

Sus Flora project: a genetic and genomic study of gut microbiota and immune system homeostasis in swine

Claire Rogel-Gaillard¹, Jordi Estellé¹, Bertrand Bed'hom¹, Jean-Pierre Bidanel¹, Silvia Vincent-Naulleau², Mustapha Berri³, François Meurens³, Nicolas Bertho⁴, Marie-José Mercat⁵, Yvon Billon⁶, Isabelle Oswald⁷, Joël Doré⁸ and Sus Flora consortium

¹INRA, UMR de Génétique Animale et Biologie Intégrative, Jouy-en-Josas, France

²CEA, DSV, IRCM, Laboratoire de Radiobiologie et Etude du Génome, Jouy-en-Josas, France

³INRA, Laboratoire d'Infectiologie Animale et Santé Publique, Tours, France

⁴INRA, Laboratoire de Virologie et Immunologie Moléculaire, Jouy-en-Josas, France

⁵BIOPORC, La Motte au Vicomte, France

⁶INRA, Unité de Génétique et Expérimentation en Productions Animales, Le Magneraud, France

⁷INRA, Laboratoire de Pharmacologie et Toxicologie, Toulouse, France

⁸INRA, Unité de Microbiologie de l'alimentation au service de la santé humaine, Jouy-en-Josas, France

In the near future, a broader definition of breeding goals in agronomic sectors should balance productivity with improved functional traits such as health, considering animals as a fully integrated component of sustainable production systems. The gut microbiota develops as a host-specific parameter that gets stabilized early in life. Analyzing microbiota as a potent relevant phenotype acting in the development and maintenance of immunocompetence represents a prospective and original approach in the pig species, *Sus scrofa*. The aim of the ANR-funded Sus Flora project (2011-2013) will be to study gut microbiota in pigs that are scored for innate and adaptive immunity traits and consider the gut microbiota as a new parameter to include in genetic analysis. Ninety families will be produced and four piglets per family will be studied. Microbiota of 60 days-old piglets will be characterized together with the microbiota of the sows after piglet birth. Variation of microbiota during early lifetime will be studied for a subset of piglets from birth to growing period. Microbiota heritability and correlations between gut microbiota and immune response parameters will be calculated. The 360 piglets and the 90 boars will be genotyped using the genome-wide porcine 60K iSelect chips in order to accumulate data for further genome-wide association studies. In addition, interactions between gut epithelium and microbiota will be investigated for a subgroup of piglets. This project will generate new data on inter-relations between immunity and microbiota homeostasis in swine. It is expected to provide interesting conclusions for porcine production and health and could be considered as a good model for research in human.