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

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BACKGROUND

• Brucellosis is a zoonotic disease affecting animals and livestock producers world-wide
• Current Brucella vaccines, RBS1, 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

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 Bronchialveolar lavage (BAL) were performed
Fig. 8 Endpoint ELISA was used to detect IgG1 levels in blood serum levels for day 0, 42, and 56
Fig. 9: BALB/C Mice body weights over 65 days. Data presented as average weights ± Standard error

RESULTS

Table 1. Experimental schedule over the study

<table>
<thead>
<tr>
<th>DAY</th>
<th>PROCEDURE (n=60 mice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Blood collection</td>
</tr>
<tr>
<td>14</td>
<td>Blood collection</td>
</tr>
<tr>
<td>28</td>
<td>Blood collection</td>
</tr>
<tr>
<td>42</td>
<td>Blood collection</td>
</tr>
<tr>
<td>56</td>
<td>Blood collection</td>
</tr>
<tr>
<td>65</td>
<td>Blood collection</td>
</tr>
<tr>
<td>86</td>
<td>Euthanize challenged mice</td>
</tr>
</tbody>
</table>

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

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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REFERENCES