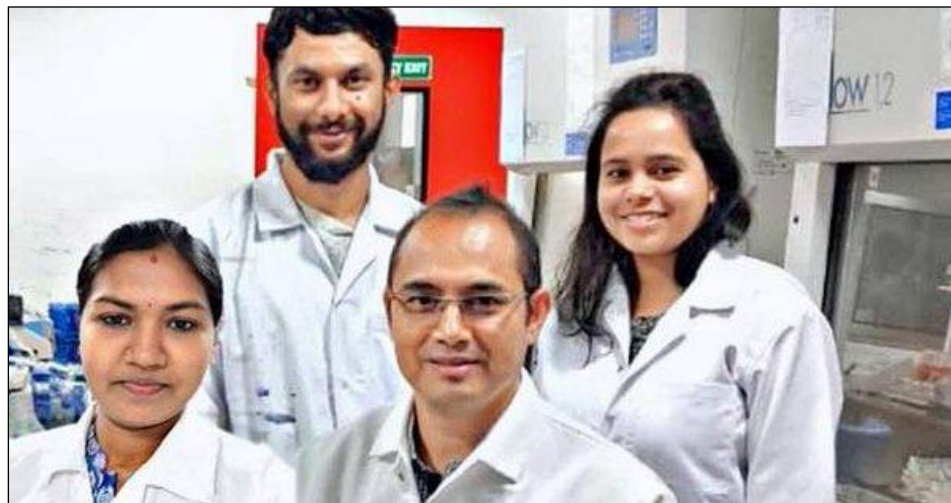


## The CSIR-CCMB developed a Cost Effective ‘Lyse-Reseal’ Method to Fight Malaria



**Team of researchers headed by Dr. Puran Singh Sijwali at CCMB**

The Centre for Cellular and Molecular Biology (CCMB), Hyderabad is an Indian biotechnology research laboratory that operates under the aegis of the Council of Scientific and Industrial Research (CSIR), New Delhi. The CCMB is a designated as ‘*Center of Excellence*’ by the Global Molecular and Cell Biology Network, UNESCO.

The World Health Organisation (WHO) has estimated 3.4 billion people across 92 countries are at risk of being infected with plasmodium parasites and malarial infection. The parasite grows in the oxygen carrying red blood cells (RBCs) in the body and cause malaria. Therefore, such cells are the major targets for the gene delivery after proper genetic manipulation. There are multiple challenges in studying genes of the malarial parasites and identification of targets for drug and vaccine development.

A team of researchers at CCMB has come up with new and cost effective procedure to make genetic alterations in malaria parasite. The innovative research work has been published in a reputed peer reviewed journal ‘*Scientific Reports*’. In the current study, the gene functions were studied using the electroporation also known as electropermeabilization method (It is a microbiology technique in which an electrical field is applied to cells in order to increase the

permeability of the cell membrane, allowing chemicals, drugs, or DNA to be introduced into the cell) and to alter the genetic makeup of the malaria parasite.

The scientist at CCMB has successfully developed the '*Lyse-Reseal*' method as an alternative and financially viable method for gene delivery into the *Plasmodium falciparum*, the parasite responsible for majority of severe cases of malaria and deaths caused by the infection. The research team headed by Senior Principal Scientist Dr Puran Singh Sijwali have successfully has been able to fill in RBCs by opening them up by a process also called 'lyse', with circular DNA of their choice. The RBCs are then resealed to close the pores and these are infected with *Plasmodium falciparum* parasite. Then, the parasite goes inside the RBC and passively takes up the DNA from RBC. The DNA eventually ends up in the parasite's nucleus with its own genes.

The research team has developed an effective 'electroporation' method for two different *P. falciparum* strains and has claimed that it works with 10 times lesser DNA than what is needed in electroporation technique usually.

The major advantage of the '*Lyse-Reseal*' method is that it does not need any expensive electroporation device, and other related equipments. Hence, it can be used for *P. falciparum* genetic studies in resource constrained research settings. The team has also demonstrated that the blood group O+ carrying RBC's provides the most efficient delivery of DNA into *P. falciparum* cells *in vitro*.

The recent study is an important mile stone in drug development for malaria. The techniques provides an easy way of making genetic alterations in the parasite cells that will help in better understanding of the biology of parasite. The technique will thereby help in controlling the malaria infection in a better way.

Dr. Bilqeesa Bhat  
Project Scientist,  
[bhat.bilqeesa3000@gmail.com](mailto:bhat.bilqeesa3000@gmail.com)