BIO-DATA

Dr. Kota Arun Kumar
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Education and Professional Position

- 2020 Feb till to date: Professor Dept of Animal Biology, School of Life Sciences, University of Hyderabad
- 2019 Dec to 9th Feb 2020 Associate Professor, Dept of Animal Biology, School of Life Sciences, University of Hyderabad
- 2007 Oct to 2019 Dec, Assistant Professor, Dept of Animal Biology, School of Life Sciences, University of Hyderabad
- 2002 (Aug)- 2007 (Oct): Post doctoral fellow, Dept of Pathology, Micheal Hidelberg Division of Immunology, New York University School of Medicine, New York-100016.
- 1997- 2002: PhD in Animal Sciences, University of Hyderabad. Title" Pathology of fatal cerebral malaria: Studies on the role of novel RBC membrane glycoproteins, Cell Death Mediators and Signal transduction cascades"
- 1995-1997 : M.Sc Zoology, Osmania University
- 1992-1995: B.Sc (Botany, Zoology, Chemistry) Osmania University

Thrust area: Understanding the biology of *Plasmodium* sporozoite, liver and transmission stages by reverse genetics

Dr. Kota Arun Kumar is currently Professor at Department of Animal Biology, School of Life Sciences. He joined University of Hyderabad in 2007. He obtained his post doctoral training from New York University School of medicine, USA, where he studied the mechanism of protective immune responses against the pre-erythrocytic stages of *Plasmodium* using rodent malaria model. At University of Hyderabad, his research group aims at understanding the biology of *Plasmodium* liver stages and mosquito stages by approaches of reverse genetics. His work has demonstrated that targeting sporozoite specific genes can yield mutants that experience a block in liver, thus preventing clinical malaria. In addition depletion of

parasite specific metabolic enzymes and proteases yielded mutants that failed to transmit malaria. These finding have implications for developing whole organism attenuated vaccine for pre-erythocytic stages and prospects for developing transmission blocking drugs. His research is funded by SERB, ANRF, DBT, CSIR, ICMR and UGC.

Research projects completed

- DST sponsored project. Title of the project: "Validating the gene expression and localization of secreted, developmentally regulated and export antigens from the sporozoites and Liver stages of the Malaria Parasites: Implications for developing effective vaccine targets against pre-erythrocytic stages of Date of Start: 01-2-2010 and date of completion: 31-7- 2013 (Rs. 33,75,000) **SR/SO/HS-122/2008**
- CSIR sponsored project. Title of the project: "Gene targeting of a novel protein kinase involved in *Plasmodium* ubiquitin-proteosomal pathway: Implications for developing a transformation defective phenotype" Date of project initiation: 01-02-2012 and date of completion: 31-1 2015. (Rs. 19,45,000) **37(1496)/11/EMR-II**
- ICMR sponsored project: Title of the project "Expression profiling of immune responsive genes activated by IFN-gamma during *Plasmodium* Liver stage development" Date of project initiation: 7-5-2012 and date of completion 6-5-15 (Rs, 35,00,000) **5/8-7(240)/2011-ECD-II**
- DBT sponsored project: "Unraveling the mechanism of host SUMOylation in regulating the growth of *Plasmodium* Liver stages" sanctioned recently. Date of project initiation :21-8-2012 and date of completion 20-8-2015 (Rs, 69,00,000) **BT/PR2495/BRB/10/950/2011**
- UGC sponsored project: "Characterization of the Macrophage Activation status following *Plasmodium* sporozoites infections" Date of project initiation 1-4-2013 and date of completion 31-3-2016 (Rs. 12, 88,000) **42-591/2013(SR)**
- DST sponsored project "Functional investigation of *Plasmodium berghei* nicotinamidase (PBANKA_121800) by reverse genetics approach-Implications for developing malaria transmission blocking drug" Date of project initiation: 19-11-2019 and date of completion 18-11-22 (Rs. 57,56,000) **EMR/2016/006331**

Research projects: Ongoing

SERB-CRG sponsored project “Functional investigation of aspartic proteases of Plasmodium (Plasmepsins IX and X) by conditional mutagenesis approach: Implications for anti-malarial drug discovery and vaccine development” (Rs. 70,00,000) **SERB CRG/2022/005632**

List of all publications (Total 31)

1. Singh D, Patri S, Veeda N, Verma CK, Kavati A, Segireddy RR, Kolli SK, Arun Kumar K. Plasmodium berghei serine repeat antigen 3 (PbSERA3) is required for hepatic merozoite egress. **mBio**. 2026 Mar 11;17(3):e0381825. doi: 10.1128/mbio.03818-25. Epub 2026 Jan 30. PMID: 41616267; PMCID: PMC12977625.

2. Narahari V, Patri S, Satpute MD, Vemuganti GK, Mishra DK, Kolli SK, Arun Kumar K. Plasmodium berghei rhoptry neck protein 6 maintains parasite infectivity and virulence. **mBio.** 2025 Nov 12;16(11):e0194125. doi: 10.1128/mbio.01941-25. Epub 2025 Sep 25. PMID: 40996030; PMCID: PMC12607912.

3. Singh P, Tabassum W, Fangaria N, Dey S, Padhi S, Bhattacharyya MK, Arun Kumar K, Roy A, Bhattacharyya S. Plasmodium Topoisomerase VIB and Spo11 Constitute Functional Type IIB Topoisomerase in Malaria Parasite: Its Possible Role in Mitochondrial DNA Segregation. **Microbiol Spectr**. 2023 Jun 15;11(3):e0498022. doi: 10.1128/spectrum.04980-22. Epub 2023 May 22. PMID: 37212694; PMCID: PMC10269783.

4.Tanneru N, Nivya MA, Adhikari N, Saxena K, Rizvi Z, Sudhakar R, Nagwani AK, Atul, Mohammed Abdul Al-Nihmi F, Kumar KA, Sijwali PS. Plasmodium DDI1 is a potential therapeutic target and important chromatin-associated protein. **Int J Parasitol.** 2023 Mar;53(3):157-175. doi: 10.1016/j.ijpara.2022.11.007. Epub 2023 Jan 16. PMID: 36657610.

5. Araveti PB, Kar PP, Kuriakose A, Sanju A, Kumar KA, Srivastava A. Identification of a Novel Interaction between *Theileria* Prohibitin (*Ta*PHB-1) and Bovine RuvB-Like AAA ATPase 1. **Microbiol Spectr**. 2023 Feb 14;11(1):e0250222. doi: 10.1128/spectrum.02502-22. Epub 2023 Jan 18. PMID: 36651733; PMCID: PMC9927103.

6. Fangaria N, Rani K, Singh P, Dey S, Kumar KA, Bhattacharyya S. DNA damage-induced nuclear import of HSP90α is promoted by Aha1. **Mol Biol Cell**. 2022 Dec 1;33(14):ar140. doi: 10.1091/mbc.E21-11-0554. Epub 2022 Oct 19. PMID: 36260391; PMCID: PMC9727810.

7. Singh D, Patri S, Narahari V, Segireddy RR, Dey S, Saurabh A, Vijay M, Prabhu NP, Srivastava A, Kolli SK, Kumar KA. A conserved Plasmodium structural integrity maintenance protein (SIMP) is associated with sporozoite membrane and is essential for maintaining shape and infectivity. **Mol Microbiol**. 2022 Jun;117(6):1324-1339. doi: 10.1111/mmi.14894. Epub 2022 Apr 8. PMID: 35301756.

* A commenty is published in **Mol Microbiol** (**https://doi.org/10.1111/mmi.14910**) on the above-mentioned manuscript. The commentary highlights the importance of these findings in the context of developing a pre-erythrocytic vaccine based on SIMP.

8. Jha P, Gahlawat A, Bhattacharyya S, Dey S, Kumar KA, Bhattacharyya MK. Bloom Helicase Along with Recombinase Rad51 Repairs the Mitochondrial Genome of the Malaria Parasite. **mSphere**. 2021 Dec 22;6(6):e0071821. doi: 10.1128/mSphere.00718-21. Epub 2021 Nov 3. PMID: 34730376; PMCID: PMC8565512

9. Surface expressed Plasmodium circumsporozoite protein (CSP) modulatescellular flexibility and motility. Aditya Prasad Patra, Vrushali Pathak, Segireddy Rameswara Reddy , Aditya Chhatre, Crismita Dmello, Satya Narayan, Dipti Singh, Kumar KA, Sri Rama Koti Ainavarapu, and Shobhona Sharma. **bioRxiv** preprint doi: https://doi.org/10.1101/2021.08.04.455043

10. Jillapalli R, Narwal SK, Kolli SK, Mastan BS, Segireddy RR, Dey S, Srivastava PN, Mishra S, Kumar KA. A *Plasmodium berghei* putative serine-threonine kinase 2 (*PBANKA_0311400*) is required for late liver stage development and timely initiation of blood stage infection. **Biol Open**. 2019 Aug 23;8(8):bio042028. doi: 10.1242/bio.042028. PMID: 31444161; PMCID: PMC6737972.

11. Togiri J, Segireddy RR, Mastan BS, Singh D, Kolli SK, Ghosh A, Al-Nihmi FMA, Maruthi M, Choudhary HH, Dey S, Mishra S, Kumar KA. Plasmodium berghei sporozoite specific genes- PbS10 and PbS23/SSP3 are required for the development of exo-erythrocytic forms. **Mol Biochem Parasitol**. 2019 Sep;232:111198. doi: 10.1016/j.molbiopara.2019.111198. Epub 2019 Jun 26. PMID: 31251952.

12 Nagappa LK, Singh D, Dey S, Kumar KA, Balaram H. Biochemical and physiological investigations on adenosine 5' monophosphate deaminase from Plasmodium spp. **Mol Microbiol**. 2019 Aug;112(2):699-717. doi: 10.1111/mmi.14313. Epub 2019 Jul 5. PMID: 31132185.

13. Choudhary HH, Srivastava PN, Singh S, Kumar KA, Mishra S. The shikimate pathway enzyme that generates chorismate is not required for the development of Plasmodium berghei in the mammalian host nor the mosquito vector. **Int J**

Parasitol. 2018 Mar;48(3-4):203-209. doi: 10.1016/j.ijpara.2017.10.004. Epub 2018 Jan 13. PMID: 29338985.

14. Mastan BS, Narwal SK, Dey S, Kumar KA, Mishra S. Plasmodium berghei plasmepsin VIII is essential for sporozoite gliding motility. **Int J Parasitol**. 2017 Apr;47(5):239-245. doi: 10.1016/j.ijpara.2016.11.009. Epub 2017 Feb 10. PMID: 28192122.

15. Maruthi M, Singh D, Reddy SR, Mastan BS, Mishra S, Kumar KA. Modulation of host cell SUMOylation facilitates efficient development of Plasmodium berghei and Toxoplasma gondii. **Cell Microbiol**. 2017 Jul;19(7). doi: 10.1111/cmi.12723. Epub 2017 Feb 20. PMID: 28078755.

16. Al-Nihmi FM, Kolli SK, Reddy SR, Mastan BS, Togiri J, Maruthi M, Gupta R, Sijwali PS, Mishra S, Kumar KA. A Novel and Conserved Plasmodium Sporozoite Membrane Protein SPELD is Required for Maturation of Exo-erythrocytic Forms. **Sci Rep**. 2017 Jan 9;7:40407. doi: 10.1038/srep40407. PMID: 28067322; PMCID: PMC5220379.

17. Voss C, Ehrenman K, Mlambo G, Mishra S, Kumar KA, Sacci JB Jr, Sinnis P, Coppens I. Overexpression of Plasmodium berghei ATG8 by Liver Forms Leads to Cumulative Defects in Organelle Dynamics and to Generation of Noninfectious Merozoites. **mBio.** 2016 Jun 28;7(3):e00682-16. doi: 10.1128/mBio.00682-16. PMID: 27353755; PMCID: PMC4937212.

18. Nemetski SM, Cardozo TJ, Bosch G, Weltzer R, O'Malley K, Ejigiri I, Kumar KA, Buscaglia CA, Nussenzweig V, Sinnis P, Levitskaya J, Bosch J. Inhibition by stabilization: targeting the Plasmodium falciparum aldolase-TRAP complex. **Malar J.** 2015 Aug 20;14:324. doi: 10.1186/s12936-015-0834-9. PMID: 26289816; PMCID: PMC4545932.

19. Singhal N; Atul; Mastan BS, Kumar KA, Sijwali PS. Genetic ablation of plasmoDJ1, a multi-activity enzyme, attenuates parasite virulence and reduces oocyst production. **Biochem J**. 2014 Jul 15;461(2):189-203. doi: 10.1042/BJ20140051. PMID: 25091419.

20. Mastan BS, Kumari A, Gupta D, Mishra S, Kumar KA. Gene disruption reveals a dispensable role for plasmepsin VII in the Plasmodium berghei life cycle. **Mol Biochem Parasitol.** 2014 Jun;195(1):10-3. doi: 10.1016/j.molbiopara.2014.05.004. Epub 2014 Jun 2. PMID: 24893340.

21. Kumar KA, Baxter P, Tarun AS, Kappe SH, Nussenzweig V. Conserved protective mechanisms in radiation and genetically attenuated uis3(-) and uis4(-) Plasmodium sporozoites **PLoS One**. 2009;4(2):e4480. doi: 10.1371/journal.pone.0004480. Epub 2009 Feb 13. PMID: 19214236; PMCID: PMC2637429.

22. Kato N, Sakata T, Breton G, Le Roch KG, Nagle A, Andersen C, Bursulaya B, Henson K, Johnson J, Kumar KA, Marr F, Mason D, McNamara C, Plouffe D, Ramachandran V, Spooner M, Tuntland T, Zhou Y, Peters EC, Chatterjee A, Schultz PG, Ward GE, Gray N, Harper J, Winzeler EA. Gene expression signatures and small-molecule compounds link a protein kinase to Plasmodium falciparum motility. **Nat Chem Biol.** 2008 Jun;4(6):347-56. doi: 10.1038/nchembio.87. Epub 2008 May 4. PMID: 18454143; PMCID: PMC11892688.

23. Zhou Y, Ramachandran V, Kumar KA, Westenberger S, Refour P, Zhou B, Li F, Young JA, Chen K, Plouffe D, Henson K, Nussenzweig V, Carlton J, Vinetz JM, Duraisingh MT, Winzeler EA. Evidence-based annotation of the malaria parasite's genome using comparative expression profiling. **PLoS One**. 2008 Feb 13;3(2):e1570. doi: 10.1371/journal.pone.0001570. PMID: 18270564; PMCID: PMC2215772.

24. Oliveira GA, Kumar KA, Calvo-Calle JM, Othoro C, Altszuler D, Nussenzweig V, Nardin EH. Class II-restricted protective immunity induced by malaria sporozoites. **Infect Immun**. 2008 Mar;76(3):1200-6. doi: 10.1128/IAI.00566-07. Epub 2007 Dec 26. PMID: 18160479; PMCID: PMC2258813.

25. Kumar KA, Garcia CR, Chandran VR, Van Rooijen N, Zhou Y, Winzeler E, Nussenzweig V. Exposure of Plasmodium sporozoites to the intracellular concentration of potassium enhances infectivity and reduces cell passage activity. **Mol Biochem Parasitol**. 2007 Nov;156(1):32-40. doi: 10.1016/j.molbiopara.2007.07.004. Epub 2007 Jul 13. PMID: 17714805.

26. Kumar KA, Sano G, Boscardin S, Nussenzweig RS, Nussenzweig MC, Zavala F, Nussenzweig V. The circumsporozoite protein is an immunodominant protective antigen in irradiated sporozoites. **Nature.** 2006 Dec 14;444(7121):937-40. doi: 10.1038/nature05361. Epub 2006 Dec 6. PMID: 17151604. (***Corresponding author**)

Commentary on above article was also published in Nature. 2006 Dec 14;444(7121):824-7. doi: 10.1038/nature05409.

27. Kumar KA, Singh S, Babu PP. Studies on the glycoprotein modification in erythrocyte membrane during experimental cerebral malaria. **Exp Parasitol**. 2006 Nov;114(3):173-9. doi: 10.1016/j.exppara.2006.03.009. Epub 2006 Jun 5. PMID: 16753147.

28. Kumar KA, Oliveira GA, Edelman R, Nardin E, Nussenzweig V. Quantitative Plasmodium sporozoite neutralization assay (TSNA). **J Immunol Methods**. 2004 Sep;292(1-2):157-64. doi: 10.1016/j.jim.2004.06.017. PMID: 15350520.

29. Kumar KA, Rajgopal Y, Pillai U, Babu PP. Activation of nuclear transcription factor-kappa B is associated with the induction of inhibitory kappa B kinase-beta and involves differential activation of protein kinase C and protein tyrosine kinases during fatal murine cerebral malaria. **Neurosci Lett**. 2003 Apr 10;340(2):139-42. doi: 10.1016/s0304-3940(03)00107-1. PMID: 12668256.

30. Kumar KA, Babu PP. CaM kinase II-alpha activity, levels and Ca/calmodulin dependent phosphorylation of substrate proteins in mice brain during fatal murine cerebral malaria. **Neurosci Lett.** 2003 Jan 16;336(2):121-5. doi: 10.1016/s0304-3940(02)01100-x. PMID: 12499055.

31. Kumar KA, Babu PP. Mitochondrial anomalies are associated with the induction of intrinsic cell death proteins-Bcl(2), Bax, cytochrome-c and p53 in mice brain during experimental fatal murine cerebral malaria. **Neurosci Lett.** 2002 Sep 6;329(3):319-23. doi: 10.1016/s0304-3940(02)00470-6. PMID: 12183040.

Research supervision

- Number of PhDs awarded: 10
- Number of students currently under supervision: 7
- DST Inspire Faculty (associated during 2018-2023): 1
- M.Sc Project dissertation: 24

Membership in professional bodies and scientific reviewing

- Life member in Indian Society for Parasitology
- Life member in Indian Society of Neurochemistry
- Reviewed manuscripts for following journals: Plos Pathogens, Molecular and Biochemical Parasitology, FEBS Journal, Plos One, Future Drugs

Other administrative responsibilities

- Member Secretary, Institutional Bio-Safety Committee (IBSC), School of Life Sciences, University of Hyderabad (2017-2020)
- Member, Institutional Ethics Committee (IEC), IIT, Hyderabad
- Member, Institutional Animal Ethics Committee IAEC), UoH
- Member, School Board, School of Life Sciences, UoH
- Incharge, UoH Animal House

- Member, National Educations Policy (NEP) Committee at School of Life Sciences, for implementation of NEP program
- Coordinator for IQAC (Internal Quality Assurance Cell) for Dept of Animal Biology
- Coordinator for NAAC (National Assessment and Accreditation Council) for Dept of Animal Biology, University of Hyderabad
- Member IQAC (Internal Quality Assurance Cell), University of Hyderabad (2023-2024)
- VC's nominee for BoS for Biotechnology, at GITAM University
- Member IBSC for Indian Immunologicals, Gachibowli, Hyderabad
- Head, Dept of Animal Biology since 1-6-2024