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Molecular studies on drug resistant malaria in India

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Malaria remains uncontrolled to-date despite immense efforts being made to contain the disease. Malaria situation in India is unique as the country has regions with different epidemiological conditions i.e. hyper endemic, mesoendemic and low endemic regions where malaria vector may vary from region to region. Similarly, the prevalence of parasite species as well as the level of drug resistance also varies from region to region (1-3). This warrants for the situation where malaria control strategies will be region specific. We have been studying molecular epidemiology of drug resistant malaria in India vertically and horizontally (1-11). These studies using molecular tools have revealed that the antimalarial drug resistance varies from region to region and there is a temporal increase in the level of resistance in India (4-7). For example, chloroquine and antifolate drugs are still effective in Northern India which is a non-endemic region for malaria. However, these drugs are ineffective in Northeastern region which are hyper endemic regions for malaria. We have also observed different fixation rates of the mutations in the marker genes associated with drug resistance in the parasite population of these different regions (12,13). Due to differential drug usage, after tsunami in the Andaman & Nicobar Islands, there was a selection of the parasite population with a novel mutation in the antifolate drug resistance marker gene (9). Furthermore, our data clearly indicates the prevalence of parasite population with high antifolate drug resistance associated mutations in India but the drug policy of the country continued to prescribe the combination therapy where Artesunate is combined with sulfadoxine-pyrimethamine. This ACT usage will soon lead to the emergence of the resistant parasite population resulting in the treatment failures.