Aviral Kumar

Prime Minister's Research Fellow | Doctoral Scholar

linkedin.com/in/aviral-kumar-iitg aviralkmr@gmail.com
+91-829-921-0814 aviral.kumar@iitg.ac.in
Indian Institue of Technology (IIT) Guwahati, Assam

An enthusiastic in the road to comprehend the signaling cascades that govern life. My primary research interest lies in exploring the intricate cross-talk between cancer cells and their micro-environment in the early stage of transformation. To me understanding a system as perfect as cancer is both relevant and heartfelt passion.

Education

2020- Present	PhD in Cancer Biology, Indian Institute of Technology (IIT) Guwahati, Grades in course work-9.6/10
2017-2019	MTech in Biotechnology, Maulana Azad National Institute of Technology (NIT), Bhopal, Grades-9.58/10
2013-2017	BTech in Biotechnology, Vellore Institute of Technology (VIT), Vellore, Grades-9.32/10
2012	Higher Secondary (Class 12th), Central Board of Secondary Education (CBSE), Grades-8/10
2010	High School (Class 10th), Indian Certificate of Secondary Education (ICSE), Grades-8.8/10

Research Experience

Present – August 2020 | **Doctoral Scholar | Indian Institute of Technology (IIT), Guwahati, Assam,**

- Development of nucleic acid based therapeutics for oral cancer
- Evaluation of natural compounds as a therapy for cancer
- Elucidating mechanistic cues in cancer development

Animal Cell Culture | Immunoblots | Immunocytochemistry | RT-PCR

February 2020 – July 2019 | **Project Trainee | CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad, Telangana**

- Project to validate the biomarkers of different sub-type (benign, borderline, fibro adenocarcinoma, malignant) present in phyllode tumor samples using global proteomic analysis, IHCs and IFs
- In-vivo drug trials of chemically designed octapeptide P4 in Apc knockout models
- Writing a BIRAC PACE grant with the PI on Development of microfluidic lab on chip device for breast cancer diagnostics

Animal Models | Immunohistochemistry | Cardiac Perfusion | Transgenics

June 2019 – May 2018 | **Dissertation Student | CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad, Telangana**

- Genotyping and characterization of transgenic murine models of colorectal cancer
- In vivo delivery of shRNA mediated curcumin nanoparticles to APC flox murine models of colon cancer
- Understanding the effect of Camptothecin mediated DNA damage response in EMT on APC knockout models of colorectal cancer
- A review on EMT and breast cancer with significance of miRNA as a potential biomarker
- Participate in scientific talks, group discussions and seminars with scientists, scholars and faculty

Animal Models | Tissue Processing | Drug delivery | Pre-clinical studies | PCR | Transgenics | Human samples

April 2018 – July 2017 | **Graduate Work | Maulana Azad National Institute of Technology (NIT), Bhopal, Madhya Pradesh**

MTech Research pour Department of Biological Science and Engineering

- Project to design an aptamer for rapid detection of cocaine
- In silico analysis of various drug interactions with the RAS ligand
- Collaborate and coordinate with faculty, staff scientists, and fellow graduate students across departments

Autodock | QSAR | Microfluidic | Plant tissue culture Chromatography | Microbial Cultures

April 2017 – January 2014 | **Undergraduate Work, Vellore Institute of Technology (VIT), Tamil Nadu**

BTech Research pour Center for Biomaterials, Cellular and Molecular Theranostic (CBCMT), VIT

- Collaboration with IIT Madras to investigate probable role of non-extracellular vesicles in colorectal cancer metastasis to kidney : an invitro cell line-based study and image analysis
- A venture to study factors affecting growth of GFP variant by changing the glucose concentration in E. Coli

Animal Cell Cultures | Invasion Assays | Exosomes isolation | TEM | Microbial Cultures | Gene Cloning

Publications

Research Articles

1- Buhrmann, C.; Kunnumakkara, A. B.; **Kumar, A.**; Samec, M.; Kubatka, P.; Aggarwal, B. B.; Shakibaei, M. Multitargeting Effects of Calebin A on Malignancy of CRC Cells in Multicellular Tumor Microenvironment. Frontiers in Oncology. 2021, p 3911. https://doi.org/ 10.3389/fonc.2021.650603. **I.F-6.32**

2- **Kumar, A.**; Nayakanti, D. S.; Mangalaparthi, K. K.; Gopinath, V.; Reddy, N. V. N.; Govindan, K.; Voolapalli, G.; Kumar, P.; Kumar, L. D. Quantitative Proteome Profiling Stratifies Fibroepithelial Lesions of the Breast. Oncotarget 2021, 12 (5), 507–518. https://doi.org/10.18632/oncotarget.27889.**I.F-3.87**

3- Katoch, A.; Nayak, D.; Faheem, M. M.; **Kumar, A.**; Sahu, P. K.; Gupta, A. P.; Kumar, L. D.; Goswami, A. Natural Podophyllotoxin Analog 4DPG Attenuates EMT and Colorectal Cancer Progression via Activation of Checkpoint Kinase 2. Cell death Discov. 2021, 7 (1), 25. https://doi.org/10.1038/s41420-021-00405-3.**I.F-5.21**

4- Chakraborty, S.; **Kumar, A**; Faheem, M. M.; Katoch, A.; Kumar, A.; Jamwal, V. L.; Nayak, D.; Golani, A.; Rasool, R. U.; Ahmad, S. M.; Jose, J.; Kumar, R.; Gandhi, S. G.; Dinesh Kumar, L.; Goswami, A. Vimentin Activation in Early Apoptotic Cancer Cells Errands Survival Pathways during DNA Damage Inducer CPT Treatment in Colon Carcinoma Model. Cell Death Dis. 2019, 10 (6). https://doi.org/10.1038/s41419-019-1690-2.**I.F-8.46**

5- **Kumar, A.**; Nag, R.; Mishra, S.; Ramakrishna, B.; Sai, V. V. R.; Mishra, D. Probable Role of Non-Exosomal Extracellular Vesicles in Colorectal Cancer Metastasis to Kidney : An In Vitro Cell Line Based Study and Image Analysis BT - ICTMI 2017. In Springer Nature; Gulyás, B., Padmanabhan, P., Fred, A. L., Kumar, T. R. S., Kumar, S., Eds.; Springer Singapore : Singapore, 2019; pp 163–174

Review Articles

1- **Kumar, A.**; Harsha, C.; Parama, D.; Girisa, S.; Daimary, U. D.; Mao, X.; Kunnumakkara, A. B. Current Clinical Developments in Curcumin-Based Therapeutics for Cancer and Chronic Diseases. Phyther. Res. 2021. https://doi.org/10.1002/ptr.7264. **I.F-5.87**

2- Verma, E.; **Kumar, A.**; Devi Daimary, U.; Parama, D.; Girisa, S.; Sethi, G.; Kunnumakkara, A. B. Potential of Baicalein in the Prevention and Treatment of Cancer : A Scientometric Analyses Based Review. J. Funct. Foods 2021, 86, 104660. https://doi.org/10.1016/j.jff.2021.104660.**I.F-4.45**

3- Parama, D.; Rana, V.; Girisa, S.; Verma, E.; Daimary, U. D.; Thakur, K. K.; **Kumar, A.**; Kunnumakkara, A. B. The Promising Potential of Piperlongumine as an Emerging Therapeutics for Cancer. Explor. Target. Antitumor Ther. 2021, 2, 323–354. https://doi.org/10.37349/etat.2021.00049.

4- Thakur, K. K.; **Kumar, A.**; Banik, K.; Verma, E.; Khatoon, E.; Harsha, C.; Sethi, G.; Gupta, S. C.; Kunnumakkara, A. B. Long Noncoding RNAs in Triple-Negative Breast Cancer : A New Frontier in the Regulation of Tumorigenesis. J. Cell. Physiol. 2021. https://doi.org/10.1002/jcp.30463. **I.F-6.38 Equal contribution**

5- Swaminathan, G.; Shigna, A.; **Kumar, A.**; Byroju, V. V.; Durgempudi, V. R.; Dinesh Kumar, L. RNA Interference and Nanotechnology : A Promising Alliance for Next Generation Cancer Therapeutics . Frontiers in Nanotechnology . 2021, p 42. https://doi.org/10.3389/fnano.2021.694838

6- Girisa, S.; **Kumar, A.**; Rana, V.; Parama, D.; Daimary, U. D.; Warnakulasuriya, S.; Kumar, A. P.; Kunnumakkara, A. B. From Simple Mouth Cavities to Complex Oral Mucosal Disorders-Curcuminoids as a Promising Therapeutic Approach. ACS Pharmacol. Transl. Sci. 2021, 4 (2), 647–665. https://doi.org/10.1021/acsptsci.1c00017. **Equal contribution**

7- Rishabh, K.; Khadilkar, S.; **Kumar, A.**; Kalra, I.; Kumar, A. P.; Kunnumakkara, A. B. MicroRNAs as Modulators of Oral Tumorigenesis-A Focused Review. Int. J. Mol. Sci. 2021, 22 (5). https://doi.org/10.3390/ijms22052561. **I.F-5.92**

8- Daimary, U. D.; Parama, D.; Rana, V.; Banik, K.;**Kumar, A.**; Harsha, C.; Kunnumakkara, A. B. Emerging Roles of Cardamonin, a Multitargeted Nutraceutical in the Prevention and Treatment of Chronic Diseases. Curr. Res. Pharmacol. Drug Discov. 2021, 2, 100008. https://doi.org/10.1016/j.crphar.2020.100008.

9- **Kumar, A.**; Golani, A.; Kumar, L. D. EMT in Breast Cancer Metastasis : An Interplay of MicroRNAs, Signaling Pathways and Circulating Tumor Cells. Front. Biosci. - Landmark 2020, 25 (5). https://doi.org/10.2741/4844.**I.F-4.23**

10- Kumar, M. D.; Dravid, A.; **Kumar, A.**; Sen, D. Gene Therapy as a Potential Tool for Treating Neuroblastoma-A Focused Review. Cancer Gene Ther. 2016, 23 (5). https://doi.org/10.1038/cgt.2016.16 **I.F-5.98**

Book Chapters

1- Rawoof, A.; **Kumar, A.**; Tiwari, S.; Kumar, L. D. Bioinformatics of MicroRNA Target Prediction. In Bioinformatics and Human Genomics Research; **CRC Press**(ISBN 9780367437602), 2021.

2- Swaminathan, G.; Byroju, V. V.;**Kumar, A.**; Kourani, K.; Kumar, L. D. Acute Lymphoblastic Leukemia : Promising Technologies for the Management of the Disease. In Advances in Health and Disease; Nova Medicine and Health, **Nova Science Publishers**, 2021; Vol. 37, pp 1–79

Laboratory Skills

In vivo Techniques	Mice Handling, Breeding, Injections- intraperitoneal, Intratumoral, Oral guvaging, Cardiac Perfusion, Anesthetize, Histology, Tissue Processing, Sectioning
Animal Cell Culture	Subculturing, MTT assay, Invasion assay, Scratch assay, Colony formation assay, Transfection
Molecular Biology Techniques	DNA, RNA and Protein Isolation, Plasmid Isolation, PCR, RT-PCR, Agarose Gel Electrophoresis
Immunological Assays	Immunoblots, ELISA, Immunocytochemistry, Immunohistochemistry, Rocket Electrophoresis
Microbial Techniques	Plating, Streaking, Transformation, Cloning, Staining, Restriction Digestion
Computational Techniques	Primer Design, BioEdit, ClustalW, MEGA6, Phylognetics, Autodock, miRNA Target Predcition

Conference Presentations

March 2019

Oral and Poster Presentation | International Conference on Advances in Chemical Biology and Biologics (ICACB 2019), CSIR- Indian Institute of Chemical Technology, Hyderabad
Activation of Epithelial Mesenchymal Transition (EMT) during early drug response inhibits apoptotic progression by stimulating survival pathways in colon carcinoma model

October 2016

Poster Presentation | International Conference on Nanoscience and Nanotechnology (ICNAN'16)), Vellore Institute of Technology (VIT), Vellore
Use of Membrane filter for isolation of Nanoscopic Extracellular Vesicles from cultured A549 lung cancer cell : A feasibility study

Honors and Awards

- 2021 Recipient of Prime Minsiter's Research Fellow (PMRF) for carrying out the vision of research and development through innovation, Ministry of Education (MOE), Govt. of India
- 2020 "Certificate of Appreciation" for contribution as an "Instructor" in the Winter Research Observership Programme for Medical Students (MBBS) at CSIR- Centre for Cellular and Molecular Biology, Hyderabad under CSIR Integrated Skill Initiative
- 2019 Best Oral Presentation in International Conference on Advances in Chemical Biology and Biologics (ICACB 2019), by Royal Society of Chemistry, CSIR-Indian Institute of Chemical Technology, Hyderabad
- 2019 Merit Scholar, First Rank in Department of Biological Science and Engineering, MANIT, Bhopal
- 2019 Recipient of GATE-MHRD fellowship, from the Ministry of Human Resource Development, Govt. of India
- 2014 Merit Certificate, Best academic performance in Vellore Institute of Technology (VIT)

Languages

Hindi ●●●●●
English ●●●●●
German ●●●○○

Forces

- Problem solving
- Ability to work as part of a team
- Strong work ethic

References

Ajaikumar B. Kunnumakkara, PhD, FRSM
Professor, Indian Institute of Technology(IIT) Guwahati
@ kunnumakkara@iitg.ac.in
+91 361 258 2231/3220

Lekha Dinesh Kumar, PhD
Senior Principal Scientist, CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad
@ lekha@ccmb.res.in
+91-40-2719 2933/2576