

# Establishment of Serodiagnostic System for Rickettsial Diseases

## Abstract

The laboratory of Vector-borne viral and Rickettsial diseases in the Center of Research and Diagnostics is responsible for the laboratory diagnostics of various reportable Rickettsial diseases in CDC Taiwan. Due to increased international traffic exchanges and global warmer climate, the spread of vector-borne diseases have expanded rapidly in whole world with increased intensity and severity. Similarly, the tendency of these infectious diseases has increased in Taiwan in recent years. Development of rapid diagnostic assay is important for early diagnosis and timely treatment. Currently, the three basic methods used by most laboratories for the diagnosis of Rickettsial infections are Rickettsial isolation and characterization, detection of genomic sequence by nucleic acid amplification technology assay, and detection of specific antibodies.

Until now, laboratory diagnosis of Rickettsial infections was largely relied on serological assay using microimmunofluorescence (MIF) detecting specific antibodies from acute and convalescent phase serum samples. However, there is a trend toward the use of enzyme-linked immunosorbent assay (ELISA) to replace MIF due to its high sensitivity, specificity and simplicity. Therefore, analysis of specific IgM and IgG antibodies based on ELISA will become the new standard assay for the detection and differentiation of Rickettsial infections.

We have developed two different ELISA systems for the screening of Rickettsial infections, a Capture IgM ELISA and Indirect IgM and IgG ELISA. Capture IgM ELISA will be used for the detection and differentiation of various Rickettsial infections at the acute and convalescent phases, while Indirect IgM and IgG ELISA will be used for detection of IgM and IgG antibodies induced after acute, convalescent and post infections. Preliminary evaluation of in house ELISAs on the screening of *O. tsutsugamushi* using tsa56kD recombinant antigens and a monoclonal antibody (9-1) showed good correlation with MIF and a commercial ELISA kit from PanBio. Commercial ELISA kits for the diagnosis of typhus fever and spotted fever infections were compared and evaluated in this study. The development of rapid diagnostic assays for acute phase infection based on the combined analyses of real-time PCR and ELISA would contribute greatly to the early detection and timely treatment of Rickettsial infections.

*Key words:* Rickettsia, Scrub typhus, ELISA, MIF, recombinant protein