placenta shaping and identifying novel biomarkers for early detection of maternal disease with placental disorder.

Professional Qualifications & Experience

Academic Qualifications

Degree	Year	Subject	University/Institution
PhD	2008	Biochemistry	University of Delhi, India
MSc	2002	Biotechnology	Indian Institute of Technology (IIT), Roorkee, India

Professional & Research Experience

Positions held	Name of the Institute	From	To
Associate Professor, Department of Molecular Medicine & Biotechnology	SGPGIMS, Lucknow, India	July 2022	Till date
Assistant Professor, Department of Molecular Medicine & Biotechnology	SGPGIMS, Lucknow, India	March 2019	June 2022
Assistant Instructor (Junior Faculty appointment), Department of Molecular Biology	UT Southwestern Medical Center, Dallas, Texas, USA	August 2018	March 2019
Visiting Postdoctoral Fellow, Section on Membrane Biology	NICHD, National Institutes of Health (NIH), Bethesda, USA	November 2011	November 2017
Assistant Professor, Center for Biotechnology	University of Allahabad, India	March 2009	October 2011

Research Grants (As Principal Investigator):

1. ICMR-Extramural Research Grant (2023-2024); (Ongoing)
2. SERB-Core Research Grant (2022-2025); (Ongoing)
3. DBT, Govt. of India (2020-2023); (Ongoing)
4. SGPGIMS, Intramural Research Grants: 2019-21 (Completed); 2020-23 (Ongoing); 2023-24 (Ongoing)

Publications

Articles & Reviews

1. Kumar V., Mishra S., Sharma R., Agarwal J., Ghoshal U., Khanna T., Sharma L.K., **Verma S.K.**, Mishra P., and Tiwari S. (2022) Development of RNA-based assay for rapid detection of SARS-CoV-2 in clinical samples. *Intervirolgy*, Feb 22. doi: 10.1159/000522337. Epub ahead of print
2. Tiwari S., Kumar V., Randhawa S., and **Verma S.K.** (2021) Preparation and characterization of Extracellular Vesicles. *Am J Reprod Immunol.*, **85(2):e13367**
3. Awasthi M. *, Gulati S. *, Sarkar D.P., Tiwari S., Kateriya S., Ranjan P.†, and **Verma S.K.** †(2020) The Sialoside-Binding Pocket of SARS-CoV-2 Spike Glycoprotein Structurally Resembles MERS-CoV. *Viruses*, **12(9):E909** (* Equal co-first author) (†Corresponding author)
4. Uygur B., Leikina E., Melikov K., Villasmi R., **Verma S.K.**, Vary C.P.H., Chernomordik L.V. (2019) Interactions with muscle cells boost fusion, stemness and drug resistance of prostate cancer cells *Mol. Cancer Res.*, **17(3): 806-820**
5. **Verma S.K.**, Leikina E., Melikov K., Gebert C., Kram V., Young M.F., Uygur B., and Chernomordik L. V. (2018) Cell-surface phosphatidylserine regulates osteoclast precursor fusion *J. Biol. Chem.*, **293 (1): 254-270**
6. **Verma S.K.** Chernomordik L. V. and Melikov K. (2018) An improved metrics for osteoclast multinucleation. *Sci. Rep.*, **8(1): 1768**
7. **Verma S.K.**, Leikina E., Melikov K. and Chernomordik L. V. (2014) Late stages of synchronized macrophage fusion in osteoclast formation depends on dynamin. *Biochem. J.*, **464:** 293-300
8. Leikina E., Melikov K., Sanyal S., **Verma, S. K.**, Eun B., Gebert C., Pfeifer K., Lizunov V.A., Kozolov M.M., And Chernomordik L. V. (2013) Extracellular annexins and dynamin are important for sequential steps in myoblast fusion *J. Cell Biol.*, **200:** 109-123
 - Journal highlighted this study as “In Focus” article entitled as ‘The Two stages of cell fusion’ *J. Cell Biol.*, (2013) **200:** 3
 - “Primary myoblast fuse to form multinucleated myotubes” presented as Cover Page Illustration *J. Cell Biol.*, (2013) **200** (1)
9. Krishnan, A.*, **Verma, S. K.***, Mani P., Gupta, R., Kundu, S. and Sarkar, D. P. (2009) A histidine switch in hemagglutinin-neuraminidase triggers Paramyxovirus-cell membrane fusion *J. Virol.*, **83:**1727-1741 (* Equal co-first author)
10. **Verma, S. K.***, Mani, P.*, Sharma, N. R.*, Krishnan, A., Kumar, V.V., Reddy, B. S., Chaudhuri, A., Roy, R.P. and Sarkar, D.P. (2005) Histidylated lipid-modified Sendai viral envelopes mediate enhanced membrane fusion and potentiate targeted gene delivery *J. Biol. Chem.*, **280:** 35399– 35409 (* co-first author)

Preprint publications

1. Awasthi M. *, Gulati S. *, Sarkar D.P., Tiwari S., Kateriya S., Ranjan P.†, and **Verma S.K.** †(2020) N-terminal domain (NTD) of SARS-CoV-2 spike protein structurally resembles MERS-CoV NTD sialoside-binding pocket. *Research Square* (* **Equal co-first author**) (†**corresponding author**)
2. Kumar V., Mishra S., Sharma R., Agarwal J., Ghoshal U., Khanna T., Sharma L.K., **Verma S.K.**, and Tiwari S. (2020) Development of RNA-based assay for rapid detection of SARS-CoV-2 in clinical samples. *bioRxiv*

Blog articles

- **Scientific Blog article** (Scientific Outreach programme): Blog article entitled as, “**Sugars as an alternate receptors for SARS-CoV-2**” related to our COVID-19 research contribution published in journal “*viruses*” published online on **SCI-SOUP (8th Dec. 2020)** <https://scisoup.org/article/2020/sugars-as-an-alternate-receptors-for-SARS.html>