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Academic Details:

- PhD in Biochemistry in the year 1994, All India Institute of Medical Sciences, New Delhi.
- Masters in Science (M.Sc in Biochemistry) in the year 1987, SIES College, Mumbai

Dr. Kalpana Luthra is a Professor & Head in the Department of Biochemistry, All India Institute of Medical Sciences (AIIMS), New Delhi, India. She completed her PhD at AIIMS in 1994 and joined as faculty at AIIMS in 1998. She was awarded Shakuntala Amir Chand Prize by Indian Council of Medical Research (ICMR) for the year 2003 & Fogarty fellowship in 2002 and availed training in HIV-1 antibody related work at New York University. She is a Fellow of The National Academy of Medical Sciences India (NAMS), National Academy of Sciences, India (NASI) & Indian National Science Academy (INSA).

Research Focus of the lab

HIV Immunology: Coevolution of virus and antibody responses, generation and characterization of human recombinant anti-HIV-1 monoclonal antibodies

HIV-1 is a complex virus with a remarkable ability to protect itself from our intricate network of immune system. This is achieved by masking itself from the immune recognition by acquiring the host proteins or by escaping the humoral response by virtue of its extraordinary ability to mutate. This leads to generation of diverse strains of HIV-1 virus, making the treatment and prevention a complicated process. More than 90% of the HIV-1 infections in India are caused by clade C viruses. Our lab focuses on studying various aspects of HIV-1 infection which includes:

- Characterizing the antibody responses against the circulating virus in infected donors, particularly infected infants and pediatric patients.
- Generation and characterization of human anti-HIV-1 recombinant monoclonal antibodies as potential therapeutic reagents against HIV-1.
- To study the coevolution of virus and antibody responses during natural infection and map neutralization determinants on the HIV-1C viruses circulating in infant and adult infected individuals to identify clade C specific epitopes for immunogen design.
- Currently, our lab is in the process of generating native-like, soluble HIV-1 envelope immunogens and characterizing their potential as vaccine candidates in rabbits. Towards this, we have recently designed and immunogenically characterized an HIV-1 clade C pediatric envelope glycoprotein stabilized by multiple platforms, providing a candidate immunogen for further pre-clinical evaluation (Kumar S et al. Vaccines, 2025).

Studies on pediatric HIV-1 infection

HIV-1C primary isolates generated in our lab from select infected children showed resistance to neutralization by majority of the known second generation bNAbs (Makhdoomi et al, *Virology* 2016). We followed up antiretroviral naïve chronically infected children and mapped their plasma for presence of bNAbs (Makhdoomi et al. *J Gen Virol.* 2017 Jul;98(7):1879-189) and identified a pair of identical twins AIIMS_329 and AIIMS_330. The plasma from both donors showed the evolvement of bNAbs targeting common epitopes in the V2 and V3 regions of the envelope, suggesting bnAb development in these twins may perhaps be determined by specific sequences in the shared virus that can guide development of immunogens aimed at eliciting V2 and V3 bNAbs. Characterization of the neutralization sensitive and resistant viruses coevolving with bNAbs in the contemporaneous AIIMS_330 plasma provides information towards understanding viral alterations that may have contributed to the development of resistance to bNAbs. (Mishra N. *J Virol* <https://doi.org/10.1128/JVI.00654-19>).

Our work on circulating HIV-1 in perinatally infected infants defined viral factors associated with early bnAb responses, supportive of polyvalent vaccination approaches capable of inducing bnAbs against HIV-1 (Mishra N. Nat. Commun., 2020) 11:4409 <https://doi.org/10.1038/s41467-020-18225-x>). As in the case of monozygotic twins, we identified that the antibody response in infants primarily targets the V2 region of HIV-1, making it an attractive target for immunogen design to elicit antibodies.

Using the high throughput technology of HIV-1 specific single B cell sorting, we isolated a bnAb AIIMS-P01 from a pediatric elite neutralizer (Kumar et al, *JVI*, 2019). This mAb has shown 67% breadth at a potency of 0.5 µg/ml, and shows good neutralizing activity against Indian clade C viruses and needs to be tested in future for in vivo protection against HIV-1 infection.

Recently, we generated and structurally analyzed a heavy chain matured lineage antibody 44m of the parental anti-HIV-1 human monoclonal AIIMS P01, that demonstrated improved neutralization potential against globally diverse viruses, as compared to the parent antibody (Kumar S et al. *iScience*. 2023). Further, using B cell receptor repertoire sequencing of HIV-1 pediatric elite-neutralizers, we identified multiple broadly neutralizing antibody clonotypes targeting diverse epitopes of the HIV-1 envelope, providing a substrate for future antibody isolation and lineage-guided immunogen design (Kumar S et al. *Front Immunol.*, 2024).

SARS-CoV-2

During the COVID-19 pandemic, neutralizing antibodies have been shown to be a critical feature of recovered patients. Given the unique nature of HIV-1 bnAbs and their ability to recognize and/or accommodate viral glycans, we reasoned that the glycan shield of SARS-CoV-2 spike protein can be targeted by HIV-1 specific bnAbs. We showed that HIV-1 specific monoclonal antibodies as well as polyclonal plasma antibodies cross-react and neutralize SARS-CoV-2. (Mishra N. *PLoS Pathog* 2021. 17(9): e1009958 <https://doi.org/10.1371/journal.ppat.1009958>).

Diagnostics for HIV-1 Clade C

Recognizing the need for rapid, accessible diagnostic tools suited to the Indian context, our lab has developed a CRISPR/Cas12a-based assay for the detection of HIV-1 Clade C in infants, extending our work into translational diagnostic technology (Gaur A et al. *Clin Chim Acta*, 2026).

Publications (Selected publications since last 5 years)

1. Gaur A, Bhakhri H, Mishra N, Sharma S, Bansal T, Kalaivani M, Brijwal M, Das BK, Lodha R, Sinha S, **Luthra K**. [A rapid CRISPR/Cas12a-based assay for the detection of HIV-1 Clade C in infants](#). *Clin Chim Acta*. 2026 Jan 1;578:120518. doi: 10.1016/j.cca.2025.120518. Epub 2025 Jul 30. PMID: 40749819.
2. Srivastava A, Anand S, Kumar H, Meena JK, Verma A, **Luthra K**, Hari P. [Urinary NGAL and renalase as non-invasive biomarkers for detection of deterioration of kidney function](#)

- [and kidney scarring in children with neurogenic bladder](#). *Pediatr Nephrol*. 2025 Sep;40(9):2871-2877. doi: 10.1007/s00467-025-06808-z. Epub 2025 May 14. PMID: 40369125.
3. Agarwal M, Seth R, **Luthra K**. [Expression of CRLF2 gene in childhood B lineage lymphoblastic leukemia: A prospective analytical study](#). *Med J Armed Forces India*. 2025 Jul-Aug;81(4):416-423. doi: 10.1016/j.mjafi.2023.11.011. Epub 2024 Feb 10. PMID: 40697681.
 4. Kumar S, Moral-Sánchez ID, Singh S, Newby ML, Allen JD, Bijl TPL, Vaghani Y, Jing L, Lodha R, Ortlund EA, Crispin M, Patel A, Sanders RW, **Luthra K**. [The Design and Immunogenicity of an HIV-1 Clade C Pediatric Envelope Glycoprotein Stabilized by Multiple Platforms](#). *Vaccines (Basel)*. 2025 Jan 22;13(2):110. doi: 10.3390/vaccines13020110. PMCID: PMC11860714.
 5. Faisal S, Vats D, Panda S, Sharma V, **Luthra K**, Mohan A, Kulkarni S, Gupta PK, Singh A. [Synergistic role of Mycobacterium indicus pranii and human beta Defensin-2 as adjunctive therapy against Mycobacterium tuberculosis](#). *Tuberculosis (Edinb)*. 2024 Oct 15;149:102571. doi: 10.1016/j.tube.2024.102571. PMID: 39442483.
 6. Goel L, Gupta P, Kumar L, Velpandian T, Singh A, **Luthra K**, Gupta YK. [Effect of CYP2C19 polymorphism on response to bortezomib-based therapy in multiple myeloma patients](#). *Am J Med Sci*. 2024 Jul;368(1):18-24. doi: 10.1016/j.amjms.2024.03.022.
 7. Khan MT, Almas M, Malik N, Jalota A, Sharma S, Ali SA, **Luthra K**, Suri V, Suri A, Basak S, Seth P, Chosdol K, Sinha S. [STAT1 mediated downregulation of the tumor suppressor gene PDCD4, is driven by the atypical cadherin FAT1, in glioblastoma](#). *Cell Signal*. 2024 Jul;119:111178. doi: 10.1016/j.cellsig.2024.111178. Epub 2024 Apr 18.
 8. Panda S, Tiwari A, **Luthra K**, Kumar K, Singh A. [Nitric oxide brings innate immune resistance to M. tuberculosis infection among high-risk household contacts of pulmonary tuberculosis patients](#). *J Biosci*. 2024;49:73. doi: 10.1007/s12038-024-00459-2. PMID: 39046034.
 9. Panda S, Arora A, **Luthra K**, Mohan A, Vikram NK, Kumar Gupta N, Singh A. [Hyperglycemia modulates M1/M2 macrophage polarization in chronic diabetic patients with pulmonary tuberculosis infection](#). *Immunobiology*. 2024 Mar;229(2):152787. doi: 10.1016/j.imbio.2024.152787. Epub 2024 Jan 14. PMID: 38271857.
 10. Kumar S, Bajpai P, Joyce C, Kabra SK, Lodha R, Burton DR, Briney B, **Luthra K**. [B cell repertoire sequencing of HIV-1 pediatric elite-neutralizers identifies multiple broadly](#)

[neutralizing antibody clonotypes](#). Front Immunol. 2024 Feb 16;15:1272493. doi: 10.3389/fimmu.2024.1272493. eCollection 2024. PMID: 38433846.

11. Kumar S, Singh S, Chatterjee A, Bajpai P, Sharma S, Katpara S, Bhakhri H, Lodha R, Dutta S, **Luthra K**. Recognition determinants of improved HIV-1 neutralization by a heavy chain matured pediatric antibody. iScience. 2023 Aug 9;26(9):107579. doi: 10.1016/j.isci.2023.107579. eCollection 2023 Sep 15. PMID: 37649696.
12. S Kumar, S Singh, K Luthra, An Overview of Human Anti-HIV-1 Neutralizing Antibodies against Diverse Epitopes of HIV-1, ACS omega, 2023 - ACS Publications, 8, 8, 7252–7261, February 15, 2023 <https://doi.org/10.1021/acsomega.2c07933>
13. Meena K, Misra A, Vikram N, Ali S, Upadhyay AD, **Luthra K**. Genetic polymorphism of fatty acid binding protein-2 in hyperlipidemic Asian Indians in North India. Am J Hum Biol 2023 Mar;35(3):e23834. doi: 10.1002/ajhb.23834
14. Ray MD, Deo SVS, Luthra K, Mathur S, Anand P, Kumar R, Sharma S, Kahol S, Wahid A. Molecular linking of HIPEC (Hyperthermic Intraperitoneal Chemotherapy) and T-regulatory cells (FOXP3) and Th-17 (RORγ) in advanced epithelial ovarian cancer. Clin Immunol Commun. 2022 Dec 1;2:62–8.doi.org/10.1016/j.clicom.2022.03.005
15. Mishra N, Kumar S, Singh S, Bansal T, Jain N, Saluja S, Kumar R , Bhattacharyya S , Jayanth Palanichamy J, Mir RA, Sinha S , Luthra K. (Sept 2021) Cross-neutralization of SARS-CoV-2 by HIV-1 specific broadly neutralizing antibodies and polyclonal plasma. PLoS Pathog. 2021 Sep 24;17(9):e1009958. doi: 10.1371/journal.ppat.1009958. eCollection 2021 Sep.PMID: 34559854
16. Singh V, Nambirajan A, Malik PS, Thulkar S, Pandey RM, Luthra K, Arava S, Ray R, Mohan A, Jain D. Spectrum of uncommon and compound epidermal growth factor receptor mutations in non-small-cell lung carcinomas with treatment response and outcome analysis: A study from India. Lung Cancer. 2020 Nov;149:53-60. doi: 10.1016/j.lungcan.2020.07.038. Epub 2020 Sep 13. PMID: 32971387
17. Mishra N, Sharma S, Dobhal A, Kumar S, Chawla H, Singh R, Makhdoomi MA, Das BK, Lodha R, Kabra SK, Luthra K. Broadly neutralizing plasma antibodies effective against autologous circulating viruses in infants with multivariant HIV-1 infection. Nat Commun. 2020 Sep 2;11(1):4409. *Nat Commun*. 2020; 11: 4409. Published online 2020 Sep 2. doi: 10.1038/s41467-020-18225-x PMCID: PMC7468291
18. Mohan A, Ansari A, Masroor M, Saxena A, Pandey RM, Upadhyay A, Luthra K, Khilnani GC, Jain D, Kumar R, Guleria R. Measurement of Serum EGFR mRNA Expression is a Reliable Predictor of Treatment Response and Survival Outcomes in Non- Small Cell Lung

Cancer. Asian Pac J Cancer Prev. 2020 Nov 1;21(11):3153-3163. doi: 10.31557/APJCP. 2020. 21.11.3153. PMID: 33247670

19. Mishra N, Sharma S, Dobhal A, Kumar S, Chawla H, Singh R, Das BK, Kabra SK, Lodha R, Luthra K. A Rare Mutation in an Infant-Derived HIV-1 Envelope Glycoprotein Alters Interprotomer Stability and Susceptibility to Broadly Neutralizing Antibodies Targeting the Trimer Apex. J Virol. 2020 Sep 15;94(19):e00814-20. doi: 10.1128/JVI.00814-20. Print 2020 Sep 15. PMID: 32669335
20. Kumar S, Batra H, Singh S, Chawla H, Singh R, Katpara S, Hussain AW, Das BK, Lodha R, Kabra SK, Luthra K. Effect of combination antiretroviral therapy on human immunodeficiency virus 1 specific antibody responses in subtype-C infected children. J Gen Virol 2020 Dec;101(12):1289-1299. doi: 10.1099/jgv.0.001480. Epub 2020 Sep 11
21. Sahu AK, Aggarwal P, Ekka M, Nayer J, Bhoi S, Kumar A, Luthra K. Top of Form Assessing the serum chymase level as an early predictor of dengue severity. J Med Virol. 2020 Aug 28. doi: 10.1002/jmv.26468. Online ahead of print. PMID: 32857465
22. Sharma V, Makhdoomi M, Singh L, Kumar P, Khan N, Singh S, Verma HN, Luthra K, Sarkar S, Kumar D. Trehalose limits opportunistic mycobacterial survival during HIV co-infection by reversing HIV-mediated autophagy block. Autophagy. 2020 Feb 20;1-20. doi: 10.1080/15548627.2020.1725374
23. Panda S, Tiwari A, Luthra K, Sharma SK, Singh A. Association of Fok1 VDR polymorphism with Vitamin D and its associated molecules in pulmonary tuberculosis patients and their household contacts. Sci Rep. 2019 Oct 24;9(1):15251. doi: 10.1038/s41598-019-51803-8
24. Kumar R, Parray HA, Shrivastava T, Sinha S, Luthra K. Phage display antibody libraries: A robust approach for generation of recombinant human monoclonal antibodies. Int J Biol Macromol. 2019 Aug 15;135:907-918. doi: 10.1016/j.ijbiomac.2019.06.006. Epub 2019 Jun 3
25. Panda S, Tiwari A, Luthra K, Sharma SK, Singh A. Status of vitamin D and the associated host factors in pulmonary tuberculosis patients and their household contacts: A cross sectional study. J Steroid Biochem Mol Biol. 2019 Oct;193:105419. doi: 10.1016/j.jsbmb.2019.105419.
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27. Nitesh Mishra, Madhav Mohata, Rajeev Narang, R. Lakshmy, Anjali Hazarika, R. M. Pandey, Nibhriti Das and Kalpana Luthra. Altered Expression of Complement Regulatory

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29. Mochan S, Dhingra MK, Gupta SK, Saxena S, Arora P, Yadav V, Rani N, Luthra K, Dwivedi S, Bhatla N, Dhingra R. Status of VEGF in preeclampsia and its effect on endoplasmic reticulum stress in placental trophoblast cells. *Eur J Obstet Gynecol Reprod Biol X*. 2019 Jun 21;4:100070. doi: 10.1016/j.eurox.2019.100070
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Chapters in Books

- Chapter on “Indian Scientist major contribution in the field for Nobel Prize” in “Nobel Dreams of India” Editors: Dr Archana Sharma, Dr. Sweta Vijaykrishnan. 2020

- Muzamil A. Makhdoomi, Lubina Khan, Sanjeev Kumar, Heena Aggarwal, Ravinder Singh, Rakesh Lodha, Mohit Singla. Bimal K Das, Sushil K. Kabra and Kalpana Luthra. Title of the Chapter: “Cross-neutralizing antibodies involve in plasma of chronic HIV-1 infected ART naïve children (long term non-progressors) from India”, (Editors: Satish Kumar Gupta and Nirmal Kumar Lohiya), Name of the Book: “Molecular Medicine Bench to Beside and Beyond” 2018, page 253-260, Publisher: Indian society for the study of reproduction and fertility, University of Rajasthan.
- Chapter on The Thyroid Gland in ‘*Textbook of Biochemistry, Biotechnology, Molecular Biology and Allied Medicine*’ (Editors: Dr. G.P. Talwar, Dr. SeyedE. Hasnain and Dr. ShivKumarSarin. 2016
- ‘Fat metabolism and its regulation’. Published in “Concepts of Biochemistry”. Ed. Dr. L.M.Srivastava, CBS Publications, pp. 189-248, 2004.
- Two chapters on Centrifugation and Electrophoresis under Laboratory Instrumentation in “**Essentials of Biochemistry**”. LM Srivastava (Editor), CBS Publishers, New Delhi, India. **Chapters 3.1 & 3.5** Page 11-18 & 32-37, 2002.
- Chapter on DNA Fingerprinting for class XI-XII ‘**Textbook in Biology (supplementary material)**’ published by the Central Board of Secondary Education (CBSE) in December 2000. Chapter on “Basic concept of Clinical Biochemistry” in the book “Clinical Biochemistry”, 18th September 2006. (Revised 5th May 2008). http://nsdl.niscair.res.in/jspui/bitstream/123456789/691/1/ClinicalBiochem_Concepts.pdf

Patents

INDIAN:

1. **Invention Title:** “Neutralizing human anti-V3 monoclonal antibody generated from HIV-1 Clade C infected Indian patient” Authors: Dr. Kalpana Luthra, Dr. Raiees Andrabi, Dr. Naveet Wig, Dr. Ashutosh Biswas, Patent Application No: 1882/DEL/2012. The above patent was advertised and granted on 26 February 2014 (**Patent number: ZA Patent No. 2013/04490**).
2. **Invention Title:** “**A BROADLY NEUTRALIZING ANTIBODY**” Authors: Dr. Kalpana Luthra, Sanjeev Kumar, Dr Rakesh Lodha: Indian Provisional Patent Application No.: **201811021940**, 12th June, 2018, LIPC Ref: 55/PA/AJ/CA/2018. Publication number 50/2019; granted as Indian Patent Number 502350 on 23/01/2024.
3. **Invention Title** “Novel engineered HIV-1 Subtype-C envelope glycoprotein” Prof. Kalpana Luthra, Mr. Swarandeep Singh, Dr. Sanjeev Kumar, Mr. Nitesh Mishra, Ms.

Shaifali Sharma, Dr. Muzamil Ashraf Makhdoomi, Dr. Rakesh Lodha. Applied for professional patenting through AIIMS, New Delhi, in December, 2021. (Reference Number: F:1-132/2021/P.Cell, Application Number: 202211004612)

4. **Invention title:** “Process for Guide RNA Sequence Generation and CRISPR Based Detection Assay for Clade C HIV-1” Prof. Kalpana Luthra, Ms. Anjali Gaur, Mr. Harsh Bhakhri, Mr. Nitesh Mishra, Ms. Shaifali Sharma, Ms. Tanu Bansal, Prof. Subrata Sinha, Prof. Rakesh Lodha, Applied for patenting through AIIMS, New Delhi, in September 2022. (Indian Provisional Patent Application No: 2022211059208)

Honors/Awards/Achievements

- Fellow of the following National Academies; The National Academy of Medical Sciences India (NAMS), National Academy of Sciences, India (NASI) & Indian National Science Academy (INSA).
- Dr Tulsi Das Chung Academic Award 2023 by NAMS (India) for the publication “Mishra N, Sharma S, Dobhal A, Kumar S, Chawla H, Singh R, Makhdoomi MA, Das BK, Lodha R, Kabra SK, **Luthra K.** *Broadly neutralizing plasma antibodies effective against autologous circulating viruses in infants with multivariant HIV-1 infection. Nat Commun.* Sep 2;11(1):4409, 2020. DOI: 10.1038/s41467-020-18225-x
- AIIMS Excellence Research Award 2020 in Basic Research (1stPrize)
- AIIMS Excellence Research Award 2019 in Basic Research (1stPrize)
- Shakuntala Amir Chand Prize by Indian Council of Medical Research (ICMR) for the year 2003
- Fogarty fellowship in 2002
- Elected as “Women in Science of Antiviral Research Society and was awarded the same on 24th October 2017 by Antiviral Research Society at the National Seminar on Recent advances in Antiviral Drug Design against Emerging and Re-emerging viral diseases held in Kalasalingam University, Krishnakoil, Tamil Nadu
- AIIMS Excellence Research Award 2017 in Basic Research (3rdPrize)
- AIIMS Excellence Award 2013 in Basic Sciences (2nd Prize)
- Life Member of Indian Society of Translational Research
- Life member of Association of Clinical Biochemists of India
- Life member of Indian Immunological Society
- Executive Committee member of the Indian Immunology Society
- Life member of Indian Academy of Biomedical Sciences (IABS)
- Contributing membership of American Society of Microbiology (ASM)
- Life member of Society of Free Radical Research (SFRR)
- Life Member of Indian Society of Translational Research
- Editorial Board Member of Indian Journal of Clinical Biochemistry

Dr. Swarandeeep Singh, Research Associate:

Dr. Swarandeeep Singh, is a Research Associate, working on a project entitled "Development of therapeutic broadly neutralizing monoclonal antibodies against circulating HIV-1 clade C in children and adults." He earned his Ph.D. in the HIV-1 Immunology Laboratory at AIIMS New Delhi under the chief guidance of Professor Kalpana Luthra. During his Ph.D., he developed expertise in HIV-1 vaccine design. Dr. Singh's primary research interest lies in viral vaccine design, with a focus on evaluation of designed immunogen constructs in preclinical animal



models. Additionally, under current project he actively explores the generation and engineering of novel monoclonal antibodies from chronically HIV-1 infected patients for therapeutic purposes. During the COVID-19 pandemic, he has contributed to study that showcased the cross-reactivity of HIV-1 broadly neutralizing antibodies & polyclonal plasma antibodies cross-reacted and effectively neutralized SARS-CoV-2. Through the esteemed HIV-1 Research Trust Fellowship Award (United Kingdom), Dr. Swarandeeep Singh has gained advanced skills in design of self-assembling protein nanoparticle as a platform for HIV-1 vaccines & other innovative vaccine strategies.

Patents:

Potential HIV-1 Subtype-C envelope trimer mimic from a pediatric elite neutralizer for vaccine development. Contributors: Swarandeeep Singh, Prof. Kalpana Luthra, , Sanjeev Kumar, Nitesh Mishra, Shaifali Sharma, Rakesh Lodha Indian Patent IP No. 202211004612 (LIPC ref: IP0696) Filed: Jan 27 2022, Issued: Dec 29 2023

Publications:

1. Singh S, Kumar S, Luthra K. Recent Advances in HIV-1 Envelope Based Vaccine Designs for guiding Broadly Neutralizing Antibody Response JVI <https://doi.org/10.1128/jvi.02202-25>
2. Swarandeeep Singh, Surabhi Gautam, Sanjeev Kumar*, Devyani Joshi* Viral Vaccine Adjuvant Strategies for Shaping Durable Immunity Across the Human Lifespan Vaccines (in-press)
3. Swarandeeep Singh*, Sanjeev Kumar*, Arnab Chatterjee*, Lakshay Malhotra, Abdul Rahman, Ifrah Andrabi, Bapan Mondal, Sanket Katpara, Shaifali Sharma, Harsh Bhakri, Anjali Gaur, Tanu Bansal, Muneeb Pervez, Vikram Iyer, AbdulWahid Hussain, Shubbir Ahmed, Rajesh Kumar, Abdul S Ethayathulla, Rakesh Lodha, Somnath Dutta, Kalpana Luthra Immunogenicity and Structure of stabilized HIV-1 Clade-C Env from pediatric Elite-neutralizer complexed with autologous bNAb BioRxiv doi: <https://doi.org/10.1101/2025.04.26.649701> . *Equal Contribution/Sharing 1st Author

4. S. Singh*, M. Brinkkemper*, Newby ML, Moral-Sánchez ID, M. Gast, W. Olijhoek, M. Gills, Max Crispin, Neil P. King., K. Luthra, R.W. Sanders Structural and functional evaluation of two-component nanoparticle carriers for HIV Env trimer immunogens derived from a pediatric elite neutralizers (under preparation) *Equal Contribution/Sharing 1st Author

5. Cisplatin Induced Ototoxicity in Patients with Head and Neck Malignancies: A Clinical Study Harneet Kaur , Jagat Singh , Ashok Chauhan, Vijay Kalra , Swarandeep Singh, Sahil Sharma¹, Shivangi Manglik Indian Journal of Otolaryngology and Head & Neck Surgery (under press)

6. Kumar S*, Moral-Sánchez ID*, Singh S*, Newby ML, Allen JD, Bijl TPL, Vaghani Y, Jing L, Lodha R, Ortlund EA, Crispin M, Patel A, Sanders RW, Luthra K. The Design and Immunogenicity of an HIV-1 Clade C Pediatric Envelope Glycoprotein Stabilized by Multiple Platforms. Vaccines (Basel). 2025 Jan 22;13(2):110. doi: 10.3390/vaccines13020110. PMID: 40006657; PMCID: PMC11860714.*Equal Contribution/Sharing 1st Author

7. Kumar S*, Singh S*, Chatterjee A*, Bajpai P, Sharma S, Katpara S, Lodha R, Dutta S, Luthra K. Recognition determinants of improved HIV-1 neutralization by a heavy chain matured pediatric antibody. iScience. 2023 Aug 9;26(9):107579. doi: 10.1016/j.isci.2023.107579. Erratum in: iScience. 2023 Oct 06;26(10):108013. PMID: 37649696; PMCID:PMC10462834 *Equal Contribution/Sharing 1st Author

8. Kumar S*, Singh S*, Luthra K. An Overview of Human Anti-HIV-1 Neutralizing Antibodies against Diverse Epitopes of HIV-1. ACS Omega. 2023;8(8):7252-7261. Published 2023 Feb 15. doi:10.1021/acsomega.2c07933 *Equal Contribution/Sharing 1st Author

9. Perween R, PraveenKumar M, Shrivastava T, Parray HA, Singh V, Singh S, Chiranjivi A, Jakhar K, Sonar S, Tiwari M, Reema, Panchal AK, Sharma C, Rathore DK, Ahamed S, Samal S, Mani S, Bhattacharyya S, Das S, Luthra K, Kumar R. The SARS CoV-2 spike directed non-neutralizing polyclonal antibodies cross-react with Human immunodeficiency virus (HIV-1) gp41 International Immunopharmacology 2021 Dec;101(Pt B):108187. doi: 10.1016/j.intimp.2021.108187. Epub 2021 Sep 28. PMID: 34649114; PMCID: PMC8479463.

10. Murugavelu P, Perween R, Shrivastava T, Singh V, Ahmad Parray H, Singh S, Chiranjivi AK, Thiruvengadam R, Singh S, Yadav N, Jakhar K, Sonar S, Mani S, Bhattacharyya S, Sharma C, Vishwakarma P, Khatri R, Kumar Panchal A, Das S, Ahmed S, Samal S, Kshetrapal P, Bhatnagar S, Luthra K, Kumar R. Non-neutralizing SARS CoV-2 directed polyclonal antibodies demonstrate cross-reactivity with the HA glycans of influenza virus International Immunopharmacology. 2021 Oct;99:108020. doi: 10.1016/j.intimp.2021.108020. Epub 2021 Jul 29. PMID: 34426117; PMCID: PMC8318684.

11. Mishra N, Kumar S, Singh S, Bansal T, Jain N, Saluja S, Kumar R, Bhattacharyya S, Palanichamy JK, Mir RA, Sinha S, Luthra K. Cross- neutralization of SARS-CoV-2 by HIV-1 specific broadly neutralizing antibodies and polyclonal plasma PLoS Pathogens 2021 Sep 24;17(9):e1009958. doi: 10.1371/journal.ppat.1009958. PMID: 34559854; PMCID: PMC8494312.

12. Kumar S, Batra H, Singh S, Chawla H, Singh R, Katpara S, Hussain AW, Das BK, Lodha R, Kabra SK, Luthra K. Effect of combination antiretroviral therapy on human immunodeficiency virus 1 specific antibody responses in subtype-C infected children. Journal of General Virology. 2020 Dec;101(12):1289-1299. doi: 10.1099/jgv.0.001480. Epub 2020 Sep 11. PMID: 32915123

Awards/Scholarships/Achievements

1. Recipient of Keystone Scholarship: HIV vaccines; Intersections of Basic and Clinical Science, Breckenridge, CO, USA 16-19 April 2026
2. Recipient of Anusandhan National Research Foundation (ANRF)-International Travel Scheme (ITS) to attend Keystone Symposia on HIV-1 vaccines, Breckenridge, CO, USA 2026
3. Awarded 2nd Best Poster (Scientist Category) in AIIMS 4th Annual Research Day, Jan. 2025
4. Recipient of USAID-PEPFAR sponsored travel grant for IAVI-ADVANCE Leadership Programme meeting Johannesburg, South Africa, Nov. 2024
5. Awarded 2nd Best Poster (Ph.D. Category) in AIIMS 3rd Annual Research Day, Jan. 2024
6. Awarded Best Poster Presentation IIS-Immunocon, Bangalore 2024
7. Recipient of FEBS Journal poster prize for an outstanding poster at IIS 2024
8. Recipient of prestigious HIV Research Trust Scholarship Award, UK, 2023
9. Recipient of prestigious International AIDS Society (IAS) scholarship award 2023, held in Brisbane, Australia.
10. Qualified and secured 53th All India rank for JRF (NET) in Joint CSIR-UGC exam, June 2018.
11. Qualified and secured 65th All India rank for Lectureship in Joint CSIR- UGC exam, Dec 2018.
12. Qualified and secured 45th All India rank for Lectureship in Joint CSIR- UGC exam, June 2017.
13. Qualified and secured 1868th All India rank for Life Sciences in Graduate Aptitude Test in Engineering GATE 2018.

Oral/Poster Presentations, Participation in Conferences & Symposiums

1. Oral presentation IAVI-LDP ADVANCE cohort 3 meeting, Johannesburg, South Africa, Nov. 2024
2. Best Poster presentation IIS-Immunocon, Bangalore Oct. 2024
3. Oral presentation IAS-HIVR4P 2024, 5th Research for Prevention Conference, Lima, Peru Oct. 2024
4. 2nd Best poster presentation (Ph.D. Category), AIIMS 3rd Annual Day, Jan 2024
5. Presented poster in International AIDS society (IAS) conference, Brisbane, Australia, 2023.
6. Awarded the best Oral Talk in the “International conference on molecular and cellular Electron Tomography”, Electron microscopy facility, Department of Anatomy, AIIMS, New Delhi, 2023
7. Participated in Keystone Symposia for Next Generation HIV Vaccines & Therapies, March 2022, AB, Canada.
8. Participated in International CEPI Meet on Preparedness for Future Epidemics ‘Is India Ready to

meet the 100 days vaccine challenge', Dec 2022 THSTI, Faridabad

9. Participated in SPR seminar and AKTA Pure UNICORN workshop conducted by Cytivia, Sep. 2022
10. Participated in 48th Annual of Indian Immunology Society (IIS) Conference on Vaccines & Immuno-Innovations for Human Health, July 2022

Training National/International

1. Indo-Dutch KIR-HLA HIV-1 Cohort Building & Management at AIIMS site for Y.R. Gaitonde Centre for AIDS Research & Education, Chennai, 7th-22th Feb 2022
2. HIV-1 Trust, U.K., sponsored-Nanoparticles based HIV-1 vaccines under the supervision of Prof. Rogier W. Sanders, University Medical Centre, Amsterdam, Netherlands, July-Sep 2023
3. Africa Research Excellence Fund sponsored AREF Beginner's Grant Writing Programme, 1st May-15th July, 2024
4. International AIDS Vaccine Initiative (IAVI)-USAID, PEPFAR sponsored ADVANCE Leadership Development Program Cohort 3, 1st Aug-11th Nov. 2024

Membership National/International

1. Global Outreach Postdoctoral Member- 200489067 American Society for Microbiology (ASM), 2025-Presently Member
2. Lifetime Member-Indian Immunology Society- LM/IIS 1039/02/24, 2024-Presently Member
3. LDP Cohort 3 Fellow- ADVANCED Leadership Development Program (LDP) –International AIDS Vaccine Initiative (IAVI), 2024
4. Member-International AIDS Society (IAS), 2023-Presently Member



Mr. Harsh Bhakhri

Harsh Bhakhri is a PhD scholar (Dec 2021–present) in the Department of Biochemistry, AIIMS New Delhi, working under the supervision of Prof. Kalpana Luthra. His doctoral research focuses on characterizing the B-cell receptor repertoire of HIV-1 subtype C elite neutralizers — both adults and pediatric cases — identified from an Indian contemporaneous cohort, and on isolating broadly neutralizing monoclonal antibodies from these individuals. He works with both bulk BCR sequencing and single-cell BCR sequencing (BD Rhapsody) using antigen-barcoded BG505-SOSIP to link antigen specificity to clonotype identity. His current pipeline integrates antigen-barcode signal, AlphaFold3 structural screening, and ProteinMPNN-based heavy-chain redesign to prioritize and engineer antibody candidates for synthesis and functional validation through pseudovirus neutralization assays.

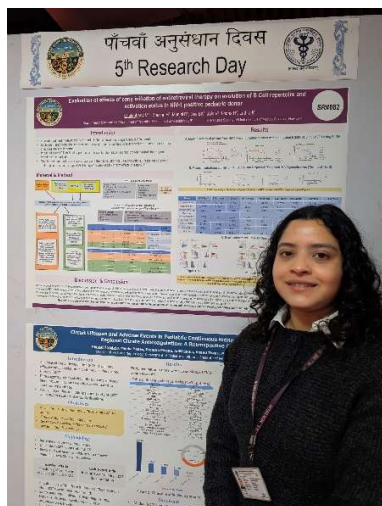
Skills: HIV-1 and SARS-CoV-2 pseudovirus generation and neutralization assays, single B-cell sorting (BD FACS Aria Fusion III), single-cell BCR library preparation (BD Rhapsody), molecular cloning, site-directed mutagenesis, Freestyle mammalian protein expression and purification, Protein A/G and SEC chromatography (ÄKTA Pure), multicolor flow cytometry, ELISA, lentiviral transduction, and stable cell line generation. Computational: BCR repertoire analysis (Immcount Suite, scRepertoire, Seurat, abstar/abutils), protein structure prediction and redesign (AlphaFold3, ProteinMPNN, Rosetta), R and Python, Linux/HPC environments.

Selected Publications

1. Gaur A, **Bhakhri H**, Mishra N, Sharma S, Bansal T, Kalaivani M, Brijwal M, Das BK, Lodha R, Sinha S, Luthra K. "A rapid CRISPR/Cas12a-based assay for the detection of HIV-1 Clade C in infants." *Clinica Chimica Acta* 578:120518, 2026.
2. Kumar S, Singh S, Chatterjee A, Bajpai P, Sharma S, Katpara S, **Bhakhri H**, Lodha R, Dutta S, Luthra K. "Recognition determinants of improved HIV-1 neutralization by a heavy chain matured pediatric antibody." *iScience* 26(9):107579, 2023.
3. Bhardwaj R, **Bhakhri H**, Palanichamy JK. "Context-Dependent Synergism and Antagonism between IGF2BP1/3 and METTL3/14 in m6A-mediated mRNA regulation." *bioRxiv*, 2025. (under review)

Patent: Luthra K, Gaur A, **Bhakhri H**, Mishra N, Sharma S, Bansal T. "A proof-of-principle study for the development of CRISPR-based detection of Clade C HIV-1." Indian Provisional Patent No. 2022211059208, filed 2022.

Hobbies: Making viruses (lots of them), making antibodies (fewer than viruses), picking up new skills, graphic design, music, and badminton.



Dr. Madhuti Chakraborty

Dr. Madhuti Chakraborty is a 3rd Year PhD student in the Department of Biochemistry, working under the supervision of Dr. Kalpana Luthra. She is working on the characterization of the B cell receptor repertoire and B cell functionality in HIV-1 infected children pre and post antiretroviral therapy. She is looking into the broadly neutralizing antibody generating B cell lineages and how they change longitudinally as an effect of initiation of early antiretroviral therapy (ART). She is also interested in the activation status and functionality of B cells subsets in paediatric HIV-1 patients pre-ART as well as post-ART.

Dr. Madhuti is also working as a final year Senior Resident in the Department of Biochemistry, AIIMS, New Delhi. As a senior resident, she is actively involved in undergraduate and postgraduate teaching at AIIMS and in the daily functioning of the NABL accredited clinical biochemistry laboratory and Renal research laboratory, AIIMS, New Delhi.

Awards /Workshops and Conferences attended

- Awarded Gold medal for securing 1st position in MD Biochemistry exit exam, GGSIPU, 2023
- Presented poster under the SR category at the 5th Research Day (AIIMS, New Delhi) conducted between 29th-30th January 2026
- Selected for Award Paper presentation at the 48th Annual Conference of the Association of Clinical Biochemists of India conducted between 24-26th November 2023 at New Delhi.
- Completed Basic Course in Biomedical Research (March-June 2021), conducted by ICMR & NIE with a consolidated score of 90%.

- Attended workshop on Molecular techniques and cell culture held at Department of Biochemistry, MAMC, New Delhi between 24-26th March, 2023.
- Attended 29th Annual Conference of Association of Medical Biochemists of India (21-23rd July, 2022, Bangalore)
- Attended Association of Clinical Chemistry & Lab Medicine Practitioners Conference, 2021
- Workshop on In-vitro Mammalian cell culture techniques and its applications held at Department of Research, Sir Ganga Ram Hospital, New Delhi between 22-23rd November, 2022.
- Attended workshop on “Advanced molecular genetics” as part of pre-conference workshops of AMBICON 2022 at Centre for Human genetics, Bangalore, held on July 18-20, 2022.
- Attended ‘Developing Indian Physician Scientists (DIPS) workshop’ (6-7, 13-14 March, 2021) by DBT

PUBLICATIONS:

1. **Chakraborty M.**, Arora M., Ramteke A. et al. FokI polymorphism of Vitamin D receptor gene and deficiency of serum Vitamin D increases the risk of breast cancer in North Indian women. Endocrine 2023; 79(2). (PMID: 36854857)



Dr Prameya Gawai.

Dr. Prameya Gawai is an MD Biochemistry resident at AIIMS New Delhi. His research focuses on the neutralization susceptibility of circulating pediatric HIV-1 Clade C viruses to combinations of broadly neutralizing antibodies (bnAbs). His work aims to identify neutralization determinants within pediatric HIV-1 viral envelopes and evaluate the protection conferred by bnAb cocktails

targeting distinct viral epitopes. Through viral envelope sequence analysis and pseudovirus-based neutralization studies, his research seeks to contribute to the development of effective antibody-based preventive and therapeutic strategies against pediatric HIV-1 infection

Neeti Bharadwaj joined the laboratory as a PhD student in April 2026. She completed her MSc in Medical Biochemistry from the Department of Biochemistry at All India Institute of Medical Sciences in August 2025. Her current research focuses on developing a CRISPR-Cas-based quantitative assay for detecting HIV-1 Clade C. During her MSc, she worked on the project titled “Evaluating the Neurotherapeutic Efficacy of Promising Drugs in an In Vitro Model of Cerebral Palsy,” which strengthened her interest in translational and molecular biomedical research.

She was awarded the second prize for poster presentation at the 4th Annual Research Day at All India Institute of Medical Sciences. She also received a Gold Medal in her undergraduate degree, B.Voc. Biomedical Sciences, from Central University of Haryana. Neeti qualified for the Joint CSIR-UGC NET JRF examination in July 2025 with an All-India Rank of 67 and qualified for GATE with an All-India Rank of 369.



Anil Kumar (Masalchi/Bearer Gd.II)

Mr. Anil Kumar previously worked as a Lab Attendant in Prof. Luthra’s lab in a research project since May, 2003. He was responsible for smooth functioning and maintenance of the lab, which included packing of tips, autoclaving and sterilization of plastic/glasswares, washing of equipment and cleaning of culture lab. He has completed his 12th standard Delhi in 2013. He is employed as Masalchi/Bearer Gd.II from January 2020.



Mr. Ajeesh T. Gangadharan (Junior Administrative Assistant)

Mr. Ajeesh T. Gangadharan joined Dr. K Luthra's Lab as a Data Entry Operator in a research project on 1st October, 2005. He completed his B.Com from MG University, Kerala in 2002 & Computer Diploma From NIIT, New Delhi in 2004. After the completion of 15 years of service in various research projects, in September 2021 he joined the same lab as a Junior Administrative Assistant. His nature of work includes entering and systematic maintenance of patient data in Excel sheet, to contact and sent written communications for getting quotations for chemicals, preparing supply orders, processing bills, maintaining Accounts of the project, preparing Utilization certificates & Statement of expenditure, maintaining stock register, compilation of the project reports etc..



Mr. Abdul Wahid Hussain (Project Technical Support-III)

Mr. Abdul Wahid Hussain is working as a Project Technical Support-III in Dr. Kalpana Luthra's lab in a research project since January, 2010. He is an expert phlebotomist. His nature of works are cell culture (mammalian and bacterial) media preparation, Buffers preparation etc., PCR, DNA isolation, Patient sample collection, PBMCs isolation, Protein purification, Biological substance distribution to collaborators, Procurement/ordering of chemicals and lab instruments maintenance. He has completed his M.Sc. MLT from NIMS university Jaipur, Rajasthan in year 2020.

Publications:

1. Ray MD, Deo SVS, Luthra K, Mathur S, Anand P, Kumar R, **Sharma S**, Kahol S, Wahid A. Molecular linking of HIPEC (Hyperthermic Intraperitoneal Chemotherapy) and T-regulatory cells (FOXP3) and Th-17 (ROR γ) in advanced epithelial ovarian cancer. Clin Immunol Commun. 2022 Dec 1;2:62–8. doi.org/10.1016/j.clicom.2022.03.005
2. Kumar S, Batra H, Singh S, Chawla H, Singh R, Katpara S, Hussain AW, Das BK, Lodha R, Kabra SK, Luthra K. Effect of combination antiretroviral therapy on human immunodeficiency virus 1 specific antibody responses in subtype-C infected children. J Gen Virol. 2020 Dec;101(12):1289-1299. doi: 10.1099/jgv.0.001480. Epub 2020 Sep 11. PMID: 32915123.
3. Khan L, Kumar R, Thiruvengadam R , parray HA , makhdoomi MA, Kumar S , Aggarwal H, Mohata M , Hussain A W, Das R, Varadarajan R, Bhattacharya J, Vajpayee M, Murugavel KG, Solomon S, Sinha S, Luthra K. Cross- neutralization anti-HIV-1 human single chain variable fragment(scFvs) against CD4 binding site and N332 glycan identified form a recombinant page library. Sci Rep.2017 Mar23;7:45163
4. Swarandeeep Singh, Sanjeev Kumar*, Arnab Chatterjee*, Lakshay Malhotra, Abdul Rahman, Ifrah Andrabi, Bapan Mondal, Sanket Katpara, Shaifali Sharma, Harsh Bhakri, Anjali Gaur, Tanu Bansal, Muneeb Pervez, Vikram Iyer, AbdulWahid Hussain, Shubbir Ahmed, Rajesh Kumar, Abdul, S Ethayathulla, Rakesh Lodha, Somnath Dutta, Kalpana Luthra Immunogenicity and Structure of stabilized HIV-1 Clade-C Env from pediatric Elite-neutralizer complexed with autologous bNAbs BioRxiv doi: <https://doi.org/10.1101/2025.04.26.649701> . *Equal Contribution/Sharing 1st Author