

## ***Toxoplasma gondii* chimeric antigens – construction, production, and diagnostic utility examination**

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The intracellular parasite *Toxoplasma gondii* has the ability to infect a wide range of warm-blooded animals, including humans. From a medical point of view, the correct recognition of *T. gondii* invasion is very important in the case of pregnant women and for patients with immunodeficiency. As shown by numerous epidemiological studies, toxoplasmosis is widespread among different populations of animals. In farm animals, toxoplasmosis is a major contributor to the loss of reproductive and malformations in young individuals, which is a serious economic problem. In addition, one of the main transmission routes of the parasite to humans is via the consumption of undercooked or raw meat and improperly processed dairy products.

Currently, the diagnosis of toxoplasmosis is based mainly on the use of native antigens in enzyme immunoassay, which allows for the detection of IgG, IgM and IgA antibody classes. However, in some cases, the performed studies give ambiguous results. Moreover, due to their price, commercially-available diagnostic tests are not generally used in the serodiagnosis of toxoplasmosis in animals, which requires the analysis of large numbers of samples. For this reason, many research groups are currently working on new diagnostic tools based around recombinant antigens.

In this work, efficient *Escherichia coli* expression systems for the production of different variants of recombinant chimeric antigens composed of the immunodominant regions of three selected *T. gondii* antigens GRA1, GRA2, GRA6, MAG1, MIC1, MIC3, ROP1, SAG1 and SAG2 were constructed. The diagnostic value of obtaining proteins for the detection of anti-*T. gondii* antibodies was then evaluated by IgG ELISA assay using human and animal (feline, equine, ovine and porcine) sera. The results show that the use of newly-produced chimeric antigens could be an alternative to that of the native polyvalent antigen for the detection of anti-*T. gondii* IgG antibodies found in the sera of patients with diagnosed toxoplasmosis (sensitivity of IgG ELISA assays between 88.4% to 100%). In addition, the chimeric antigen SAG2-GRA1-ROP1<sub>D</sub>, characterized by a high reactivity in the IgG ELISA assays using animal sera (from 93.3% to 100%), could be used to develop a universal serodiagnostic assay for the detection of specific anti-*T. gondii* antibodies in sera derived from different animal species.