



EVALUATING THE EFFICACY OF A GREEN VACCINE AGAINST BRUCELLOSIS IN A MURINE MODEL



Veterinary Research
Scholars Program
University of Missouri



Veterinary Pathobiology
University of Missouri

Emily L. Lemoine¹, Mostafa F. N. Abushahba¹, Vandana B. Patravale²
and Jeffrey J. Adamovicz¹

¹ Department of Veterinary Pathobiology, University of Missouri, Columbia, MO 65211

² Department of Pharmaceutical Sciences and Technology, Institute of Chemical Technology, N.P. Marg, Matunga (E), Mumbai 400019, Maharashtra, India

BACKGROUND

- Brucellosis is a zoonotic disease affecting animals and livestock producers world-wide
- Current Brucella vaccines, RB51, S19 & Rev1, have several drawbacks on humans and livestock
 - Incomplete protection for livestock
 - Hazardous to veterinarians during livestock vaccination
 - Public health hazard: 3 confirmed human brucellosis cases from RB51-vaccinated cattle raw milk since July 2017 (CDC)
- There is a demand for a novel, safe, and efficient vaccine against brucellosis
- Here, we have tested the safety & efficacy of a formulated green vaccine against the disease in a murine model

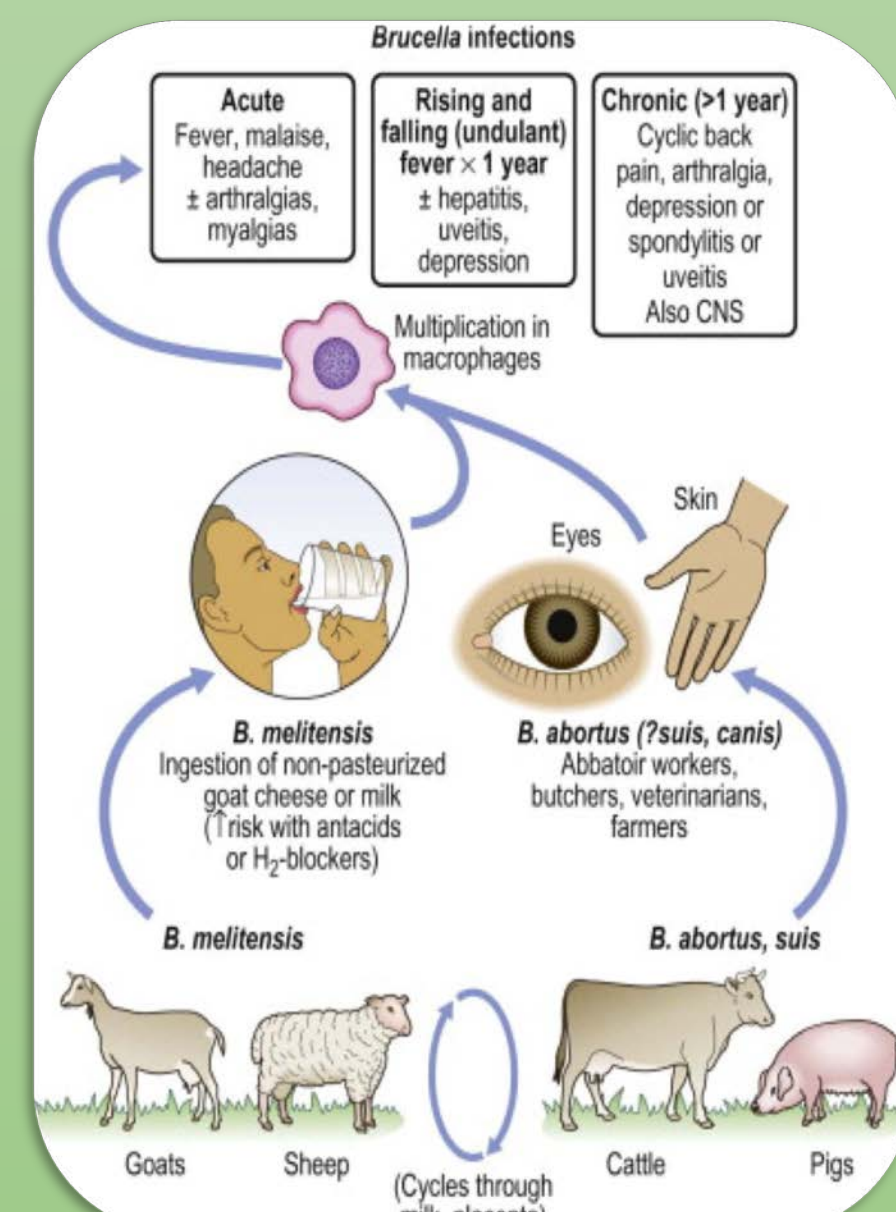


Fig. 1. Brucellosis infection cycle

METHODS

DAY	PROCEDURE (n=60 mice)
0	• Blood collection • 1 st vaccine dose
14	• Blood collection
28	• Blood collection • 2 nd vaccine dose
42	• Blood collection
56	• Blood collection • Euthanized 50% for BAL collection • Challenged other 50% of mice with <i>B. abortus</i> S19 (1.91x10 ⁷ CFU/animal)
65	• Blood collection
86	• Euthanize challenged mice

Table 1. Experimental schedule over the study

CONCLUSIONS

- Our preliminary data indicates that our vaccine is safe based on
 1. Lack of any adverse post vaccine reactions
 2. 100% survival rate of all the mice
 3. Insignificant weight loss throughout the study
- The vaccine is immunogenic based on
 1. Significant IgG1 production in the test groups vs control groups
 2. Addition of the Saponin to the LPS significantly increased the titer of IgG1 compared to other groups indicating its role as a potential adjuvant

METHODS

Animals: 6-8 week-old female BABL/C mice (n=60) were divided into 5 groups



Fig.2. Saponin from Quillaja Bark (15 µg/mouse)

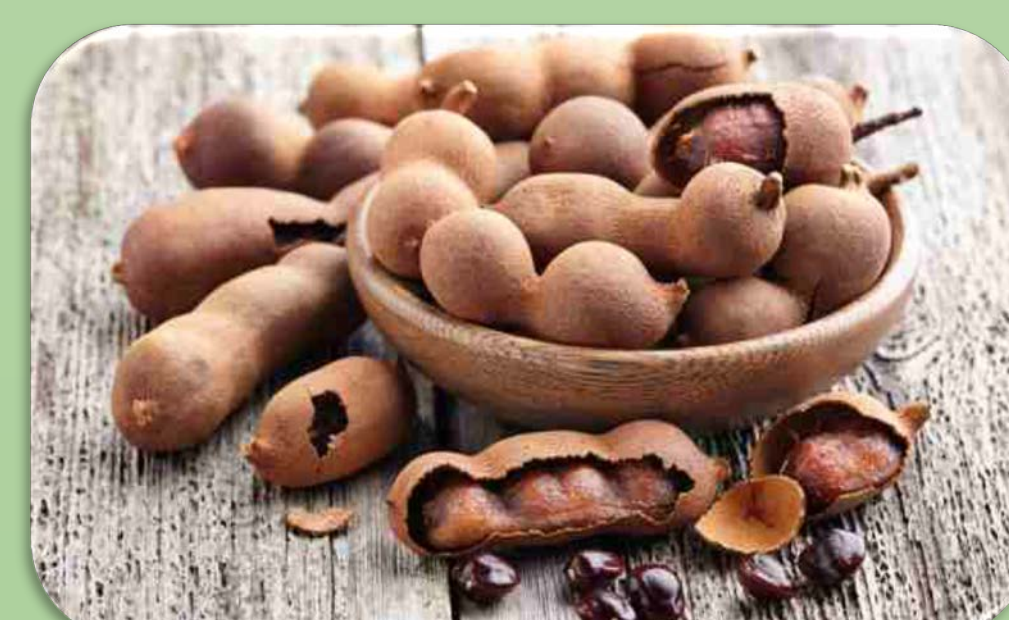


Fig.3. Tamarind seed powder (100 µg/mouse)

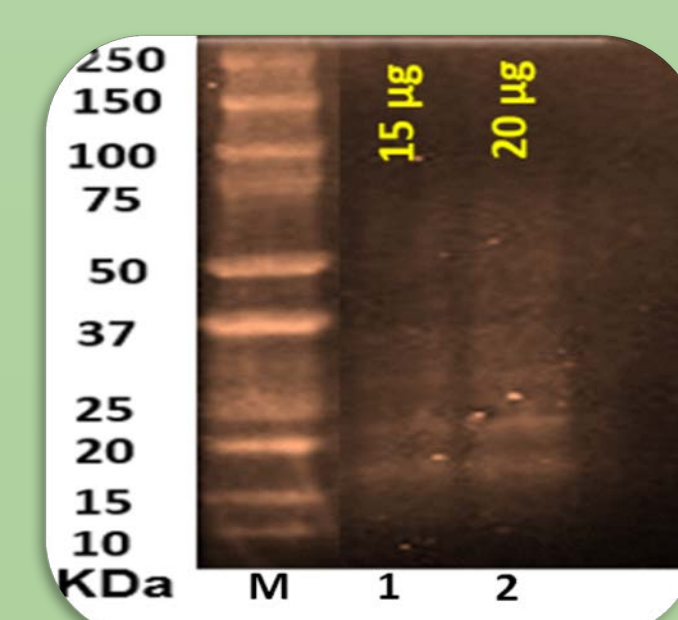


Fig. 4. Smooth *B. abortus* S19 LPS (50 µg/mouse)



Fig. 5 Formulation of vaccine



Fig. 6 Intranasal administration of vaccine (2 doses)



Fig. 7 Blood serum collection via Lancet method and Bronchoalveolar lavage (BAL) were performed

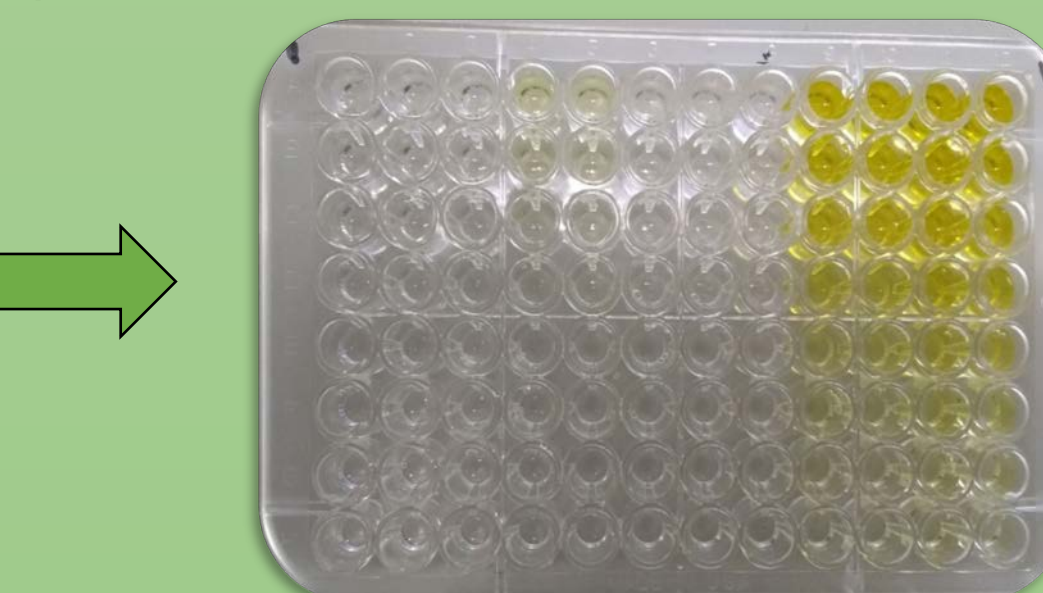


Fig. 8 Endpoint ELISA was used to detect IgG1 levels in blood serum levels for day 0, 42, and 56

RESULTS

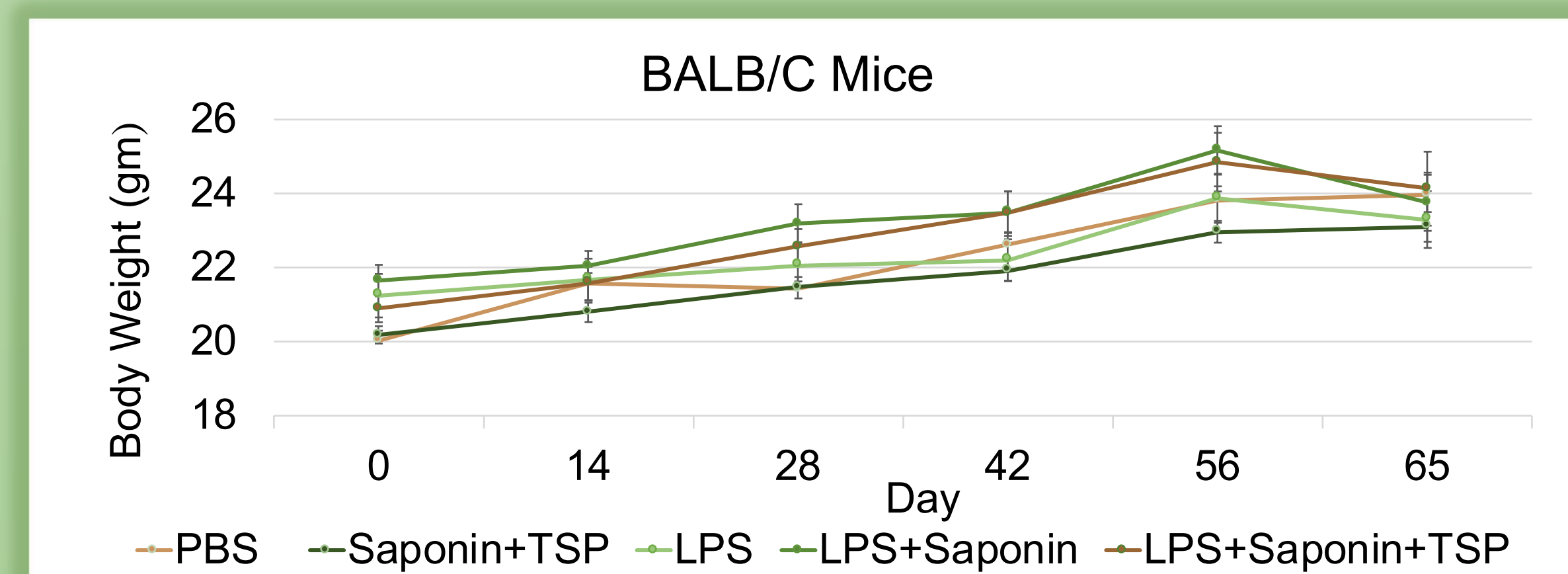


Fig. 9: BALB/C Mice body weights over 65 days. Data presented as average weights ± Standard error

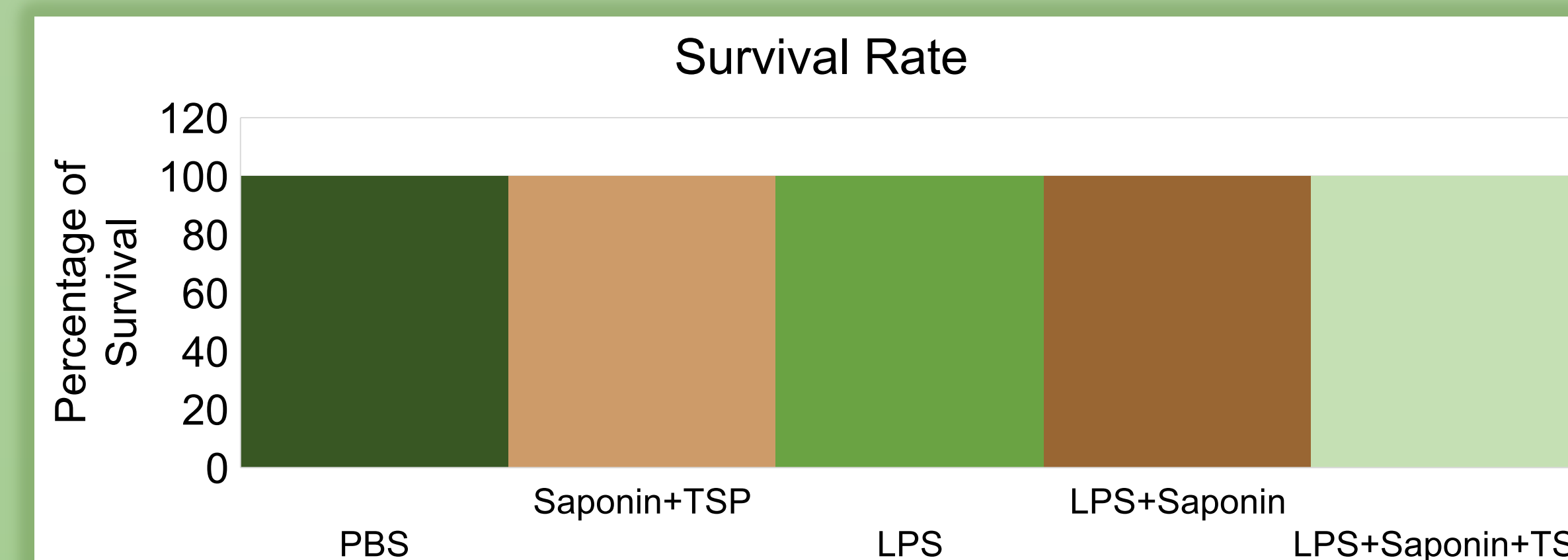


Fig. 10: Survival rates of mice over 65 days

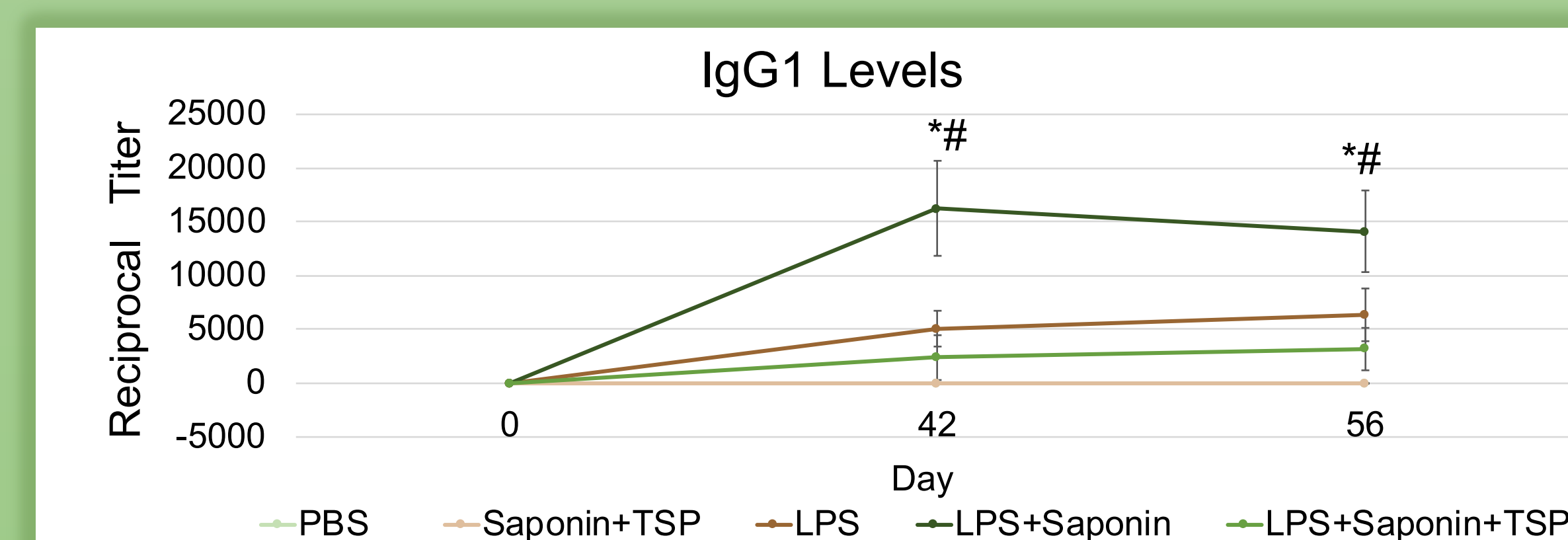


Fig. 11: IgG1 serum levels over 3 major time points. Data presented as average titers ± Standard error. ANOVA in IBM SPSS software was used for statistics. Values of P < 0.05 were considered significant

FUTURE DIRECTIONS

- Serum IgG2a levels across all time points will be measured by End Point ELISA
- IgA secretion level in BAL samples will be evaluated
- Survival rate as well as animal weights will be recorded over a 30-day post-challenge observation
- *B. abortus* S19 loads in lungs, livers & spleens of the challenged animals will be determined after ten-fold serial dilutions

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- Fig. 2,3,5 were retrieved from Google images.