

The project will evaluate the utility of acute phase proteins (APP) as early biomarkers of swine dysentery (SD) and the effectiveness of an experimental autogenous vaccine in controlling the disease as an alternative to antibiotics. SD, caused by *Brachyspira hyodysenteriae* (B.hyo), is a pig disease of global distribution and has a significant economic impact. Despite SD being known for approximately a hundred years, there are still knowledge gaps regarding many aspects of this disease. In addition, increasing antimicrobial resistance of B.hyo complicates disease treatment and control, which has negative consequences that include economic losses, a decrease in animals' health status and welfare, and a further increase in resistance development. Therefore, to minimise the negative impact of the disease, special attention should be paid to developing efficient diagnostics and preventive measures, like early disease biomarkers and effective vaccines. For this purpose, an extension of knowledge in SD pathogenesis, immune, and inflammatory response seems essential. APP are plasma proteins of hepatic origin, which are produced and released upon activating pro-inflammatory cytokines due to inflammation, which can be caused by, among others, infections. The observed variation in the serum levels of some APP during the SD course suggests that they can represent candidates for such early disease biomarkers.

For our project, two separate experiments will be conducted. The first aims to determine whether and which APP shows the most significant differences between healthy and diseased animals. Therefore, we will experimentally infect piglets with B. hyo and subsequently compare evaluated parameters to control piglets. Clinical condition and faecal consistency will be assessed twice a day. Blood samples and faeces/faecal swabs will be collected at specific intervals. Whole blood samples will be subjected to haematology examination and flow cytometry. The serum sample concentration of selected APP (serum amyloid A, haptoglobin, C-reactive protein, and pig major acute protein) will be determined. Faeces/faecal swabs will be used for bacteriological and molecular examination. During the necropsy, a gross pathology assessment will be done on each animal, and samples for histopathological examination will be collected. The second experiment aimed to verify the hypothesis that autovaccines may help control SD and may represent a valuable alternative to antibiotic therapy. Therefore, two groups vaccinated with experimental autovaccine and non-vaccinated will be infected with B. hyo. Evaluation of clinical condition, sample collection and laboratory analysis, and necropsy will be conducted as described for the first experiment.

We expect the results of the planned study to answer the question of the usefulness of selected APP for early SD biomarkers and whether autogenous vaccines may be considered as a preventive measure for clinical SD and to reduce antibiotic use in SD-affected herds.