AIM AND SCOPE

Malaria parasite infects millions of people throughout the tropical and subtropical regions of the world and *Plasmodium falciparum* is responsible for majority of these deaths. Its incidence is currently increasing due to development of resistance of the malarial parasite to existing drugs and also prevalence of parasites in human population is being greatly underestimated by microscopical examination. Therefore there is an urgent need to develop new chemotherapeutic approaches and new sensitive diagnostic methods.

Polyamines (putrescine, spermidine and spermine) are small positively charged organic compounds that have been implicated to be involved in a wide variety of cellular physiological and developmental functions. The enzymes catalyzing the regulatory steps in the biosynthesis of the polyamines are ornithine decarboxylase (ODC) and S-adenosylmethionine decarboxylase (AdoMetDC). Cell growth and differentiation are dependent on adequate intracellular levels of polyamines. The biological half-lives of these regulatory enzymes in polyamine biosynthetic pathway are among the shortest known for mammalian enzymes, which gives the cell a way to rapidly change polyamine synthesis. Polyamine analogs and enzyme inhibitors are usually characterized by their ability to decrease levels of polyamine pools in cells. Inhibition of polyamine synthesis results in an arrest of cell growth, which can be reversed by supplementation with exogenous polyamines. Thus, the polyamine biosynthetic pathway is a potential target for therapeutic agents against various hyperproliferative disorders particularly cancer. However the promising use of polyamine biosynthesis inhibitors and polyamine analogues is for the treatment of disease caused by parasitic protozoans especially in treatment of African trypanosomiasis caused by *Trypanosoma brucei*.

Due to increasing incidence of drug resistance of malarial parasite to most of the existing antimalarial drugs, the research to combat malaria has been focused on identification of novel chemotherapeutic targets. In order to exploit the usage of the inhibitors of polyamine biosynthetic pathway for effective chemotherapy of malaria it is very important to study the profile of polyamines and characterize the genes
encoding the regulatory enzymes namely ornithine decarboxylase (ODC) and S-adenosylmethionine decarboxylase (AdoMetDC) at molecular level.

Besides identification of novel chemotherapeutic targets, development of new diagnostic methods for malaria is also urgently desired. A number of measures should be applied to all patients with clinically diagnosed or suspected severe malaria for proper treatment and management. In the malaria infected patients, microscopic examination of thick and thin films of the peripheral blood reveal, the presence of different stages of malaria parasites, though thick films are more useful. Malaria may be misdiagnosed as meningitis, typhoid fever or septicaemia which are a frequent cause of morbidity and mortality. It is important to treat malaria promptly on diagnosis to avoid further complications. Diagnosis and epidemiological surveillance are essential elements in the management of the malaria infection both at the level of treatment of malaria infected patient and to control the spread of the drug resistance strains. Traditional diagnosis of malaria which is based on microscopic examination of Giemsa-stained thick and thin blood smears has drawbacks due to its labour intensive nature, inability to identify drug resistance strains, strain heterogeneity and to monitor the efficacy of chemotherapeutic treatment of malaria. Hence the development of new diagnostic methods for identification of low level of infection and of different strains is of utmost importance.

The main objectives of the present study are:

A: Genomic Cloning and Characterization of the *Plasmodium falciparum* gene encoding Ornithine decarboxylase (ODC).

B: Detection and Strain identification of *Plasmodium falciparum* strains by Polymerase chain reaction (PCR).