Genetic variability of vaccine responses in pigs: application to vaccines against Mycoplasma hyopneumoniae and Influenza A virus

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Genetic variability of vaccine responses in pigs: application to vaccines against *Mycoplasma hyopneumonia* and Influenza A virus

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5. Abstract:

Deciphering the influence of host genetics in shaping innate and adaptive immunity could contribute to improve vaccination strategies. In the H2020-funded SAPHIR project, we aim at analyzing the individual variability of responses to vaccines against *Mycoplasma hyopneumoniae* (*M. hyo*) or Influenza A Virus (IAV) in pigs, and at identifying candidate genetic markers and blood biomarkers that predict response levels. Forty-eight families of Large White pigs were produced in five batches and housed in a conventional facility. All pigs were vaccinated at weaning (around 28 days of age) with a booster vaccination three weeks later. 182 and 98 piglets were vaccinated against *M. hyo* or IAV, respectively, and 64 non-vaccinated piglets were included as shared controls for the two vaccine experiments. The humoral vaccine response was measured by following levels of seric *M. hyo*- or IAV-specific IgGs, before vaccination on the vaccine day, every week during five weeks post-vaccination, and before slaughtering. In addition, haemagglutination inhibition

(HAI) assays were performed for IAV-vaccinated pigs. Our results showed a wide range of responses. Females exhibited a higher humoral response to vaccination compared to males for the two vaccines. Blood sampled before vaccination was used for high-density SNP genotyping and RNAseq analysis. Genome wide association studies have revealed few candidate genomic regions associated with individual variabilities of vaccine responses to *M. hyo* or IAV. We have also identified significant associations between gene expression in blood before vaccination and vaccine responses, confirming that blood could be a source of predictive biomarkers.

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F. Blanc: None. **T. Maroilley:** None. **G. Lemonnier:** None. **J. Leplat:** None. **E. Bouguyon:** None. **Y. Billon:** None. **O. Bouchez:** None. **J. Bidanel:** None. **B. Bed'Hom:** None. **J. Estellé:** None. **C. Rogel-Gaillard:** None.

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