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Nutrient metabolism alterations caused by co-infection by swine influenza virus and *Mycoplasma hyopneumoniae* in pigs - mitigating effects of feed restriction

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Nutritional strategies can be effective to improve the ability of pigs to cope with disease. Indeed, inflammation is responsible for changes in nutrient partitioning between growth and functions devoted to body defense. Reciprocally, many nutrients are involved in metabolic pathways modulating inflammatory and immune responses. European avian-like swine H1N1 is a major pathogen of the porcine respiratory disease complex together with *Mycoplasma hyopneumoniae* (Mhp). We studied the impact of a moderate feed restriction on the ability of pigs pre-infected with Mhp to cope with an H1N1 influenza challenge and its consequences on nutrient metabolism and performance. Post-prandial nutrient utilization was used to identify nutrients whose metabolism was modified.

Two groups of 8 SPF pigs were intra-tracheally inoculated with Mhp and H1N1 21 days apart. One group was fed *ad libitum* (AL) whereas the other one was applied a 40% feed restriction (FR) 1 week before H1N1 infection. One mock-inoculated AL and 1 mock-inoculated FR group of 4 pigs each were included. All pigs were fitted with a jugular catheter. Three days post-H1N1 infection and after an overnight fast, 200g of feed was given to all animals and serial blood samples were performed during 4h for measuring post-prandial plasma nutrient concentrations. Pigs were slaughtered 7d post-H1N1 infection. Clinical signs were observed throughout the study.

Both FR and infection modified postprandial kinetics of glucose and amino acid (AA) concentrations showing dramatic changes in nutrient metabolism. Glucose, arginine and threonine plasma concentrations were lower in infected pigs. The lower threonine concentrations might be related to the greater concentrations in plasma immunoglobulins that are rich in this AA. Feed restriction hardly modified the plasma nutrient response to infection. However, FR pigs presented a shorter hyperthermia as well as a positive mean weight gain over the 3 first days following H1N1 infection while animals fed AL lost weight during that period. This trial confirmed that feeding practices could be a strategy to help animals to overcome an influenza infection.