

Development of a multiepitope antigen as a serodiagnosis marker of *Toxoplasma gondii* infection

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Abstract

The high prevalence of *Toxoplasma gondii* infection has been attracted a lot of attention to its diagnosis and treatment. The use of pure antigens although show high sensitivity and specificity, however, the challenges such as cross-reactivity remain still as diagnostic difficulties. In this study, three surface antigens (SAG) of *T. gondii* were employed for designing of a multiepitope protein. The multiepitope antigen was then expressed using *E. coli* BL21 (DE3) cells and purified by affinity chromatography. ELISA analysis was used for evaluation of acute toxoplasmosis (Fig. 1). The results showed a sensitivity of 72.6% and a specificity of 90.3% for recombinant ELISA.

Key words: Multiepitope antigen; Surface antigens; *Toxoplasma gondii*; Diagnosis

References

1. Dubremetz, J. F. and Lebrun, M. (2012). Virulence factors of *Toxoplasma gondii*. *Microbes Infect*, 14, 1403-1410. doi: 10.1016/j.micinf.2012.09.005.
2. Hajissa, K., Zakaria, R., Suppian, R. and Mohamed, Z. (2015). Design and evaluation of a recombinant multi-epitope antigen for serodiagnosis of *Toxoplasma gondii* infection in humans. *Parasit Vectors*, 8, 315. doi: 10.1186/s13071-015-0932-0.
3. Khanaliha, K., Motazedian, M. H., Kazemi, B., Shahriari, B., Bandehpour, M. and Sharifniya, Z. (2014). Evaluation of recombinant SAG1, SAG2, and SAG3 antigens for serodiagnosis of toxoplasmosis. *Korean J Parasitol*, 52, 137-142. doi: 10.3347/kjp.2014.52.2.137.
4. Larsen, J. E., Lund, O. and Nielsen, M. (2006). Improved method for predicting linear B-cell epitopes. *Immunome Res*, 2, 2. doi: 10.1186/1745-7580-2-2.
5. Lekutis, C., Ferguson, D. J., Grigg, M. E., Camps, M. and Boothroyd, J. C. (2001). Surface antigens of *Toxoplasma gondii*: variations on a theme. *Int J Parasitol*, 31, 1285-1292.
6. Montoya, J. G. (2002). Laboratory diagnosis of *Toxoplasma gondii* infection and toxoplasmosis. *J Infect Dis*, 185 Suppl 1, S73-82. doi: 10.1086/338827.
7. Saha, S. and Raghava, G. P. (2006). Prediction of continuous B-cell epitopes in an antigen using recurrent neural network. *Proteins*, 65, 40-48. doi: 10.1002/prot.21078.
8. Vita, R., Overton, J. A., Greenbaum, J. A., Ponomarenko, J., Clark, J. D., Cantrell, J. R., Wheeler, D. K., Gabbard, J. L., Hix, D., Sette, A. and Peters, B. (2015). The immune epitope database (IEDB) 3.0. *Nucleic Acids Res*, 43, D405-412. doi: 10.1093/nar/gku938.

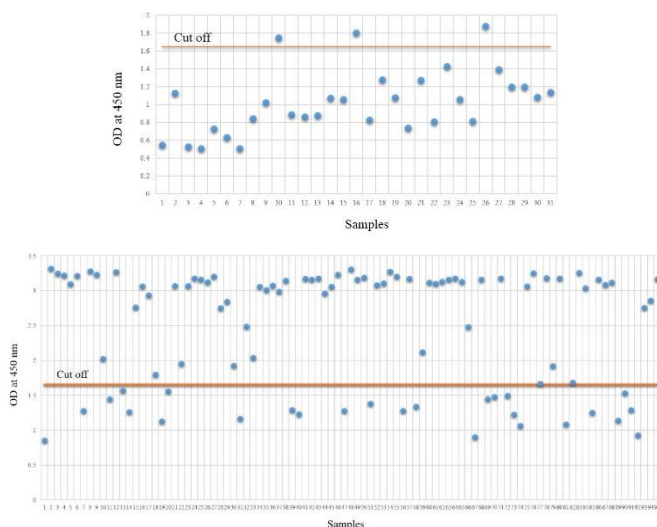


Figure 1. Results of IgG ELISA. (up) Negative samples; (down) Positive samples