

## Recombinant SAG1 antigen - loaded PLGA microspheres as a novel vaccine delivery system against *Toxoplasma gondii*

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**Background and Aims:** The study was designed to assess PLGA microspheres capability as an antigen delivery system for recombinant SAG1 (surface antigen 1) of *Toxoplasma gondii*. Development of vaccines against *Toxoplasma gondii* in humans is of high priority, given the high burden of disease in some areas of the world and also the lack of effective drugs with few adverse effects.

**Methods:** Recombinant *Toxoplasma gondii* surface antigen (SAG1) which previously produced in *E.coli* as a purified and refolded protein was adsorbed on blank PLGA microspheres (Poly(D,L-lactic-co-glycolic acid, lactide:glycolide ratio 50:50), RG505) microspheres. PLGA microspheres were prepared by single emulsion oil in water solvent evaporation method (6% w/v polymer solution in Aceton, with 40 ml of 0.5 % w/v Poly vinyl alcohol). Recombinant SAG1 was adsorbed on PLGA microspheres at 1% w/w in PBS buffer, pH=7. Adsorption efficiency was assessed by protein quantification (BCA method). Protein integrity and antigenicity were evaluated by SDS PAGE, ELISA and Western blotting of released SAG1 during release profile.

**Results:** The mean size and PDI (Poly dispersity Index) of the resulting microspheres were 550 nm and 0.2, respectively. Adsorption efficiency of SAG1 on PLGA microspheres was 60%. The burst release was 30% of total adsorbed protein that occurred in 5 hours and followed by zero order release of 45% of total adsorbed protein in the subsequent 8 days. Integrity and antigenicity of SAG1 was confirmed during release profile.

**Conclusions:** Aforementioned findings confirm that PLGA microspheres were capable of the efficient and reproducible adsorption of recombinant SAG1 from *Toxoplasma gondii*. Also, PLGA microspheres which would preserve the adsorbed antigen integrity and antigenicity can be used as a potent delivery system. Ongoing in vivo studies are being done.

**Keywords:** PLGA; Recombinant SAG1; *Toxoplasma gondii*