

Special issue on World Malaria Day

NEWS & VIEWS

Issue 06, April 2021

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**International Malaria
Symposium**

**Mega Exhibition
at Uttarakhand**

Guest Commentary

**Featured Scientific
Publications in Malaria**

**Malaria Scientists
to watch this month**

MERA-India

Malaria Elimination Research Alliance-India

MERA-India Secretariat,

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MERA India
Malaria Elimination Research Alliance India
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MERA-INDIA Newsletter 'News & Views' April 2021

International Malaria Symposium on the occasion of
World Malaria Day, 2021

World Malaria Day 2021
International Malaria Symposium
"Glimpse of Malaria Research and Strategies"

Prof Sanjeev Krishna
St. George's,
University of London
UK

Prof Utpal Tatu
Indian Institute of
Science, India

Prof Richard Maude
Mahidol-Oxford Tropical
Medicine Research Unit,
Thailand

Dr Marta Maia
KEMRI Wellcome Trust
Programme, Kenya

Prof Ashis Kumar Das
Birla Institute of
Technology & Science
Pilani, India

Dr Bart Knols
SCIE:NCE, Soneva Fushi,
Republic of Maldives

Dr Avdhesh Kumar
NVBDCP, India

April 26, 2021 13:25 – 16:50 IST

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Figure 1: The MERA-India is organizing a virtual International Malaria Symposium “Glimpse of Malaria Research and Strategies” on April 26th, 2021 on the occasion of World Malaria Day. The eminent malaria scientists across the globe will share their research experiences and discuss knowledge pertaining to all the areas of malaria research. The main agenda of the symposium is explained in the poster above which includes malaria centric talks by 07 distinguished malaria research experts followed by a comprehensive panel discussion amongst them to discuss the gaps in knowledge and research and also to devise strategies for malaria elimination from the country. ([Click Here](#)).

ICMR-NIMR Activities: The Mega Exhibition at Uttarakhand, March 2021



Figure 2: NIMR represented ICMR at the **three-day Mega exhibition** held in Rudrapur district, Uttarakhand from 19th to 21st March, 2021 (a) NIMR employees described the Institute's activities to raise awareness about malaria and mosquito control at the exhibition. The visitors were acquainted with identification of mosquitoes by dissecting microscope (b), larval stages and potential mosquito breeding grounds such as overhead tanks (c) and biological control of mosquito larvae by *Gambusia* fish (d).

Guest Commentary

In the Quest of the Unknown: Basic Research with Translational Intent

The current trends in malaria prevalence appear to be heartening with a lower number of reported cases in India as well as globally. The major malaria parasites affecting humans namely, *Plasmodium falciparum* and *Plasmodium vivax* thus appear to be partly contained at present. However, similar situations have arisen in the past, following which, there has been a subsequent increase in malaria caseload in the years to follow. Causes for concern remains, there are reports of artemisinin resistance from different parts of the world, and, reports from India and other countries about disease severity caused by *P. vivax* which was earlier considered to be a relatively benign parasite. Investigations are in progress globally in the search for new antimalarials, new diagnostic targets and more effective vaccines.

If we consider our knowledge about the genes in the parasite genome, the functions of approximately 50 to 60% of the genes respectively of *P. falciparum* and *P. vivax* remain little understood. There is scanty knowledge about the nature of the parasite transcriptome in parasite material directly isolated from patients. This had led our initiatives over the past few years to examine the transcriptome of *P. falciparum* and *P. vivax* from patients exhibiting different disease states (uncomplicated disease and disease complications like hepatic dysfunction, renal failure, and cerebral malaria).

Natural Antisense Transcripts (NATs)

One of the novel aspects on which we have made preliminary publications and are now involved in examining in detail is the presence of Natural Antisense Transcripts (NATs) obtained on studying the parasite transcriptome from the earlier mentioned samples. Our reports are the first-ever in *P. vivax* and the first from patient-derived material in *P. falciparum*. Interestingly, the ratio of antisense /sense transcripts appeared to change for subsets of genes between disease manifestations for both the parasites. This suggests the possible involvement of NATs in gene regulation. If this possibility is verified through further studies, it could influence the selection of targets for diagnostic or intervention strategies. Further, the identification of predominantly occurring NATs could pave the way for innovative strategies for disease control or diagnosis.

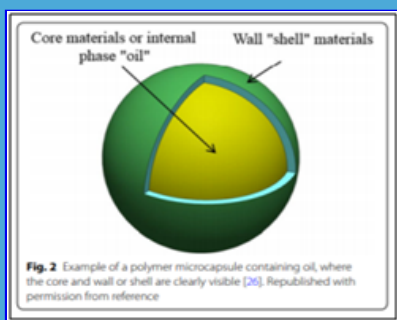
Co-Expression Networks and HUB Genes

Another facet of our efforts has been the creation of Whole Genome Co-Expression Networks for both the named parasites. Analysis of these networks has allowed us to identify modules that have high percentages of differentially expressed genes, based on which some of the modules have been classified as severe disease or uncomplicated disease-specific. HUB genes, which represent key central genes from such network

modules, can provide the basis for future research leading to the identification of new targets for diagnosis or therapeutics. Of special interest to us are HUB genes which represent conserved plasmodium proteins with unknown function. The protein products of such genes are thought to have little or no similarity with proteins from the human host. Continuing investigation of some of these HUB genes in the case of *P. falciparum* has shown the presence of the protein in cultured parasites and in the case of one such protein, localization studies have shown its presence in both asexual as well as sexual stages of the parasite. There remains the strong possibility of identifying some of these as targets for future translational research. If that were to happen, we would be gratified in being involved in translating research outcomes initiated through the support of infected patients, to ameliorate patient suffering.

(Professor Ashis Kumar Das, PhD, Department of Biological Sciences, Birla Institute of Technology & Science, Pilani, Rajasthan, India – 333031)

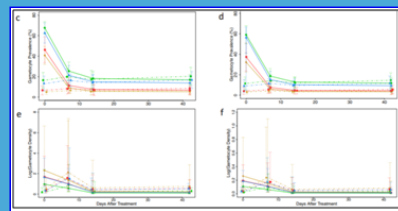
Scientific contributions by dedicated Scientists/Researchers in the field of Malaria Research



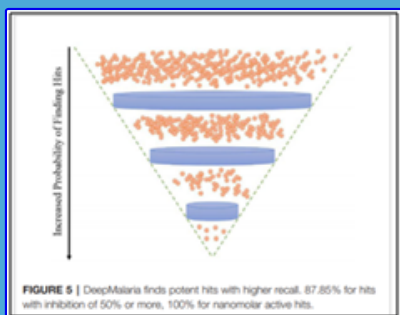
Mosquito-repellent controlled-release formulations for fighting infectious diseases

Mosquito repellants can be helpful in reducing vector-borne disease transmission. However, once applied it is important that they last long enough to prevent frequent re-application. Polymer based encapsulation and release of repellents from multiple matrices has emerged as an alternative method for the production of vector repellent-based systems with prolonged efficacy. In a recently published article [Mapossaet al.,\(2021\)](#) have reviewed various repellent formulations with controlled-release property and also the various mathematical models used for predicting the release rates of repellents from such formulations.

School-based screening and treatment may reduce *P.falciparum* transmission



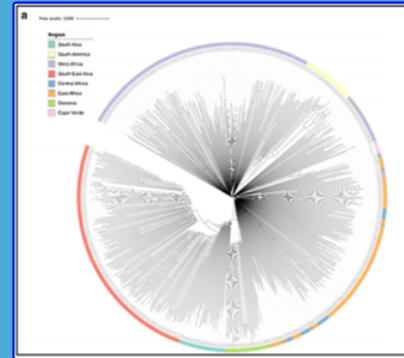
Children in the age group of 6-15 years are an important reservoir of malaria parasite and that targeting them could greatly reduce disease transmission in a community was recently demonstrated by [Coheeet al.](#), in their study published this year in *Nature Scientific Reports*. The authors screened-and-treated asymptomatic Malawian schoolchildren (n= 364 in the rainy season and 341 in the dry season) which significantly reduced the gametocyte burden in the community by 25-55%. The children were screened with RDT and gametocyte carriage was determined using RT-PCR. Children positive for malaria parasite were treated with artemether-lumefantrine, which reduced the gametocyte prevalence from 51.8% to 9.7% in treated children. Household-surveys were done concomitantly to assess the potential reduction in disease transmission in the surrounding community. Hence, introduction of school based malaria prevention strategies would not be useful only in improving the health of children but also can reduce the community level malaria transmission.



DeepMalaria: Artificial Intelligence Driven Discovery of Potent Anti-plasmodials

[Arshadiet al., 2020](#), described that Artificial intelligence (AI) can act as an effective alternative strategy to HTS based screening for potent anti-malarial drugs. In this particular study, a deep learning based process called Deep Malaria has been introduced by the authors to predict the hit compounds with anti-*Plasmodium falciparum* inhibitory properties using their SMILES. To validate the hits, the authors performed SYBR Green I fluorescence based screening assay. The results of the study showed that DeepMalaria could identify all the potential anti-plasmodial compounds with nanomolar specific activity and more than 87% of the compounds with greater than 50% inhibition of *Plasmodium falciparum* induced infection.

Drug resistance profile and clonality of *Plasmodium falciparum* parasites in Cape Verde: the 2017 malaria outbreak



[Da Veiga Leal et al, 2021](#), described that the majority of the tested samples bore the pfmdr1 haplotype and anti-malarial-related mutations in the *pfcr1* and *pfdhfr* genes, but no genetic polymorphisms in *Pfk13* genes which is associated with artemisinin-based combination therapy (ACT) tolerance found in Southeast Asia. The first whole genome sequencing (WGS) for Cape Verdean parasites was performed in this study, which revealed that the samples cluster together, have a high degree of similarity, and are similar to other parasite populations from West Africa.

Malaria Scientists to watch: 1. An interview with Dr. Madhumita Dobe



[Dr. Madhumita Dobe](#), Director-Professor (Public Health), All India Institute of Hygiene & Public Health, Kolkata

1. Can you please describe your research background and career route that motivated you to become a skilled malaria scientist and a public health scientist?

In the initial stages of my career, I, like many other public health professionals like me was focusing mainly on classic epidemiological research, mainly of communicable and vaccine preventable illnesses. There was very little focus on behavioral and social sciences research except the traditional Knowledge, attitude and practice studies. The upstream determinants were still not receiving due attention. Gradually with the epidemiological shift towards the new burden of Non communicable diseases, the research direction shifted to assessing lifestyle risk factors like dietary habits, physical activity, tobacco and alcohol use etc. There was also the huge challenge of controlling HIV/AIDS infection – these were largely dependent on behavior change and as I started my new innings as HoD

Department of Health Promotion & Education in AIIPH, Kolkata, the time was ripe for Health Education to move beyond simple awareness generation (especially in the context of immunization, family planning etc.) to embrace evidence generation through behavioral epidemiological studies. In my work with the WHO – SEARO, in India and Timor Leste, I was exposed to the evolving strategies of Diet, Physical activity, etc. models of Health Promoting settings like schools, hospitals, markets and workplaces in India and abroad, which provided new directions for research along with perspectives of health literacy. Since then I have tried to incorporate behavioral and social component of research especially based on behavioral models of change, in the public health studies undertaken under my guidance, including studies on malaria, which has enriched our learning and understanding at the same time opening up new vistas for research to understand and change health related behavior to promote health of our communities.

2, What has been the significance of your valuable research so far that is highly inspiring for young researchers?

Students, trainees and young researchers have been oriented to the fact that we need to conduct research to understand behaviors that contribute to increased health risks, as well as how they can be changed in real situations and settings. Young researchers have particularly been enthusiastic about carrying out Community-Based Participatory Research to understand community needs and learn the best ways to tailor the delivery of information and interventions, enhanced by evidence-based understanding of various behavioral, social, and cultural factors — including stigma and what motivates behavior change. Another area receiving a lot of attention from young researchers under my guidance has been research on personal and organizational health literacy, understanding people's ability to comprehend and use health information to develop and implement appropriate health communication strategies for social and behavioral change.

3. Our readers would like to know whether you have/had any other scientific interests other than malaria research.

The 21st century has been a revolutionary period for public health with the realization that it is just as important to understand how behavior and society affect health and can help fight diseases. Having been involved in Health Promotion and Health education research to change health behavior, my area of research focused on combining biomedical and behavioral and social sciences research to identify and implement the most effective interventions for communicable and non-communicable diseases in diverse settings and the community at large. As a public health communicator I am also involved in studying health literacy regarding different public health problems, for improving content, format and reach of health messages.

4. Finally, on a lighter note, do you have any additional interests other than science that will keep you going during your research career, even during tough times?

My interest in music has been a great boon in my research career – being a trained singer; I have experienced relaxation and developed a positive mindset along with enhancement of concentration and memory. Music acts like a cognitive workout for my brain, strengthening my research capabilities.

2. An interview with Dr. Jaspreet Kaur



[Dr. Jaspreet Kaur](#), Scientist B, ICMR-National Institute of Malaria Research, New Delhi-110077

1. How did your research career begin and what motivated you to become an efficient malaria scientist at NIMR?

When I was a child I once read that scientists are the ones who make discoveries and doctors actually use scientists' discoveries. I was quite fascinated by this thought and it motivated me to pursue the journey of becoming a discoverer. After pursuing my B.Sc. (Hons.) and M.Sc. (Hons.) in Biophysics from Panjab University, Chandigarh, I got selected as a research scholar in PGIMER, Chandigarh from where I pursued my Ph.D. In 2014, ICMR advertised Scientist B posts and I filled that form. I gave the exam and with God's grace, qualified the written exam. I got selected as Scientist B after an interview. My journey at NIMR started in November, 2016.

2. What are your current and future research interests that would be highly beneficial to the area of malaria control and prevention in the country?

Presently, I am part of some of the research projects related to vector biology and malaria epidemiology. In one of the studies, we are trying to explore the diagnostic potential of Infra-red spectroscopy to know the biological attributes of mosquitoes. The study will be beneficial in developing tools for large scale mosquito surveillance in future. I am also working on malaria epidemiology related projects. These studies can help to channelize appropriate resources and formulate strategy to control malaria and facilitate malaria elimination. I am also interested in genome-wide association studies related to malaria.

3. Enlighten us with the significance of your valuable research till date that is highly inspiring for young researchers?

I did my Ph.D from Department of Gastroenterology, PGIMER and my dissertation work mainly involved elucidation of molecular mechanisms in the etiology of gallbladder stones. However, I shifted my field to malaria research after my posting at NIMR. At NIMR, I got opportunity to work at two NIMR field sites- Nadiad (Gujarat) and S.A.S. Nagar (Punjab). I had no field experience earlier, so initially it was difficult for me. Subsequently, I learnt a lot and felt that field exposure is most significant in my research area as we need to manage a lot of operational hurdles while performing studies. Also, with field exposure, one gets new ideas to work upon. At the Nadiad (Gujarat) field site, I got the opportunity to work on different projects from WHOPEs, NIH and ICMR. The studies undertaken led to the understanding of malaria vector behaviour in different ecological areas; also assisted in characterization of severe malaria; among others. Such studies aid in developing strategies to control malaria and thereby facilitate malaria elimination. Subsequently, I was posted at NIMR field site at Dhakoli, Punjab, whereby I worked on a “disease burden project” which was accompanied by other Malaria elimination activities in the state. At field sites, I have been working in close collaboration with state authorities and giving trainings to state health workers which helped in capacity building. Besides scientific mind digging, I had administrative responsibilities being Officer in-charge at Field sites and I did office and financial management.

4. Did you develop any other scientific interests other than malaria research?

I also worked on dengue vector and economic burden associated with dengue. While working in NIMR, I have developed interest in molecular pathways involved in infectious diseases biology.

5. Finally, on a lighter note, do you have any hobbies that keep your mind sound and healthy to overcome the challenges that one encounters during her research career?

I like reading books of various genres. I read fiction, motivational and philosophical books as well as religious scriptures. However presently, I love playing, spending time and watching cartoons with my little baby girl. It refreshes me and gives me strength and motivation to work even more sincerely so that I can become a role model for her.

Future upcoming events: Announcements

MERA-India will be organizing a virtual **International Malaria Symposium** (<https://www.meraindia.org.in/>) on the occasion of **World Malaria Day**. The vision of the symposium is to bring together malaria scientists across the world to share and discuss knowledge pertaining to different areas of malaria research.



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