

## **Leptospirosis in human: biomarkers in host immune responses**

### **ABSTRACT**

Leptospirosis remains one of the most widespread zoonotic diseases caused by spirochetes of the genus *Leptospira*, which accounts for high morbidity and mortality globally. Leptospiral infections are often found in tropical and subtropical regions, with people exposed to contaminated environments or animal reservoirs at high risk of getting the infection. Leptospirosis has a wide range of clinical manifestations with non-specific signs and symptoms and often misdiagnosed with other acute febrile illnesses at early stage of infection. Despite being one of the leading causes of zoonotic morbidity worldwide, there is still a gap between pathogenesis and human immune responses during leptospiral infection. It still remains obscure whether the severity of the infection is caused by the pathogenic properties of the *Leptospira* itself, or it is a consequence of imbalance host immune factors. Hence, in this review, we seek to summarize the past and present milestone findings on the biomarkers of host immune response aspects during human leptospiral infection, including cytokine and other immune mediators. A profound understanding of the interlink between virulence factors and host immune responses during human leptospirosis is imperative to identify potential biomarkers for diagnostic and prognostic applications as well as designing novel immunotherapeutic strategies in future.

**Keyword:** Leptospirosis; Host immune responses; Biomarkers; Cytokines; Immune mediators; Proteomic approach