Review of: "Mucosal immunization with DTaP confers protection against Bordetella pertussis infection and cough in Sprague-Dawley rats"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

The manuscript titled Mucosal immunization with DTaP confers protection against Bordetella pertussis infection and cough in Sprague-Dawley rats is an important study for development of vaccines for humans. Further, authors used intranasal, oral gavage and intramuscular routes for vaccine-immunization for their studies. Immunization with IM-wP, IM-aP, IN-aP, and OG-aP immunization protected against *Bp* induced cough. Mucosal immunization (IN-aP and OG-aP) also protected against acute inflammation and decreased bacterial burden in the lung. Scientific questions are relevant and use of a coughing rat model for studying pertussis vaccine-effects seems novel.
Overall, the manuscript is well organized.
However, there are some concerns/questions with the data that need to be addressed.

Comment 1. It might be interesting to have a kinetics of the antibody response. Did the authors observe a difference in the longevity / persistence of the antibody response related to the immunization route?
Comment 2. Fig. 2A It seems that 2 out of 4 rats really have a heavy cough. What is the reproducibility of the model? How did the authors verify if the rats were indeed infected? Did cough correlate with the injected *Bp* dose?
Comment 3. At day 1 post-challenge there was a significant 98.5% reduction in bacterial burden in the lung of IM-aP immunized rats compared to MVC. Could the authors observe a difference between IM-aP and other groups?
Did the functionality of the antibodies (Serum Bactericidal Activity, or PT neutralizing activity) differ depending on the type of immunization?
Comment 4: Fig 8 Could the authors clarify how the results are calculated and how the normalization is carried out? What did the max cytokine represent: total cytokine per rat per group?
The cytokine profile in the lung of IM-wP immunized rats on day 9 appeared to be like the cytokine profile of IN-aP immunized rats on day1. is it a similar mechanism but shifted in time?
Comment 5: line290 rats OG-aP immunized did have a slight increase in IL-17, though not significant. IL-17 is significantly increased in OG-aP immunized rats as compared to MVC control group (Fig 8).
Comment 6: line 303 significant increase in blood lymphocytes in the IN aP vaccinated rats compared to

MVC post-challenge. Serum cytokines appeared to be lower in IN aP vaccinated rats as compared to post-challenge MVC rats. Do the authors have an explanation?

Comment 7: how did the authors prepare lung homogenates?