

Role of rPagSP02 and rPagSP06 salivary biomarkers of *Phlebotomus argentipes* in measuring vector exposure in Sri Lanka

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Phlebotomus argentipes is the incriminated vector of the transmission of *Leishmania donovani* across the Indian subcontinent. In Sri Lanka, this vector is predominantly linked to cutaneous leishmaniasis (CL). Host antibody responses to sand fly salivary proteins serve as valuable markers for determining human exposure to sand fly bites in endemic regions. This study aimed to evaluate and compare the immunological performance of two salivary antigens for assessing exposure to *P. argentipes* bites in a CL-endemic setting in Sri Lanka: a native salivary gland homogenate (SGH) derived from locally reared female *P. argentipes*, and a recombinant composite antigen comprising rPagSP02 and rPagSP06 proteins. Venous blood samples (3 mL) were obtained from 546 healthy individuals in a CL-endemic area, 30 confirmed CL patients, and 15 residents from non-endemic areas. Serum was separated and analyzed using optimized indirect ELISA protocols to detect anti-*P. argentipes* IgG antibodies. Both SGH and the recombinant antigen demonstrated high diagnostic accuracy. The recombinant rPagSP02 + rPagSP06 antigen showed excellent sensitivity (96.7%) and perfect specificity (100%). Comparable seropositivity rates were observed between the two antigen formats among residents in endemic areas, supporting the validity of the recombinant marker in detecting natural exposure. The recombinant antigen was more effective in distinguishing individuals with and without exposure to *P. argentipes* bites. A strong positive correlation ($r = 0.869$) was observed between optical density values from assays using SGH and those using the recombinant antigen. In conclusion, the rPagSP02 + rPagSP06 recombinant antigen is a promising, reproducible, and standardized biomarker for monitoring human exposure to *P. argentipes* in Sri Lanka. Its high diagnostic performance and scalability highlight its potential for inclusion in surveillance and vector control evaluation programmes. Further research is recommended to explore its applicability in other leishmaniasis-endemic regions.

Keywords: *Phlebotomus argentipes*, Salivary biomarkers, Vector exposure, Cutaneous leishmaniasis, *Leishmania donovani*