Uninfected second blood meal enhances the parasitic load in *Phlebotomus argentipes*

Shyamali[1], Dharmendra Kumar Maurya[1], Ashish Shukla[2], Anurag Kumar Kushwaha[2], Shyam Sundar[2], Om Prakash Singh[1*]

1. Department of Biochemistry, I.Sc., Banaras Hindu University, Varanasi, India.

2. Department of Medicine, IMS, Banaras Hindu University, Varanasi, India

* ***Corresponding author:*** *Dr. Om Prakash Singh*
*(*opsinghbiochem@bhu.ac.in)
Department of Biochemistry
Institute of Science
Banaras Hindu University
221005, Varanasi, India

Background

Visceral leishmaniasis (VL), caused by Leishmania donovani and transmitted by Phlebotomus argentipes sand flies in the Indian Subcontinent, poses a significant global health threat. Tiago et al highlighted challenges in detecting hosts with <100 parasites/mL via xenodiagnosis. The crucial second post-xenodiagnosis feeding supports promastigote development, elucidating the parasite's life cycle dynamics and aiding in identifying host reservoirs.

Objective

Identifying and stabilizing the role of refeeding in the multiplication of *Leishmania donovani* in sandfly gut.

Methodology

Two hundred 3–4-day-old female sandflies were fed on heat-inactivated rabbit blood with 2×10^6 L. *donovani* parasites/ml. After 24h, fed flies were separated. Following the first blood-meal (E1), 5 sandflies were stored in 70% ethanol 1-6 days post-feeding. On day 6, remaining sandflies fed on uninfected blood (E2). 5-6 sandflies were collected and stored at each time point post-second feeding. Individual sandflies underwent DNA isolation, and parasitic load in infected sandflies was quantified via qPCR. This approach provides insights into Leishmania-sand fly interactions, assessing parasitic presence across distinct feeding stages.

Result

From qPCR data, all E1 blood-fed sandflies showed L. donovani infection. Day 6 E1 flies exhibited a higher parasitic load than day 1 sandflies. Sandflies post-second feeding had a higher parasitic load than day 6 flies and rejected further feedings. After the initial blood meal, the parasite load stabilized at 1500–2000 by the 6th day. Upon the second blood meal, parasitic load on days 1, 3, and 6 significantly increased to approximately 20,000, 35,000, and 40,000, respectively.

Conclusion

Preliminary findings show elevated parasitic burden post-second blood meal in sandflies. Ongoing investigations aim to correlate parasitic loads after first and second meals, elucidating the dominant stage post-feeding.

BIOGRAPHY

I, Shyamali, enrolled in the PhD program under the supervision of Dr. Om Prakash Singh at the Department of Biochemistry, Institute of Science, Banaras Hindu University, India-221005. Currently I am working on infectious disease laboratory. I am passionate about working on Neglected Tropical Diseases (especially Leishmaniasis). My area of interest is vector biology, zoonotic transmission, immunology, and the epidemiology of infectious diseases.

Research Papers:

1. Singh, Bhawana, **Shyamali,** Dharmendra Kumar Maurya, Rajiv Kumar, Shashi Bhushan Chauhan, Shyam Lal Mudavath, Ram Niwas Meena, Shyam Sundar, and Om Prakash Singh. "Vaccine human clinical trial." In *System Vaccinology*, pp. 281-296. Academic Press, 2022.
2. Maurya, Dharmendra Kumar, **Shyamali**, Shyam Lal Mudavath, Shyam Sundar, and Om Prakash Singh. "Leishmania Proteomics: Insight into Diagnostics and Vaccine Development." *Challenges and Solutions Against Visceral Leishmaniasis* (2024): 81-107.

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