

Curriculum Vitae

1. **Name** : Shobhona Sharma Ph D, FASc, FNA
 2. **Date of birth** : February 5, 1953
 3. **Address (Former work)** : Senior Professor (Retd. In 2018).
 Department of Biological Sciences
 Tata Institute of Fundamental Research
 Homi Bhabha Rd, Mumbai 400 005, India.
(Current work) : Collaboration with Institute of Chemical Technology,
 and BlissGV, Mumbai.
(Residential) : 1103 A, Tulsigagan Building, Plot 28/29,
 Sector 21, Kharghar, Navi Mumbai 410210.
 Tel: (Res.) 091-22-27743426
 Mobile : 9892352830
 e-mail: sharma@tifr.res.in, shobhona@gmail.com
http://www.tifr.res.in/~dbs/faculty/S_Sharma.html

4. Academic Qualifications :

<i>Degree</i>	<i>Year</i>	<i>University (Subject)</i>	<i>Remarks</i>
B. Sc.	1973	Delhi (Chem. Hons)	Ranked first in Delhi Univ.
M. Sc.	1975	Delhi (Chemistry)	Ranked second in Delhi Univ.
Ph. D.	1981	Bombay University (Molecular Biology)	Research work from TIFR

5. Positions held:

Chairperson (2010-2017)	Department Biology, Tata Inst. of Fundamental Research
Senior Professor (2012-2018)	Tata Institute of Fundamental Research, Mumbai.
Professor (2002-2012)	-----do-----
Assoc. Professor (1997-2002)	-----do-----
Reader (1991-1997)	----- do -----
Fellow (1987-1991)	----- -do -----
Research Associate (1985-1987)	Duke University Medical Center, U.S.A.
Research Associate (1983-1985)	New York University Medical Center, U.S.A.

6. Memberships and Awards:

a) Awards, fellowships and recognition:

Prof. Seshadri Prize for first rank in B.Sc. Chemistry (Hons), Delhi University	1973.
National Science Talent Scholarship	1970-1979.
Science Exhibition Awards	1970-1975.
Best student award in Chemistry from Miranda House in B.Sc. and M.Sc.	1973 & 1975.
ICRO fellowship	1978
AMBO fellowship	1983
Award for excellence in Molecular Aspects of Vector Borne Diseases	1996
Elected member of Molecular Immunology Forum	1994
Advisory member of Malaria Foundation, New York, USA.	1997
Elected member of Guha Research Conference	1997

Elected Fellow of Indian Academy of Sciences, Bangalore.	2003
Pratima and Sucharu Chakrabarty Science Samman,	2003
Wisitex Foundation Award Vigyan Ratna in Science	2004-2005
Research Travel Award; Johns Hopkins Malaria Research Institute, USA	2009
Featured in the Book "Lilavati's Daughters"	2008
Prof M.R. Baichwal Visiting Fellowship in Pharmaceutical Science and Technology for the year 2011-2012 by ICT, Mumbai.	2012
Elected Fellow of Indian National Science Academy	2014

b) Association with Scientific Agencies and Institutions:

Member of following Scientific Advisory Committees

a) Vector Control research Institute , Pondicherry	1997-2000
b) National Institute of Malaria Research , Delhi	2002 - present
c) MSU, Biochemistry, Vadodara	2003-2006
d) Lady Tata Memorial Trust, Mumbai	2008 -2014
e) Institute of Life Sciences, Bhubaneswar	2008 -2018
f) National Centre for Cell Sciences, Pune	2013 -2015
g) Member of Executive Council, Dr. Harisingh Gour Vishwavidyalaya, Sagar, MP, India	2016- present
h) Member of Governing Body, NIT Rourkela	2016-present

Member of following Committees

"Intermediate and Senior Fellows" of Welcome Trust-DBT Alliance	2009-2011
Indian Academy of Sciences (Selection Committee-General Biology)	2010-2012
Lady Tata Memorial Trust Selection Committee	2010-2014; 2019-present
"Early Career Fellowships" of of Welcome Trust-DBT Alliance	2012 -2018
Indian National Science Academy (Council Service)	2018-2020

8. No. of Ph.D. students guided: 14; No. of M. Sc. students guided: 22

9. Patents granted:

1. "Novel Plasmodium protein as malarial vaccine and drug target". Indian Patent No. 310142; Dated 17/06/2011 applied through DAE. Authors **Shobhona Sharma** and Sudipta Das.
2. Nanocarrier based delivery of Halofantrine for treatment of Malaria. V. B. Patravale, **S. Sharma**, U Soni, S. Pathak. Patent applied through ICT in 2010.
3. Nanodrug delivery based on combination therapy for treating parasite infections "V. B. Patravale, Sonia Jain, Medha Joshi, **S. Sharma**, U Soni, S. Pathak. Patent applied through ICT in 2013.

10. List of ten selected publications:

1. Patra AP, **Sharma S** and Ainavarapu SRK. 2017 Force spectroscopy of the *Plasmodium falciparum* vaccine candidate circumsporozoite protein suggests a mechanically pliable repeat region. *J. Biol. Chem.* 292, 2110-2119.
2. Herbert F, Tchitchek N, Bansal D, Jacques J, Pathak S, Bécavin C, Fesel C, Dalko E, Cazenave PA, Preda C, Ravindran B, **Sharma S**, Das B, Pied S 2015 Evidence of IL-17, IP-10, and

IL-10 involvement in multiple-organ dysfunction and IL-17 pathway in acute renal failure associated to *Plasmodium falciparum* malaria. *J Transl Med.* 2015 Nov 24;13:369.

3. Jain SA, Basu H, Prabhu PS, Soni U, Joshi MD, Mathur D, Patravale VB, Pathak S, **Sharma S.** 2014 Parasite impairment by targeting Plasmodium-infected RBCs using glyceryl-dilaurate nanostructured lipid carriers. *Biomaterials.* 2014 Aug;35(24):6636-45.
4. Das S, Basu H, Korde R, Tewari R and **Sharma S** (2012) Arrest of nuclear division in *Plasmodium* through blockage of erythrocyte surface exposed ribosomal protein P2. *PLoS Pathogens* Aug;8(8):e1002858.
5. Das S, Sudarsan R, Sivakami S and **Sharma S** (2012) Erythrocytic stage dependent regulation of oligomerization of *Plasmodium* ribosomal protein P2. *J. Biol. Chem.* 287, 41499-513.
6. Pathak S., Rege M., Gogtay N.J., Aigal U., Sharma S.K., Valecha N., Bhanot G., Kshirsagar N.A., **Sharma S.** (2012) Age-dependent sex bias in clinical malarial disease in hypoendemic regions. *PLoS One* 7:e35592.
7. Goswami A, Singh S, Redkar VD, and **Sharma S.** 1997 Characterization of P0, a ribosomal phosphoprotein of *Plasmodium falciparum*. Antibody against amino-terminal domain inhibits parasite growth. *J. Biol. Chem.* **272**, 12138-12143.
8. Lobo CA, Kar SK, Ravindran B, Kabilan L and **Sharma S.** 1994 Novel proteins of *Plasmodium falciparum* identified by differential immunoscreening using immune and patient sera. *Infect. Immun.* **62**, 651-656.
9. **Sharma S**, Gwadz RW, Schlesinger DH and Godson GN. 1986. Immunogenicity of the repetitive and non-repetitive peptide regions of the divergent CS-protein of *Plasmodium knowlesi*. *J. Immunol.* **137**, 357-361.
10. **Sharma S**, Svec P, Mitchell GH and Godson GN. 1985. Diversity of circumsporozoite antigen genes from two different strains of the malarial parasite *Plasmodium knowlesi*. *Science* **229**, 779-782.

11. Research Support: Intra- and Extra-mural funds obtained in last few years:

- 1) In-House DAE funds on Biology of Malarial Parasites 2012-2017; Rs. 157,00,000/=
- 2) DBT project on “Nanotherapeutics with lipidic nanoparticles for the treatment of malaria”. March 2008-2012, jointly with Prof. V. Patravale, ICT Mumbai; Rs. 120,00,000/=
- 3) Indo-French IFCPAR/CEFIPRA “Role of immune and genetic factors in the outcome of *Plasmodium falciparum* malaria”; April 2008-2012; Rs. 70,00,000/=
- 4) Lady Tata Memorial Institutional Research Funds “Effect of *Plasmodial* infection on neurogenesis and cognitive behaviour in murine malaria model”. September 2009-2012; Rs. 25,00,000/=
- 5) ICMR “Effect of mild malaria on neural cells in a rodent model. Correlation with specific immune responses”; 2013-2016. Rs. 35,00,000/=
- 6) DBT-SIGID LIA grant: “International associated laboratory in the area of systems immunology and genetics infectious diseases” 2014-2018; Joint collaboration with CNRS France, ILS, Bhubaneshwar, NII, Delhi and NCCS, Pune; Indian component 98,00,000/=

Have received extra-mural grants from agencies such as WHO, DST, CSIR, ICMR and CEFIPRA earlier.

12. Scientific Contributions:

Our group has been studying various aspects of the biology of the malarial parasite:

Immune response to malaria: Our focus has been to dissect the naturally acquired immunity to the parasite. Using a differential immunoscreen we have identified novel protective proteins of *Plasmodium*. Recently we have observed distinct age-dependent sexual dimorphism in malaria infections in hypoendemic areas of Mumbai. In mouse models, we note that the development of B and T cells is impaired during malarial infection.

Properties of parasite infected red cells: We have set up a simple method to assess buckling properties of single erythrocytes with a combination of flow-cell, optical trap and fluorescence microscope.

Glycolysis and metabonomics: Using NMR on physiologically live cells, we have studied the glucose utilization by the parasite-infected and uninfected RBCs and noted that a small cohort of parasitized cells can significantly influence the glucose utilization of host cells.

Nano-lipid carrier mediated drug delivery in malaria: The inability to administer artemether intravenously has precluded the use of artemether in management of severe malaria, although the half-life of artemether is greater than that of the currently used drug artesunate. Our NLC formulation should allow intravenous use of lower doses of artemether towards a better management of cerebral malaria. Recent data shows selective uptake of NLCs by erythrocytes, providing for better therapeutic measures for malaria.

Effect of *Plasmodial* infection on neurogenesis and cognitive behaviour in animal model: Although extensive work has been carried out to examine the neural dysfunction in case of *Plasmodium falciparum* related cerebral malaria, not much is known about hippocampal plasticity and regeneration of brain cells. We have preliminary observations showing that even mild malarial infection affects learning and memory formation. We are assessing whether such effects are due to immune pathways activated by the parasite, and/or parasite secreted molecules. Is the severity of neurological sequelae altered in repeated infections, compared to single infection and how does it correlate to immune responses? Do NLCs affect such functions, on their own or help to alleviate the parasite effects? We propose to evaluate answers to such questions in collaboration with Vidita Vaidya.

Use of Nanostructured lipid carriers (NLCs) and polymeric lyotropic liquid crystalline phases (P-LLCPr) for delivery of antimalarials:

Artemether–lumefantrine (ARM–LFN) is a World Health Organization (WHO) approved fixed-dose combination having low solubility and poor oral bioavailability. Nanostructured lipid carriers (NLC) were developed to enhance the oral efficacy of this combination using the microemulsion template technique. NLC showed enhanced efficacy at 1/10 of the daily dose of ARM–LFN. The biocompatible NLC developed using an industrially feasible technique offer a promising solution for oral malaria therapy. The ARM–LFN NLC showed sustained drug release, amenability to autoclaving, compatibility with infusion fluids, good stability, complete parasite clearance and reversal of CM symptoms with 100% survival in *Plasmodium berghei*-infected mice, and safety in rats.

We also formulated lyotropic liquid crystalline preconcentrates of ART and Lumefantrine (LUM) ACT with and without biodegradable polymer for antimalarial therapy. Ex vivo release studies revealed prolong release of ART-LUM over 72h from polymeric lyotropic liquid crystalline phases (P-LLCPr). In vitro hemolysis assay and myotoxicity studies confirmed intramuscular safety. Treatment with ART-LUM P-LLCPr conferred complete protection with no mortality at 1/40th of therapeutic dose in modified Peter's four-day suppressive test as compared to marketed ART formulation resulted in 100% mortality within 20 days. The high efficacy with significantly reduced dose and a single administration with single shot therapy suggest ART-LUM P-LLCPr as a promising new patient friendly alternative for antimalarial therapy.

13. Collaborators:

Epidemiology:

In India:

U. Thatte, N. Gogatay, KEM Hospital, Mumbai.

B. Ravindran, ILS, Bhubaneswar, Bidyut Das, SCB Medical College, Cuttack.

S.K. Sharma, Neena Valecha, NIMR, New Delhi

International:

S. Pied and P.A. Cazenave, Pasteur Institute, France.

Chris King, I. Malhotra, USA; J. Ouma, Kenya.

Parasite Biology:

R.V. Hosur, TIFR. J.P.G. Ballesta and C. Santos, Severo Ochoa Centre, Madrid, Spain; C. Long,

A. Vaidya, N. Kumar and V. Carruthers, USA.

Fluid forces:

Deepak Mathur, TIFR, Mumbai.

Glucose utilization and metabolomics:

H.M. Sonawat, G.K. Jarori, TIFR, Mumbai.

Nano-lipid carriers and drug delivery:

V. Patravale and P. Devarajan, ICT, Mumbai.

Neurological consequences of malaria

Vidita Vaidya, TIFR, Mumbai

Complete List of publications:

1. Patgaonkar M, Herbert F, Powale K, Gandhe P, Gogtay N, Thatte U, Pied S, **Sharma S**, Pathak S. 2018 Vivax infection alters peripheral B-cell profile and induces persistent serum IgM. *Parasite Immunol.* 2018 Oct;40(10):e12580.
2. Dawre S, Pathak S, **Sharma S** and Devarajan PV 2018 Enhanced antimalarial activity of a prolonged release in situ gel of Arteether–Lumefantrine in a murine model. *Eur J Pharm Biopharm* 123:95-107.
3. Ghosh S, Pathak S, Sonawat HM, **Sharma S**, Sengupta A. 2018 Metabolomic changes in vertebrate host during malaria disease progression. *Cytokine.* 2018 Jul 26. pii:S1043-4666(18)30320-X.
4. Darade A, Pathak S, **Sharma S** and Patravale V 2018 Atovaquone oral bioavailability enhancement using electrospraying technology. *European Journal of Pharmaceutical Sciences* 111:195-204.
5. Patra AP, **Sharma S** and Ainaravapu SRK. 2017 Force spectroscopy of the *Plasmodium falciparum* vaccine candidate circumsporozoite protein suggests a mechanically pliable repeat region. *J. Biol. Chem.* 292, 2110-2119.
6. Patankar S, **Sharma S**, Rathod PK, Duraisingh M. Malaria in India: The Need for New Targets for Diagnosis And Detection of *Plasmodium vivax*. *Proteomics Clin Appl.* 2017 Nov 29. doi: 10.1002/prca.201700024. [Epub ahead of print] Review. PubMed PMID: 29193853.
7. Chaudhari R, **Sharma S**, Patankar S. Glutathione and thioredoxin systems of the malaria parasite *Plasmodium falciparum*: Partners in crime? *Biochem Biophys Res Commun.* 2017 Jun 17;488(1):95-100.
8. Chaudhari R, Dey V, Narayan A, **Sharma S**, Patankar S. Membrane and luminal proteins reach the apicoplast by different trafficking pathways in the malaria parasite *Plasmodium falciparum*. *PeerJ.* 2017 Apr 27;5:e3128.

9. Jain SA, Awale M, Pathak S, Vanage G, Patravale VB, **Sharma S**. 2016 Teratogenicity of Artemether-Clindamycin Nanostructured Lipid Carriers in Rats. *Int J Toxicol.* Jul;35(4):420-8.
10. Sengupta A, Ghosh S, Das BK, Panda A, Tripathy R, Pied S, Ravindran B, Pathak S, **Sharma S**, Sonawat HM. 2016 Host Metabolic Responses to *Plasmodium falciparum* infections in Eastern India evaluated by ¹H NMR Metabolomics. *Molecular BioSystems* 12:3324-3332.
11. Prabhu P, Suryavanshi S, Pathak S, Patra A, **Sharma S**, Patravale V. 2016 Nanostructured lipid carriers of artemether-lumefantrine combination for intravenous therapy of cerebral malaria. *Int J Pharm.* 513, 504-517.
12. Prabhu P, Suryavanshi S, Pathak S, **Sharma S**, Patravale V. 2016. Artemether-lumefantrine nanostructured lipid carriers for oral malaria therapy: Enhanced efficacy at reduced dose and dosing frequency. *Int J Pharm.*, 511, 473-487.
13. Kate L, Gokarna V, Borhade V, Prabhu P, Deshpande V, Pathak S, **Sharma S**, Patravale V. 2016 Bioavailability enhancement of atovaquone using hot melt extrusion technology. *Eur J Pharm Sci.* 86:103-14.
14. Panda AK, Das BK, Panda A, Tripathy R, Pattnaik SS, Mahto H, Pied S, Pathak S, **Sharma S**, Ravindran B. 2016 Heterozygous mutants of TIRAP (S180L) polymorphism protect adult patients with *Plasmodium falciparum* infection against severe disease and mortality. *Infect Genet Evol.* 43:146-50.
15. Dalko E, Tchitchek N, Pays L, Herbert F, Cazenave PA, Ravindran B, **Sharma S**, Nataf S, Das B, Pied S. 2016 Erythropoietin Levels Increase during Cerebral Malaria and Correlate with Heme, Interleukin-10 and Tumor Necrosis Factor-Alpha in India. *PLoS One.* 11(7):e0158420.
16. Ghosh S, Sengupta A, **Sharma S**, Sonawat HM 2016 Early prediction of cerebral malaria by ¹H NMR based metabolomics. *Malar J. Apr 12;15:198.*
17. Sengupta A, Ghosh, S, Pathak, S, Gogtay N, Thatte U, Doshi, H, **Sharma S** and Sonawat HM. 2015 Metabolomic analysis of urine samples of vivax malaria in-patients for biomarker identification. *Metabolomics* 11, 135-162.
18. Dalko E, Das B, Herbert F, Fesel C, Pathak S, Tripathy R, Cazenave PA, Ravindran B, **Sharma S**, Pied S. 2015 Multifaceted roles of heme during severe *Plasmodium falciparum* infections in India. *Infect Immun.* 2015 Oct;83(10):3793-9.
19. Herbert F, Tchitchek N, Bansal D, Jacques J, Pathak S, Bécavin C, Fesel C, Dalko E, Cazenave PA, Preda C, Ravindran B, **Sharma S**, Das B, Pied S 2015 Evidence of IL-17, IP-10, and IL-10 involvement in multiple-organ dysfunction and IL-17 pathway in acute renal failure associated to *Plasmodium falciparum* malaria. *J Transl Med.* 2015 Nov 24;13:369.
20. Khanam S, **Sharma S** and Pathak S (2015) Lethal and non-lethal murine malarial infections differentially affect apoptosis, proliferation and CD8 expression on thymic T cells. *Parasite Immunology* 37, 349-361.
21. Mishra P, Choudhary S, Mukherjee S, Sengupta D, **Sharma S** and Hosur RV (2015) Molten globule nature of *Plasmodium falciparum* P2 homo-tetramer. *Biochemistry and Biophysics Reports* 1, 97-107.
22. Patravale V, Desai S and **Sharma S** 2015 Phytopharmaceuticals for antimalarial therapy. *Emerging trends in phytopharmaceuticals.* CBS Publishers and Distributors; pp 85-95.
23. Mishra P, **Sharma S**, Hosur RV. 2015 Molten globule behavior of apicomplexan protein P2 from *Plasmodium falciparum* and *Toxoplasma gondii*. *J Biomol Struct Dyn.* May;33 Suppl 1:98.
24. Mishra P, Sudarsan R, **Sharma S**, Hosur RV. 2014 The C-terminal Domain of eukaryotic acidic ribosomal P2 proteins is intrinsically disordered with conserved structural propensities. *Protein & Peptide Letters* 22(3):212-8.

25. Jain SA, Basu H, Prabhu PS, Soni U, Joshi MD, Mathur D, Patravale VB, Pathak S, **Sharma S**. 2014 Parasite impairment by targeting Plasmodium-infected RBCs using glyceryl-dilaurate nanostructured lipid carriers. *Biomaterials*. 2014 Aug;35(24):6636-45.
26. Sudarsan R, Chopra RK, Khan MA, **Sharma S**. (2015) Ribosomal protein P2 localizes to the parasite zoite-surface and is a target for invasion inhibitory antibodies in *Toxoplasma gondii* and *Plasmodium falciparum*. *Parasitol Int*. 2014, 64, 43-49.
27. Mishra P, **Sharma S** and Hosur RV 2014 Residue level description of in vivo self-association of *Plasmodium falciparum* P2, *Journal of Biomolecular Structure and Dynamics*. 32, 602-12.
28. Mishra P, Sudarsan R, **Sharma S**, Hosur RV. (2014) The C-terminal Domain of Eukaryotic Acidic Ribosomal P2 proteins is Intrinsically Disordered with conserved structural propensities. *Protein & Peptide Letters* 2014 (*In Press*).
29. Guha SK, Tillu R, Sood A, Patgaonkar M, Nanavaty IN, Sengupta A, **Sharma S**, Vaidya VA, Pathak S. Single episode of mild murine malaria induces neuroinflammation, alters microglial profile, impairs adult neurogenesis, and causes deficits in social and anxiety-like behavior. *Brain Behav Immun*. 2014 Jun 19. pii: S0889-1591(14)00174-3. doi: 10.1016/j.bbi.2014.06.009. [Epub ahead of print] PubMed PMID: 24953429.
30. **Sharma S**, Gotam K Jarori and Haripal M. Sonawat, Glycolysis, Encyclopedia of Malaria (2013) DOI 10.1007/978-1-4614-8757-9_21-1. Springer Science+Business Media New York 2013.
31. Dharmadhikari A, Basu H., Dharmadhikari J, **Sharma S**, and Mathur D. 2013 On the birefringence of healthy and malaria-infected red blood cells. *J. Biomed. Optics* 18, 125001.
32. Sengupta A, Ghosh S, **Sharma S**, Sonawat HM. 2013 ¹H NMR metabonomics indicates continued metabolic changes and sexual dimorphism post-parasite clearance in self-limiting murine malaria model. *PLoS One*. 8(6):e66954. Doi: 10.1371/journal.pone.0066954.
33. Ghosh S, Sengupta A, **Sharma S**, Sonawat HM. 2013 Metabolic Perturbations of Kidney and Spleen in Murine Cerebral Malaria: (1)H NMR-Based Metabolomic Study. *PloS One*. 2013 Sep 6;8(9):e73113. doi: 10.1371/journal.pone.0073113.
34. Patil S, Suryavanshi S, Pathak S, **Sharma S**, Patravale V. 2013 Evaluation of novel lipid based formulation of β -Artemether and Lumefantrine in murine malaria model. *Int J Pharm*. 2013 Oct 15;455(1-2):229-34.
35. Borhade V, Pathak S, **Sharma S**, Patravale V. 2013 Formulation and characterization of atovaquone nanosuspension for improved oral delivery in the treatment of malaria. *Nanomedicine (Lond)*. 2014, 9, 649-666.
36. Das S, Basu H, Korde R, Tewari R and **Sharma S** (2012) Arrest of nuclear division in *Plasmodium* through blockage of erythrocyte surface exposed ribosomal protein P2. *PLoS Pathogens* Aug;8(8):e1002858.
37. Das S, Sudarsan R, Sivakami S and **Sharma S** (2012) Erythrocytic stage dependent oligomerization of *Plasmodium* ribosomal protein P2. *J. Biol. Chem*. 287, 41499-513.
38. Pathak S., Rege M., Gogtay N.J., Aigal U., Sharma S.K., Valecha N., Bhanot G., Kshirsagar N.A., **Sharma S**. (2012) Age-dependent sex bias in clinical malarial disease in hypoendemic regions. *PLoS One* 7:e35592.
39. Pathak S., Rajeshwari K, Garg S, Sudarsan R, Patel K, Das B, Pied S, Ravindran B, and **Sharma S**. (2012) *Plasmodium* riboprotein PfP0 induces a deviant humoral immune response in Balb/c mice. *Journal of Biomedicine and Biotechnology*. Volume 2012, Article ID 695843.
40. Sonawat HM, **Sharma S**. (2012) Host responses in malaria disease evaluated through nuclear magnetic resonance-based metabonomics. *Clin Lab Med*. 32(2):129-42.

41. Ghosh S, Sengupta A, **Sharma S** and Sonawat HM (2012) Metabolic fingerprints of serum, brain and liver are distinct for mice with cerebral and non-cerebral malaria: A ¹H NMR spectroscopy based metabonomic study *J Proteome Research* Oct 5;11(10):4992-5004.
42. Patil S, Joshi M, Pathak S, **Sharma S**, Patravale V. (2012) Intravenous β-artemether formulation (ARM NLC) as a superior alternative to commercial artesunate formulation. *J Antimicrob Chemother.* 67(11):2713-6.
43. Mishra P, Das S, Panicker L, Hosur MV, **Sharma S**, Hosur RV. (2012) NMR Insights into folding and self-Association of *Plasmodium falciparum* P2. *PLoS One.* 7(5):e36279.
44. Basu H, K. M. Kolwankar, A. K. Dharmadhikari, J. A. Dharmadhikari, K. Bambardekar, **S. Sharma**, and D. Mathur (2012) Laser-driven accelerated growth of dendritic patterns. *J. Phys. Chem. C.* 116, 11480-11485.
45. P. Kumari, J. A. Dharmadhikari, A. K. Dharmadhikari, H. Basu, **S. Sharma**, and D. Mathur (2012) Optical trapping in an absorbing medium: from optical tweezing to thermal tweezing *Optics Express* 2012 **20**:4645-4652.
46. **Sharma S.** and Jarori GK (2012) Translation and post-translational modifications in *Plasmodium*. *Current Science* 102, 741-748 (Review for Special Section on Malaria Research).
47. Borhade, VB, S. Pathak, **S. Sharma**, and V. Patravale. 2012 Clotrimazole nanoemulsion for malaria chemotherapy. Part II: Stability assessment, in vivo pharmacodynamic evaluations and toxicological studies. *International Journal of Pharmaceutics* 431:149-160.
48. Borhade, VB, S. Pathak, **S. Sharma**, and V. Patravale. 2012 Clotrimazole nanoemulsion for malaria chemotherapy. Part I: Preformulation studies, formulation design and physicochemical evaluation. *International Journal of Pharmaceutics* 431:138-148.
49. Basu H. Dharmadhikari A, Dharmadhikari J, **Sharma S**, and Mathur D. 2011 Tank treading of optically trapped red blood cells in shear flow. *Biophys J* 101(7):1604-12.
50. Sengupta A, Soumita Ghosh, Angika Basant, Suhas Malusare, Parul Johri, Sulabha Pathak, **Shobhona Sharma** and Haripalsingh M Sonawat (2011) Host Metabolic Response to *Plasmodium vivax* Infection: a step towards identification of metabolite biomarker of malarial infection using 1H NMR Metabonomics. *Malaria Journal* 23;10(1):384. [Epub ahead of print] PubMed PMID: 22196439.
51. Ghosh S, Sengupta, **Sharma S***, Sonawat HM 2011 Multivariate modelling with ¹H NMR of pleural effusion in murine cerebral malaria *Malar J.* 2011 Nov2;10:330.
52. Basu, H. A. K. Dharmadhikari, J. A. Dharmadhikari, **Sharma, S.** and D. Mathur 2011 A Biophotonic Study of Live, Flowing Red Blood Cells in an Optical Trap *Proc. of SPIE* Vol. 8173 817309-1
53. Bambardekar K, Dharmadhikari J, Dharmadhikari AK, Yamada T, Kato T, Kono H, Fujimura Y, **Sharma S**, Mathur D 2010 Shape anisotropy induces rotations in optically trapped red blood cells *J. Biomed. Optics* 15: 041504.
54. Sengupta A, Basant A, Soumita Ghosh, **Sharma S**, Sonawat HM. 2011 Liver Metabolic Alterations and Changes in Host Intercompartmental Metabolic Correlation during Progression of Malaria. *Journal of Parasitology Research*, Article ID 901854, 14 pages, 2011. doi:10.1155/2011/901854.
55. Basant A, Rege MM, **Sharma S**, Sonawat HM. 2010 Alterations in urine, serum and brain metabolomic profiles exhibit sexual dimorphism during malaria disease progression. *Malaria J.* 2010 Apr 23; 9:110.
56. Ramachandran H, Dharmadhikari A, Bambardekar K, Dharmadhikari J, Basu H, **Sharma S**, and Mathur D. 2010 Optical-tweezer-induced microbubbles as scavengers of carbon nanotubes. *Nanotechnology* 21 (2010) 245102.
57. Bambardekar K, Dharmadhikari J, Dharmadhikari AK, Yamada T, Kato T, Kono H, Fu-

jimura Y, **Sharma S**, Mathur D 2010 Shape anisotropy induces rotations in optically trapped red blood cells *J. Biomed. Optics* 15: 041504.

58. Dandekar PP, Jain R, Patil S, Dhumal R, Tiwari D, **Sharma S**, Vanage G, Patravale V. 2010. Curcumin-loaded hydrogel nanoparticles: application in anti-malarial therapy and toxicological evaluation. *J Pharm Sci.* 99: 4992-5010.

59. Gugulothu D, Pathak S, Suryavanshi S, **Sharma S**, Patravale V. 2010. Self-microemulsifying suppository formulation of β -artemether. *AAPS PharmSciTech.* 11: 1179-1184.

60. Mony B, Mehta M, Jarori GK and **Sharma S**. 2009 Plant-like phosphofructokinase from *Plasmodium falciparum* belongs to a novel class of ATP-dependent enzymes. *Int. J. Parasitol.* 39, 1441-1453.

61. Pal Bhowmick I, Kumar N, **Sharma S**, Coppens I, Jarori GK 2009 *Plasmodium falciparum* enolase: stage-specific expression and sub-cellular localization *Malaria J.*, 8, 179.

62. Bambardekar K, Dharmadhikari AK, Dharmadhikari JA, Mathur D and **Sharma S**. 2008 Measuring erythrocyte deformability with fluorescence, fluid forces and optical trapping. *J. Biomed. Optics* 13, 064021 (featured on journal cover).

63. **Sharma S** and Pathak S 2008 Malaria Vaccine: a current perspective *J Vect Borne Dis* **45**, 1-20.

64. Joshi, M., Pathak, S., **Sharma, S.**, Patravale, V. 2008 Design and *in vivo* pharmacodynamic evaluation of Nanostructured Lipid carriers for parenteral delivery of Artemether: Nanoject, *Int J Pharm.* 364, 119-26.

65. Joshi, M., Pathak, S., **Sharma, S.**, Patravale, V. 2008 Solid microemulsion preconcentrate (NanOsorb) of artemether for effective treatment of malaria. *International Journal of Pharmaceutics* 362, 172-178.

66. Mandawgade, S., **Sharma, S.**, Pathak, S., Patravale, V. 2008 Development of SMEDDS using natural lipophilic application of β -artemether for delivery. *International Journal of Pharmaceutics* 362, 179-183.

67. Pal-Bhowmick I, Mehta M, Coppel I, **Sharma S**, Jarori GK. 2007 Protective Properties and Surface Localization of *Plasmodium falciparum* Enolase. *Infect. Immun.* **75**, 5500-5508.

68. Roy, S, Dharmadhikari, JA, Dharmadhikari, AK, Mathur, D, and **Sharma, S.** (2007) Study of *P. falciparum*-infected erythrocytes and induced anisotropies under optical and fluid forces. *J Vect Borne Dis* **44**, 23-32.

69. A. Ghosh, Sinha, S., Dharmadhikari, JA, Roy, S., Dharmadhikari, AK, Samuel, J., **Sharma, S.** and Mathur, D. 2006 Euler buckling-induced folding and rotation of red blood cells in an optical trap. *Physical Biology* **3**, 67-73.

70. Ipsita Pal-Bhowmick, Hardeep K. Vora, Jaya Roy, **Sharma, S.** and Gotam K. Jarori: 2006 Generation and characterization of monoclonal antibodies specific to *Plasmodium falciparum* enolase. *J Vect Borne Dis* **43**, 43-52.

71. Mehta M, Sonawat HM, **Sharma S**. 2006 Glycolysis in *Plasmodium falciparum* results in modulation of host enzyme activities. *J Vect Borne Dis* **43**, 95-103.

72. Mehta, M, Sonawat, HM, and **Sharma, S.** 2005 Malaria parasite-infected erythrocytes inhibit glucose utilization in normal red cells. *FEBS Lett.* **579**, 6151-6158.

73. Aruna K., T Chakraborty, C. Rao, P., Santos, JPG Ballesta and **Sharma, S.** (2005) Functional complementation of yeast ribosomal P0 protein with *Plasmodium falciparum* P0. *Gene* **357**, 9-17.

74. Roy, S, Dharmadhikari, JA, Dharmadhikari, AK, Mathur, D, and **Sharma, S.** (2005) *Plasmodium*-infected red blood cells exhibit enhanced rolling independent of host cells and alter the flow of uninfected red cells. *Current Science* **89**, 1563-1570.

75. Malhotra I, Mungai P, Muchiri E, Ouma J, **Sharma S**, Kazura JW, King CL. (2005) Distinct Th1- and Th2-Type prenatal cytokine responses to *Plasmodium falciparum* erythrocyte invasion ligands. *Infect Immun.* **73**, 3462-70.
76. Rajeshwari, K., Patel, K., Savithri, N., Mehta, M., Sehgal A., Chakrabarty, T., and **Sharma, S.** (2004) P-domain of the P0 protein of *Plasmodium falciparum* protects against challenge with parasite. *Infect. Immun.* **72**, 5515-5521.
77. Pal-Bhowmick, I., Sadagopan, K., Vora, H.K., Sehgal, A., **Sharma, S.**, and Jarori, G.K. (2004) Cloning, over-expression, purification and characterization of *Plasmodium falciparum* enolase. *Eur. J. Biochem.* **271**, 4845-54.
78. Dharmadhikari, JA, S. Roy, A. K. Dharmadhikari, **S. Sharma**, and D. Mathur (2004) A naturally-occurring, optically-driven, cellular rotor. *Appl. Phys. Lett.* **85**, 6048-6050.
79. Dharmadhikari, JA, Roy, S, Dharmadhikari, AK, **Sharma, S.** and Mathur, D. (2004) Torque-generating malaria-infected red blood cells. *Optics Express* **12**, 1179-1184.
80. Sehgal, A., Singh, N.J., Chakrabarty, T. and **Sharma, S.** (2004). A protective merozoite protein of *Plasmodium falciparum* shares epitope with surface antigens of *Paramecium*. *Par. Immunol.* **26**, 219-227.
81. Aruna K, Chakrabarty, T., Savithri, N., Mannan, A.B., Sehgal, A., Balachandran, S., and **Sharma, S.** (2004) Identification of a hypothetical membrane protein interactor of ribosomal phosphoprotein P0. *J. Biosci.* **29**, 33-43.
82. Sehgal, A, Kumar, N., Carruthers V., and **Sharma, S.** (2003) Translocation of ribosomal protein P0 on *Toxoplasma gondii* tachyzoite surface. *Int. J. Parasitol.* **33**, 1589-1594.
83. Mannan B.A., K. Patel, I. Malhotra, B. Ravindran and **S. Sharma.** (2003) How specific is the immune response to malaria in adults living in endemic areas? *J. Vect. Borne Dis.* **40**, 84-91.
84. Singh S, Sehgal, A., Goswami, A., Waghmare, S., Chakrabarty, T. and **Sharma, S.** (2002) Surface expression of the conserved ribosomal protein P0 on parasite and other cells. *Mol. Biochem. Parasitol.* **119**, 121-124.
85. Singh S, Chatterjee, S., Sohoni, R., Badakare, S. and **Sharma S.** (2001) Sera from lupus patients inhibit growth of *plasmodium falciparum* in culture. *Autoimmunity* **33**, 253-263.
86. **Sharma S.** (2001) Novel target proteins of *Plasmodium falciparum*. In 'Trends in Malaria and Vaccine Research' ed D. Raghunath and R. Nayak; Tata McGraw-Hill Publishing Co. 106-113.
87. Sehgal A and **Sharma S** (2000) Immunological crossreactivity of protective *Plasmodium* epitope with *Paramecium* surface antigen. *J. Parasitic Diseases* **24**, 119-121.
88. Chatterjee, S., Singh S, Sohoni R, Singh, N.J., Vaidya, A., Long, C. and **Sharma S.** (2000) Antibodies against the ribosomal phosphoprotein P0 of *Plasmodium falciparum* protect mice against challenge with *P. yoelii* *Infect. Immun.* **68**, 4312-4318.
89. Chatterjee, S, Singh S.,Sohoni R, Kattige, V., Deshpande C, Chiplunkar, S., Kumar, N. and **Sharma S.** (2000) Characterization of domains of the phosphoriboprotein P0 of *Plasmodium falciparum*. *Mol. Biochem. Parasitol.* **107**, 143-154.
90. Singh NJ, Sehgal, A. and **Sharma S.** (2000) Characterization of a differential immunoscreen epitope of *Plasmodium falciparum* using combinatorial reagents. *Parasite Immunology* **22**, 333-340.
91. **Sharma, S.**, Chatterjee, S., Goswami, A. and Sehgal, A. (2000) 5'-Untranslated region of a ribosomal phosphoprotein gene of *Plasmodium falciparum*. *J. Parasitic Diseases* **24**, 15-19.
92. **Sharma, S.** (1999) Progress in genetic manipulation of *Plasmodium*. *Current Science* **77**, 101-103.
93. **Sharma S** and Bhattacharya MK. 1997 Novel putative protective antigens of *Plasmodium falciparum*. *Indian J. Med. Res.* **106**, 63-69.

94. Goswami A, Singh S, Redkar VD, and **Sharma S**. 1997 Characterization of P0, a ribosomal phosphoprotein of *Plasmodium falciparum*. Antibody against amino-terminal domain inhibits parasite growth. *J. Biol. Chem.* **272**, 12138-12143.
95. Goswami A, Chatterjee S and **Sharma S** 1996 Cloning of a ribosomal phosphoprotein P0 gene homologue from *Plasmodium falciparum*. *Mol. Biochem. Parasitol.* **82**, 117-120.
96. **Sharma S**, Goswami A, Singh NJ, Kabilan L, and Deodhar S. 1996 Immunogenicity of the nonrepetitive regions of the circumsporozoite protein of *Plasmodium knowlesi*. *Am. J. Trop. Med. Hyg.* **55**, 635-641.
97. Goswami A, and **Sharma S** 1996 A differential clone of *Plasmodium falciparum* shows homology to the yeast SEC65 domains. *J. Parasitic Diseases* **20**, 133-136.
98. Lobo CA, Kar SK, Ravindran B, Kabilan L and **Sharma S**. 1994 Novel proteins of *Plasmodium falciparum* identified by differential immunoscreening using immune and patient sera. *Infect. Immun.* **62**, 651-656.
99. Lobo CA, Pacha RF and **Sharma S**. 1994 Diversity in two candidate malaria vaccine antigens in different Indian strains of *Plasmodium falciparum*. *J. Genet.* **73**, 91-98.
100. Lobo CA, Pacha, RF and **Sharma S**. 1994. Characterization of novel putative protective epitopes of *Plasmodium falciparum*. In 'Recombinant and Synthetic Vaccines' ed. Talwar GP, Rao KVS, and Chauhan VS. Narosa Publishing House 190-194.
101. Lobo CA and **Sharma S**. 1993 A differential serological screen identifies novel and putative protective epitopes. *Am. J. Trop. Med. Hyg.* **49S**, 230-231.
102. Deodhar SS, Sampath SJ and **Sharma S**. 1992 Expression of selected domains of the circumsporozoite antigen of *Plasmodium knowlesi*. *J. Biosci.* **17**, 45-53.
103. King LB, Lund FE, White DA, **Sharma S** and Corley RB. 1990. Molecular events in B lymphocyte differentiation. Inducible expression of the endogenous mouse mammary tumor proviral gene, Mtv-9. *J. Immunol.* **144**, 3218-3227.
104. Lobo CA, Kar SK, and **Sharma S**. 1990. Natural antibodies from different malaria endemic regions of India exhibit diverse patterns of recognition of antigens. *Proc. DAE Symp. Adv. Molecular Biology. BARC*, 288-297.
105. **Sharma S**, King LB and Corley RB. 1988. Molecular events during B lymphocyte differentiation. Induction of endogenous mouse mammary tumor proviral envelope transcripts after B-cell stimulation. *J. Immunol.* **141**, 2510-2518.
106. King LB, **Sharma S**. and Corley RB (1988) Complete coding region sequence of E*_{8b} and E^b_{8b} molecules. *J. Immunogenetics* **15**, 209-214.
107. **Sharma S**. and Johri MM. 1988. Lack of inhibition of cAMP phosphodiesterase from *Funaria hygrometrica* by anticytokinins. *Pl. Physiol. and Biochem.* **15**, 75-79.
108. Corley RB, **Sharma S** and King LB. 1988 Changes in gene expression in differentiating Ly-1-B lymphocytes. *J. Cell Biochem.* **S12B**, 89.
109. **Sharma S**, King LB, and Corley RB 1987. Comparative sequence analysis of cDNA clones encoding I-A molecules of the CH12 B-cell lymphoma: nucleotide differences do not account for their defective function in B-cell stimulation. *Immunol. Invest.* **16**, 425-436.
110. **Sharma S**, Gwadz RW, Schlesinger DH and Godson GN. 1986. Immunogenicity of the repetitive and non-repetitive peptide regions of the divergent CS-protein of *Plasmodium knowlesi*. *J. Immunol.* **137**, 357-361.
111. **Sharma S**, Svec P, Mitchell GH and Godson GN. 1985. Diversity of circumsporozoite antigen genes from two different strains of the malarial parasite *Plasmodium knowlesi*. *Science* **229**, 779-782.
112. **Sharma S** and Godson GN. 1985. Expression of the major surface antigen of *Plasmodium knowlesi* sporozoites in yeast. *Science* **228**, 879-882.

113. **Sharma S.** and Johri MM. 1983. Cyclic AMP phosphodiesterases of *Funaria hygrometrica*. *Phytochemistry*. **22**, 2715-2717.
114. **Sharma, S.** and Johri MM 1982. Cell-density mediated changes in cyclic AMP phosphodiesterase activity during cell differentiation. In 'Plant Cell Cultures in Crop Improvement' ed K.L. Giles and S.K. Sen Plenum Publishing Co. 47-52.
115. **Sharma S.** and Johri MM. 1982. Partial purification and characterization of cyclic AMP phosphodiesterases from *Funaria hygrometrica*. *Arch. Biochem. Biophys.* **217**, 87-97.
116. **Sharma S** and Johri MM. 1982. Uptake and degradation of cyclic AMP by chloronema cells. *Plant Physiol.* **69**, 1401-1403.
117. **Sharma S.**, Jayaswal, RK and Johri MM. 1979. Cell-density-dependent changes in the metabolism of chloronema cell cultures. *Plant Physiol.* **64**, 154-158.

General reports

118. **Sharma S,** Sinha P, Siddiqui S, Handa A and Subbarao B 2016 Memories of Obaid Siddiqi and the Molecular Biology Unit, INSA publications (*In Press*).
119. **Sharma S.** 2008 A matter of chance, environment and inclination (Lilavati's daughter, book. (Ed. R. Godbole and R. Ramaswamy; IAS; ISBN 978-81-8465-005-1; pp 290-292).
120. **Sharma S.** 2006 Sir Ronald Ross: Discovery of the route of Malaria-From man to mosquito and back. *Resonance* **11**, 4-13.
121. Bhasin, VK, Pathak, S, **Sharma, S** 2005 William Trager-The mastermind who created a recipe for continuous *in-vitro* cultivation of killer malaria parasites. *Current Science* **88**, 2012-13.
122. **Sharma, S.** Career of women scientists 1995 *Current Science* **68**, 24-25.

Manuscripts under preparation/communicated

123. Patra AP, Kota AK, Koti ASR and **Sharma S.** Structurally required *Plasmodium falciparum* sporozoite vaccine candidate circumsporozoite protein enhances cellular flexibility and aids in motility (*Manuscript under preparation*).
124. Mishra P, Sengupta D, Dmello C, Singh SC, Hosur RV, **Sharma S.** 2019 Molecular study of binding of Plasmodium ribosomal protein P2 to erythrocytes and lipids. (*Ms. communicated*).
125. Verma R, Balaji C, **Sharma S** and Jarori GK. 2019. Specific interaction of *Plasmodium falciparum* enolase with band 3 on human erythrocytes: implications on parasite invasion.
126. Patra AP, Kota AK, Koti ASR and **Sharma S.** Structurally required *Plasmodium falciparum* sporozoite vaccine candidate circumsporozoite protein enhances cellular flexibility and aids in motility (*Manuscript under preparation*).
127. Panda A, Das B, Tripathy R, Satapathy A, **Sharma S** and Ravindran B. A primate specific loss of function polymorphism in TLR2 gene decreases inflammation and protects humans from organ dysfunction in malaria (*Manuscript under preparation*).
128. Jain S, Pathak S, **Sharma S,** Patravale V. Artemisinin based combination therapy for malaria treatment: Fabrication and characterization of lipidic nanocarriers of artemether-clindamycin. (*Manuscript under preparation*).
129. Jain S, Suryavanshi S, Pathak S, **Sharma S,** Patravale V. Pharmacodynamic evaluation of combination therapy of artemether-clindamycin. *Manuscript under preparation*.
130. Guha SK, Sarkar I, Patgaonkar M, Shah S, **Sharma S,** Pathak S, Vaidya V. A history of juvenile non-cerebral malaria predisposes to post-stress anxiety-like behavior later in life. (*Manuscript under preparation*).
131. Dalapathi G, Pathak S, **Sharma S,** Vandana Patravale. Solid lipid nanoparticles of Arteether/Ellagic acid: A novel combination therapy for treatment of malaria. (*Manuscript under preparation*).
132. **Sharma S.** P-ribosomal proteins of *Plasmodium* (*Manuscript under preparation*).