

Know thy enemy

MALSIG: an EU-India initiative in malaria research...

Malaria is a major public health problem in the developing world and is endemic in many regions of India. The rationale behind the MALSIG initiative is that development of novel strategies for malaria control requires a better understanding of the biology of malaria parasites.

The parasite's strategy: sense, multiply, develop, spread

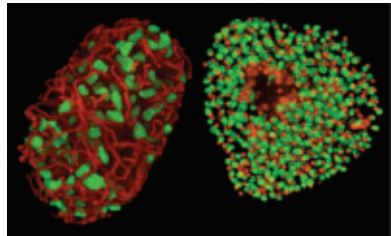
Malaria parasites (genus *Plasmodium*) have the remarkable ability to develop within and outside host cells, and in extremely diverse contexts such as the human liver and blood circulation, or a mosquito gut or salivary glands. Cellular and molecular mechanisms enabling the parasite to sense and respond to diverse environments are therefore crucial for the proliferation and transmission of *Plasmodium*, and hence represent strategic targets in the fight against this deadly disease.

Our strategy: integrate science, join forces, focus on targets

The MALSIG consortium focused on 'Signalling in life cycle stages of malaria parasites' was created with the primary objective to integrate research ongoing in Europe and India on the properties of *Plasmodium* signalling molecules on one hand, and on the other hand the developmental processes occurring at various points of the parasite life cycle. Functional studies in *Plasmodium falciparum* and in the technically more manageable rodent model *P. berghei* are providing information on the role of parasite protein kinases and other signalling molecules regulating the parasite's life cycle.

Merging interests

The MALSIG project aims at merging two lines of investigation that have



Two multinucleated malaria parasites in the liver. Mitochondria and nuclei are stained in red and green, respectively

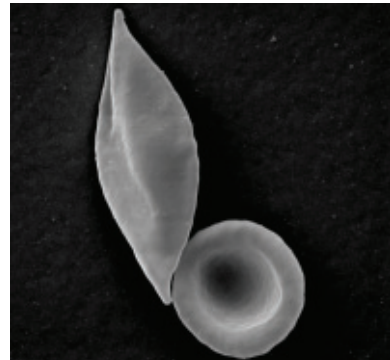
thus far been conducted largely independently from each other:

- The characterisation of molecular components of signalling pathways in malaria parasites;
- The study of specific biological and developmental processes during the life cycle of malaria parasites, namely:
 - Erythrocyte infection (invasion, parasite proliferation, egress);
 - Sexual development (gametocytogenesis, gametogenesis, transmission to the mosquito vector);
 - Hepatocyte infection (invasion, parasite proliferation, egress);
 - Membrane dynamics (trafficking, transporters).

The MALSIG consortium is convinced that integration of these two fields of malaria research will ensure a high level of complementarity and synergy.

Linking scientists

The MALSIG consortium brings together around 150 malaria scientists in 20 institutions from India and five European countries, all with proven track records. Strong attention was given to ensure access to the highest technological standards in the research approaches undertaken. State-of-the-art technological platforms include proteomics, reverse genetics, structural biology, and the use of animal models of malaria.



Scanning electron micrograph of a *Plasmodium* gametocyte (left) and a red blood cell (right)

Merging malaria research in Europe and India for a global impact

The MALSIG project, coordinated by Inserm (France), utilises the FP7 Collaborative Project (SICA) instrument and a budget of €3m to bridge ongoing European and Indian fundamental malaria research. This effort strengthens existing links and creates new ones, and has the ambition to help foster a culture of scientific cooperation between EU and India in this globally crucial public health issue, aimed at paving the way for novel intervention strategies.



Christian Doerig
Coordinator
Inserm-EPFL Joint Laboratory, Global Health Institute EPFL, Lausanne Switzerland
christian.doerig@epfl.ch

Pietro Alano
Deputy Coordinator
Istituto Superiore di Sanità, Rome
pietro.alano@iss.it

Christine Mazingue
Project Manager
Inserm Délégation Régionale Lille
christine.mazingue@inserm.fr
www.malsig.lille.inserm.fr