

O M P R A K A S H S I N G H

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Current Research Interest:

- Molecular basis of (i) insecticide resistance in insect disease vectors, and (ii) drug resistance in malaria parasites
- Genomics of malaria and dengue vectors
- Gene duplication as a mechanism of insecticide resistance

Ongoing Research Project:

- Transcriptome analysis of deltamethrin resistant *Anopheles stephensi* and *Anopheles culicifacies*—DST SERB funded project (2018-2021)

List of Publications (2010-2020)

2020

77. Kushwah RBS, Kaur T, Dykes CL, Kapoor N, Singh OP*. A new knockdown resistance (kdr) mutation F1534L in an *Aedes aegypti* population co-occurring with F1534C, S989P and V1016G. *Parasit Vectors*. 2020; 13:327. doi: 10.1186/s13071-020-04201-3
76. Rana VS, Popli S, Saurav GK, Yadav K, Kumar A, Sunil S, Kumar N, Singh OP, Natarajan K, Rajagopal R. *Aedes aegypti* lachesin protein binds to the domain III of envelop protein of Dengue virus-2 and inhibits viral replication. *Cell Microbiol*. 2020; e13200. doi:10.1111/cmi.13200
75. Singh OP*, Nanda N, Chandra D, Jha D, Dua VK, Adak T, Subbarao SK. Modified PCR-based assay for the differentiation of members of *Anopheles fluviatilis* complex in consequence of discovery of a new cryptic species (species V). *Malar J*. 2020; 19:96 doi: 10.1186/s12936-020-03172-1
74. Sharma G, Lather M, Singh OP*. Variations in palpal ornamentation of *Anopheles fluviatilis* species T and U (Diptera: Culicidae) and their taxonomic consequence. *Indian J Exp Biol*. 2020; 58: 64-68

2019

73. Kale S, Yadav CP, Rao PN, Shalini S, Eapen A, Srivastava HC, Sharma SK, Pande V, Carlton JM, Singh OP*, Mallick PK*. Antibody responses within two leading *Plasmodium vivax* vaccine candidate antigens in three geographically diverse malaria-endemic regions of India. *Malar J*. 2019; 18:425
72. Maria van Eijk A, Sutton PL, Ramanathapuram L, Sullivan S, Kanagaraj D, Lakshmi Priya GS, Ravishankaran S, Asokan A, Sangeetha V, Rao P, Wassmer S, Tandel N, Patel A, Desai N, Choubey S, Ali SZ, Barla P, Oraon RR, Mohanty S, Mishra S, Kale S, Bandyopadhyay N, Mallick P, Huck J, Valecha N, Singh OP, Pradhan K, Singh R, Sharma SK, Srivastava HC, Eapen A, Carlton JM. The burden of submicroscopic and asymptomatic malaria in India revealed from epidemiology studies at three varied transmission sites in India. *Sci Rep* 9: 17095, doi: 10.1038/s41598-019-53386-w
71. Singh H, Singh OP*, Akhtar N, Sharma G, Sindhania A, Gupta N, Valecha N. First report on the transmission of Zika virus by *Aedes (Stegomyia) aegypti* (L.) (Diptera: Culicidae) during the 2018 Zika outbreak in India. *Acta Trop*. 2019; 199:105114, doi: 10.1016/j.actatropica.2019.105114
70. Kaul A, Bali P, Anwar S, Sharma AK, Gupta BK, Singh OP, Adak T, Sohail M. Genetic diversity and allelic variation in MSP3 α gene of paired clinical *Plasmodium vivax* isolates from Delhi, India. *J Infect Public Health*. 2019; 12: 576-584. doi: 10.1016/j.jiph.2019.01.068.

69. Pradhan S, Kalia I, Roy SS, Singh OP, Adak T, Singh AP, Dhar SK. Molecular Characterization and Expression Profile of an Alternate Proliferating Cell Nuclear Antigen Homolog PbPCNA2 in *Plasmodium berghei*. *IUBMB Life*, 2019; 71:1293-1301, doi: 10.1002/iub.2036
68. Rahi M, Anvikar AR, Singh OP, Jambulingam P, Vijayachari P, Das A, Pati S, Narain K, Gangakhedkar RR, Dhingra N, Bhargava B. MERA India: Malaria Elimination Research Alliance India. *J Vector Borne Dis*. 2019, 56:1-3 doi: 10.4103/0972-9062.257766.

2018

67. Kumar A, Singh KP, Bali P, Anwar S, Kaul A, Singh OP, Gupta BK, Kumari N, Noor Alam M, Raziuddin M, Sinha MP, Gourinath S, Sharma AK, Sohail M. iNOS polymorphism modulates iNOS/NO expression via impaired antioxidant and ROS content in *P. vivax* and *P. falciparum* infection. *Redox Biol*. 2018, 15:192-206. doi: 10.1016/j.redox.2017.12.005
66. Singh KP, Shakeel S, Naskar N, Bharti A, Kaul A, Anwar S, Kumari S, Kumar A, Singh JK, Kumari N, Gupta BK, Manna P, Roy V, Lata S, Singh OP, Sinha MP, Sharma AK, Sohail M. Role of IL-1 β , IL-6 and TNF- α cytokines and TNF- α promoter variability in *Plasmodium vivax* infection during pregnancy in endemic population of Jharkhand, India. *Mol Immunol*. 2018, 97:82-93. doi: 10.1016/j.molimm.2018.03.019

2017

65. Singh R, Singh DP, Savargaonkar D, Singh OP, Bhatt RM, Valecha N. Evidence of SYBR green I based visual loop-mediated isothermal amplification (LAMP) assay for genus and species-specific diagnosis of malaria in *P. vivax* and *P. falciparum* in endemic regions. *J Vector Borne Dis*. 2017, 54(1):54-60

2016

64. Dykes CL, Das MK, Eapen A, Batra CP, Ghosh, SK, Vijayan VA, Mishra S, Singh OP*. Knockdown Resistance (*kdr*) Mutations in Indian *Anopheles stephensi* Populations. *J Med Entomol* 53:315-320, 2016
63. Jain J, Kushwah RB, Singh SS, Sharma A, Adak T, Singh OP, Bhatnagar RK, Subbarao SK, Sunil S. Evidence for Natural Vertical Transmission of Chikungunya Viruses in Field Populations of *Aedes aegypti* in Delhi and Haryana States in India - A Preliminary Report. *Acta Trop*. 2016, 162:46-55
62. Mishra N, Bharti RS, Mallick P, Singh OP, Srivastava B, Rana R, Phookan S, Gupta HP, Ringwald P, Valecha N. Emerging polymorphisms in falciparum Kelch 13 gene in Northeastern region of India. *Malar J*. 2016, 15(1):583
61. Rao P, Uplekar S, Kayal S, Mallick PK, Bandyopadhyay N, Kale S, Singh OP, Mohanty A, Mohanty S, Wassmer S, Carlton JM. A method for amplicon deep sequencing of drug resistance genes in *Plasmodium falciparum* clinical isolates from India. *J Clin Microbiol*, 54:1500-1511, 2016
60. Satsangi N, Singh OP, Preet S. Microwave-assisted green synthesis of silver nanoparticles using aqueous leaf extract of *Callistemon citrinus*: a novel approach for integrated mosquito management. *Int J Pharm Res Biosci*, 5: 96-110, 2016
59. Sharma D, Lather M, Dykes CL, Dang AS, Adak T, Singh OP*. Disagreement in genotyping results of drug resistance alleles of the *Plasmodium falciparum* dihydrofolate reductase (*Pfdhfr*) gene by allele-specific PCR (ASPCR) assays and Sanger sequencing. *Parasitol Res* 115:323-328, 2016

2015

58. Carlton JM, Volkman SK, Uplekar S, Hupalo DN, Alves JMP, Cui L, Donnelly M, Roos DS, Harb OS, Acosta M, Read A, Ribolla PE, Singh OP, Valecha N, Wassmer SC, Ferreira M, Escalante AA. Population genetics, evolutionary genomics, and genome-wide studies of malaria: A view across the International Centers of Excellence for Malaria Research. *Am J Trop Med Hyg* 93:87-98, 2015
57. Dev V, Adak T, Singh OP, Nanda N, Baidya BK. Malaria transmission in Tripura: disease distribution & determinants. *Indian J Med Res* 142:12-22, 2015

56. Dykes CL, Kushwah RBS, Das MK, Tiwari SN, Bhatt RM, Veer V, Agrawal OP, Adak T, Singh OP*. Knockdown resistance (*kdr*) mutations in Indian *Anopheles culicifacies* populations. *Parasit Vectors* 8:333, 2015
55. Kushwah RBS, Dykes CL, Kapoor N, Adak T, Singh OP*. Pyrethroid-resistance and presence of two knockdown resistance (*kdr*) mutations, F1534C and a novel mutation T1520I, in Indian *Aedes aegypti*. *PLoS Negl Trop Dis* 9(1): e3332, 2015
54. Kushwah RBS, Mallick PK, Ravikumar H, Dev V, Kapoor N, Adak T, Singh OP*. Status of DDT and pyrethroid resistance in Indian *Aedes albopictus* and absence of knockdown resistance (*kdr*) mutation. *J Vector Borne Dis* 52:95–98, 201, 2015
53. Lather M, Sharma D, Dong AS, Adak T, Singh OP*. Isolation and characterization of polymorphic microsatellite markers from the malaria vector *Anopheles fluviatilis* species T. *J. Med. Entomol.* 52(3): 408–412, 2015
52. Sharma D, Lather M, Mallick P, Adak T, Dang AS, Valecha N, Singh OP*. Polymorphism in drug resistance genes dihydrofolate reductase and dihydropteroate synthase in *Plasmodium falciparum* in some states of India. *Parasit Vectors*, 8 8:471, 2015.
51. Singh N, Mishra AK, Chand SK, Bharti PK, Singh MP, Nanda N, Singh OP, Sodagiri K, Udhayakumar V. Relative abundance and *Plasmodium* infection rates of malaria vectors in and around Jabalpur, a malaria endemic region in Madhya Pradesh state, central India. *PLoS ONE* 10(5): e0126932, 2015
50. Singh OP*, Dykes CL, Sharma G, Das MK. L1014F-*kdr* mutation in Indian *Anopheles subpictus* arising from two alternative transversions in the voltage gated sodium channel and a single PIRA-PCR for their detection. *J Med Entomol* 52 (1): 24-27, 2015. doi: 10.1093/jme/tju013, 2015

2014

49. Kar NP, Kumar, Singh OP, Carlton J, Nanda N. A review of malaria transmission dynamics in forest ecosystems. *Parasit Vectors* 7:265, 2014
48. Prajapati SK, Singh OP. Identification of a vir-orthologous immune evasion gene family from primate malaria parasites. *Parasitology.* 141:641-645, 2014
47. Prajapati SK, Culleton R, Singh OP. Protein trafficking in *Plasmodium falciparum*-infected red cells and impact of the expansion of exported protein families. *Parasitology.* 141: 1533-1543, 2014
46. Singh R, Singh DP, Gupta R, Savargaonkar D, Singh OP, Nanda N, Bhatt RM, Valecha N. Comparison of three PCR-based assays for the non-invasive diagnosis of malaria: detection of *Plasmodium* parasites in blood and saliva. *Eur J Clin Microbiol Infect Dis.* 33:1631-1639, 2014

2013

45. Mallick PK, Singh R, Singh OP, Singh AK, Bhasin VK, Valecha N. Reduced heterozygosity at intragenic and flanking microsatellites of *pfcr* gene establishes natural selection based molecular evolution of chloroquine-resistant *Plasmodium falciparum* in India. *Infect Genet Evol.* 20:407-12, 2013
44. Mallick PK, Sutton PL, Singh R, Singh OP, Dash AP, Singh AK, Carlton JM, Bhasin VK. Microsatellite analysis of chloroquine resistance associated alleles and neutral loci reveal genetic structure of Indian *Plasmodium falciparum*. *Infect Genet Evol.* 19:164-75, 2013
43. Mehrunissa A, Sharma A, Parasher H, Dhayal D, Singh OP, Nanda N, Adak T. Comparative susceptibilities of species T and U of the *Anopheles fluviatilis* Complex to *Plasmodium vinckei petterii* sporogony. *J Med Entomol* 50:594-597, 2013
42. Mittal PK, Nanda N, Singh OP, Batra CP, Adak T. Establishment of a focus on *Anopheles fluviatilis*, an important malaria vector near the National Thermal Power Corporation Project in Dadri CHC area in District Gautam Budh Nagar, Uttar Pradesh, India: a case study. *J Vector Borne Dis.* 2013 Dec;50(4):307-10
41. Nanda N, Singh OP, Dua VK, Pandey AC, Nagpal BN, Adak T, Dash AP, Subbarao SK. Population cytogenetic and molecular evidence for existence of a new species in *Anopheles fluviatilis* complex (Diptera: Culicidae). *Infect Genet Evol*, 13:218-223, 2013

40. Prajapati SK, Singh OP. Remodeling of human red cells infected with *Plasmodium falciparum* and the impact of PHIST proteins. *Blood Cells Mol Dis.* 51:195–202, 2013
39. Prajapati SK, Singh OP. Insights into the invasion biology of *Plasmodium vivax*. *Front Cell Infect Microbiol*, 3:8, 2013
38. Sharma A, Dhayal D, Singh OP, Adak T, Bhatnagar RK. Gut microbes influence fitness and malaria transmission potential of Asian malaria vector *Anopheles stephensi*. *Acta Trop*, 128(1):41-7, 2013
37. Sunil S, Singh OP, Nanda N, Raghavendra K Reddy N. Subbarao SK. Analysis of population genetic structure of Indian *Anopheles culicifacies* species A using microsatellite markers. *Parasit Vectors*, 6:166, 2013

2012

36. Das A, Anvikar AR, Cator LJ, Dhiman RC, Eapen A, Mishra N, Nagpal BN, Nanda N, Raghavendra K, Read AF, Sharma SK, Singh OP, Singh V, Sinnis P, Srivastava HC, Sullivan SA, Sutton PL, Thomas MB, Carlton JM, Valecha N. Malaria in India: the center for the study of complex malaria in India. *Acta Trop*, 121:267-273, 2012
35. Gupta P, Das A, Singh OP, Ghosh SK, Singh V. Assessing the genetic diversity of the vir genes in Indian *Plasmodium vivax* population. *Acta Trop*, 124:133-139, 2012
34. Prajapati SK, Kumari P, Singh OP. Molecular analysis of reticulocyte binding protein-2 gene in *Plasmodium vivax* isolates from India. *BMC Microbiol*, 12:243, 2012

2011

33. Dixit J, Srivastava H, Singh OP, Saksena DN, Das A. Multilocus nuclear DNA markers and genetic parameters in an Indian *Anopheles minimus* population. *Infect Genet Evol.* 11: 572–579, 2011
32. Mehruunisa A, Adak T, Singh OP, Nanda N, Dua VK, Parasher H, Khan W. Laboratory colonization of *Anopheles fluviatilis* species T and U. *J Med Entomol*, 48: 395-397, 2011
31. Singh OP*, Dykes CL, Lather M, Agrawal OP, Adak T. Knock-down resistance (*kdr*)-like mutations in the voltage gated sodium channel of a malaria vector *Anopheles stephensi* and PCR assays for their detection. *Malar J*, 10: 59, 2011

2010

30. Dixit J, Srivastava H, Sharma M, Das MK, Singh OP, Raghavendra K, Nanda N, Dash AP, Saksena DN, Das A. Phylogenetic inference of Indian malaria vectors from multilocus DNA sequences. *Infect Genet Evol.* 10:755–763, 2010
29. Singh OP*, Dykes CL, Das MK, Pradhan S, Bhatt RM, Agrawal OP, Adak T. Presence of two alternative *kdr*-like mutations, L1014F and L1014S, and a novel mutation, V1010L, in the voltage gated Na⁺ channel of *Anopheles culicifacies* sensu lato population from Orissa, India. *Malar J*, 9:146, 2010
28. Singh OP*, Dykes CL, Adak T. *kdr*-like mutations in the voltage gated sodium channel of a malaria vector *Anopheles stephensi* and development of PCR-based assays for their detection. *Malar J*, 9 (S2):P67, 2010, doi: 10.1186/1475-2875-9-S2-P67
27. Singh OP*, Nanda N, Dev V, Bali P, Sohail M, Mehruunisa A, Adak T, Das AP. Molecular evidence of misidentification of *Anopheles minimus* as *Anopheles fluviatilis* in Assam (India). *Acta Trop*, 113: 241–244, 2010
26. Surendran SN, Singh OP, Jude PJ, Ramasamy R. Genetic evidence for malaria vectors of the *Anopheles sundaicus* complex in Sri Lanka with morphological characteristics attributed to *Anopheles subpictus* species B. *Malar J*. 9:343, 2010