

Short Note

Parasitic Infections

Parthasarathy Sonaimuthu*

Post-Doctoral Fellow, Children's National Medical Center, USA

SHORT NOTE

My research interest focuses on infectious diseases involving protozoan parasites such as *Toxoplasma gondii* and *Plasmodium falciparum* that are the reason for infections classified as neglected tropical diseases. The parasitic diseases are one of the reasons for major significant global economic, environmental, and public health impacts. The increase in number of emerging or reemerging parasitic infections, the alarming speed at which anti-parasitic drug resistance develops and spreads, and the astronomical cost of developing new anti-parasitic drugs; are just some of the challenges that make the future for treatment and control of many parasitic diseases uncertain. Apart from studying the infections caused by parasites I think these protozoan parasites are also an ideal model for basic biological research. Understanding the cross-talk and communication between host and parasite is a huge challenge and to identify bio-molecular pathways and to elucidate their relationship to the progress and outcome of infection has been one of my major interests in parasite biology. While studying the biology of *T. gondii* I developed interest on the Rhoptry proteins because of their role in invading human host cells and virulence properties therefore I have made use of various molecular biology and immunological techniques to study these genes as potential candidates for DNA or protein vaccines to control toxoplasmosis in animal model systems and eventually in the humans. With promising results from experiments on Rhoptry genes I would like to further understand the implications of these and other potential parasitic proteins that can be studied by itself or in combination with one or more proteins/genes from different organelles for providing a cure or limiting the severity of infection. There are also various diagnostic kits based on immunological methods available for diagnosis of infections. As my preliminary experiments with recombinant Rhoptry proteins showed that they were capable of detecting the infection from clinical samples I am also interested to see how other parasitic proteins could be used efficiently in the form of either western blot or ELISA to detect these infections at an early onset or acute stages instead of chronic diagnosis.

*Corresponding author

Parthasarathy Sonaimuthu, Post-Doctoral Fellow,
Children's National Medical Center, USA, CRI 5 Floor
5700, 111 Michigan Ave NW, Washington, DC 20010,
USA, Tel: 2024764943; Email: parthawillbe@gmail.com

Submitted: 07 June 2018

Accepted: 8 June 2018

Published: 08 June 2018

ISSN: 2373-9282

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My interest also lies in the field of molecular and immunological methods of diagnosis for parasitic infections as I had undertaken a project that developed a highly specific, fast and robust temperature sensitive, PCR based technique known as Loop Mediated isothermal amplification. In this process I developed interest in exploring and gaining knowledge about various other techniques that might be more precise, cost effective, simple to perform diagnostic methods for different parasitic infections. I believe that developing such diagnostic tools will have a huge impact on the public health and socio-economic profile of under developing nations. I have performed some epidemiological studies for different parasitic infections by performing PCR, immunoblot, ELISA on human blood, tissue samples from affected regions across Asian countries with an interest in understanding their geographical prevalence and thereby relating that knowledge to studying the parasite biology and also find ways for containment of the infections in the endemic areas. This will also shed light on parasite-host preference, the host immune response modulation based on the parasite behavior and help in moving towards overcoming the prevalent drug resistance for different parasitic infections.

Although my research project and expertise are primarily based on *Toxoplasma gondii* and *Plasmodium falciparum*. In the far sight I have well informed knowledge parasitology in general and open to gaining more insight into the biology of different parasite, epidemiology and diagnosis of the resulting infections. On the other hand, I am also interested in vaccine, innovative molecular biology approaches and gene therapy research targeting the elimination of parasitic infectious diseases for the betterment of mankind.