Details of the Project sanctioned under the Human Resource Development scheme of Department of Health Research

1. **Project Title:**

   Molecular studies to detect markers of antimalarial drug resistance at selected study sites in the country

2. **Category of fellowship:**

   DHR-HRD Scheme for Women with break in career

3. **PI (Name & Address):**

   Dr. Shelly Goomber

   C/O Dr.Neelima Mishra, Scientist E,

   National Institute of Malaria Research (NIMR), Dwarka, New Delhi

4. **Qualifications:**

   Ph.D. (Biotechnology)

5. **Mentor or Co.PI (Name & Address):**

   i)   Dr.NeenaValecha   ii) Dr.Neelimamishra
   Scientist G and Director,   Scientist E, NIMR

   NIMR, Dwarka ·   Dwarka

6. **Duration of the project**

   3 Years

7. **Broad area of Research:**

   Biotechnology

7.1 Sub Area

Molecular Biology

8. Summary of the Project: (Give in about 300 words)

Currently most effective treatment for malaria areartemisinin based combination therapy (ACTs). Unfortunately there are recent reports on emergence of artemisinin resistant parasite. Molecular studies suggest that clinical resistance of antimalarials involves multifactorial molecular process with mutation in few of such genes as *pfmdr1*, *pfmrp1* and *pfatpase6* depending on the mechanism of antimalarials. Genes responsible for resistance to antimalarial drug have been implemented as molecular marker to screen for emergence of resistance and assess its spread. Present study is designed to provide information on polymorphism within selected gene as molecular marker for antimalarial drug resistance. Multidisciplinary approach that integrates clinical and field studies with laboratory, molecular and genomics methods will provide powerful combination for malaria control.

Finger prick blood samples collected from malaria positive patients from prospective studies will be used. Adults and children over 6 months presenting with fever (axillary temperature $\geq$ 37.5°C) at visit or a history of fever for the preceding 24 hours will be included in the study. Other criteria for inclusion will be mono-infection with *P. falciparum* with parasitaemia between 500 and 100,000 asexual parasites/µl blood, absence of other febrile conditions and informed consent.Parasite DNA will be extracted from collected blood samples from different geographical region. Primary and nested PCR will be performed for the amplification of *pfmdr1*, *pfmrp1* and *pfatpase6 genes*.

9. Objectives of the Proposal:

- To improve the predictive ability of molecular markers for drug resistance.
- To contribute to molecular marker data that promote evidence based management.

10. Innovations in the project:(Give in about 100 words)

Treatment policy for *P. falciparum* in India was changed from chloroquine to artimisinin combined therapy (ACT) as first line treatment. Resistance to partner drug in north eastern India signals the limit of its use in future. Therefore present study is designed to provide information on polymorphism within selected gene as molecular marker for predicting antimalarial drug resistance.

11. Significance of the outcome of the project:(Give in about 150 words)

Drug resistance is ongoing process and needs updating of information on the efficacy and safety of antimalarials. Molecular markers have been correlated with antimalarial drug resistance and are used as early warning signs. In the era of ACT, use of molecular markers can chart passive rise in resistance. Molecular marker data can help in deciding the expected

life of antimalarial combination. Continued surveillance of markers for drug resistance can help in deciding national drug policy.

12. Relevance in Public Health:

Molecular data on partner drug resistance from different age group, sex and population subtype will provide baseline information that will guide vulnerable population or region of the country that need early action. This data will add value to global database on molecular marker and may guide the selection of first line treatment of uncomplicated malaria in the country.

Shelly Groomber

Signature of the Fellow /Faculty