Spatiotemporal epidemiology of malaria in Madagascar between 2006 and 2015

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play a role in the policy change, including availability of resources and formation of kala-core consortium. The technical expertise of MSF has proven invaluable in supporting government during initial phase of treatment policy change implementation.

**Conclusion:** High quality and contextualized evidence is crucial in policy change process. Policy change more likely to happen when funding, tools and required inputs for implementing evidence are available and MSF project contributes to all that.

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**In silico and experimental studies of Plasmodium serpine receptor predicts its role as putative purinergic receptor**

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**Background:** Invasion of red blood cells by *Plasmodium* merozoites involves specific receptor-ligand interactions. Previous reports suggest the role of secondary messengers like calcium and cAMP in invasion and egress of *Plasmodium*. However, the receptors associated with calcium signaling and their relation with parasite growth remains undefined. Recently, serpentine receptors with G-protein coupled receptor (GPCR) like seven transmembrane (7 TM) topology are identified in *Plasmodium*. A class of GPCR known as purinergic receptors binds to purines such as ADP, ATP and UTP and mediates important physiological functions including regulation of calcium signaling.

**Methods & Materials:** Here we performed in silico analysis of *P. falciparum* serpentine receptors to investigate the presence of conserved seven transmembrane domains and a consensus nucleotide binding sequence (P-loop). The interaction of serpentine receptor PSR12 with ATP was analysed using docking programmes. The expression of PSR12 in blood stages of life cycle was analysed by confocal microscopy. We also used agonists and antagonists of purinergic signaling in the growth inhibition assays to understand the role of this receptor in *Plasmodium*.

**Results:** Computational analysis of *P. falciparum* serpentine receptors showed that one of the *P. falciparum* serpentine receptors, PSR12 possess nucleotide binding consensus P-loop sequence in addition to seven transmembrane domains. The presence of conserved seven transmembrane domains and a consensus nucleotide binding sequence (P-loop) suggest that PSR12 is a putative purinergic receptor. On further analysis using docking programmes we found active binding residues in P-loop of PSR12, interact with ATP. This work gives insights into the interactions between putative purinergic receptor PSR12 and its ligand ATP which can be explored in structure based drug designing against malaria. Localization studies using antibodies against PSR12, we have found that this receptor is expressed in malaria parasite. Our results highlighted that various antagonists used in study have a good inhibitory effect on growth cycle of malaria parasites suggesting the importance of purinergic receptors in growth of parasite.

**Conclusion:** Together our findings demonstrate that the approach that we have applied here is a powerful strategy to identify new inhibitory scaffolds suitable for further development of anti parasitic drug against these targets.

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**Spatiotemporal epidemiology of malaria in Madagascar between 2006 and 2015**

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**Background:** Malaria is endemic in Madagascar, with local specificities. Its transmission occurs throughout the year along the eastern coast, while it is unstable and seasonal on Central Highlands. In this study, we investigate the spatiotemporal patterns of the occurrence of malaria in relation to bioclimatic conditions.

**Methods & Materials:** The Service for Health and Demographic Statistics of the Ministry of Public Health provided epidemiological data related to complicated and uncomplicated malaria cases from 2006 to April 2015. We integrated these data into a Geographic Information System to map monthly incidence for each health district and identify spatiotemporal clusters. We also acquired environmental information (meteorological and vegetation indices) in order to assess relations with malaria incidences.

**Results:** Since 2010, the report of malaria cases has improved and malaria incidence shows more regular trends. Malaria transmission generally starts with the rainy season and has a distinct peak on February and March. Children under 15 years old are the most vulnerable over the country. Coastal districts can be
considered as a source of malaria because of their high incidence all over the year.

**Conclusion:** The quality of epidemiological data is discussed regarding the provision and access to health services. Case reports show weaknesses for some remote areas and at the end of each year. The persistence of malaria on the coast could induce the emergence of malaria in Central Highlands following reintroduction by travelers.

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**Rickettsial disease IFA-IgG titres in auto-immune diseases: What do they imply?**

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**Background:** Rickettsial infections are known to present mimicking autoimmune disorders. The gold standard diagnostic test for rickettsial diseases is based on the detection of IgM and or IgG antibodies against these infections by immuno-fluorescent technique (IFA). While confirmation of rickettsial diseases warrant demonstration of rising or declining antibody titres between acute and convalescent samples, high titres of either IFA-IgM or IFA-IgG in acute phase serum in patients with a compatible clinical illness may help in the presumptive diagnosis and introduction of anti rickettsial antibiotics. During the IFA test, patient sera containing anti rickettsial antibodies are made to react with rickettsial antigens that are grown in cell culture media. However, presence of nuclear material in these cell cultures may react with anti-nuclear antibodies that are produced in autoimmune disorders and cause a false positive immunofluorescent signal.

**Methods & Materials:** In order to evaluate the reactivity of rickettsial disease IFA-IgG test [IFA-IgG-OT (Orientia tsutsugamushi)] and IFA-IgG-SFG (spotted fever group)] among patients with autoimmune diseases, an analytical cross-sectional study was carried out using sera of 38 patients with confirmed auto-immune diseases.

**Results:** The 38 patients included 15 systemic lupus erythematosus (SLE), 5 autoimmune-thyroiditis, 13 idiopathic-thrombocytopenia (ITP), 4 autoimmune-haemolytic-anæmia (AIHA), 1 polymyositis, 1 polyglandular syndrome and 1 Anti-phospholipid syndrome. The IFA-IgG reactivity of ≥ 1:128 was