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EFFECT OF FEED RESTRICTION ON CHANGES IN NUTRIENT METABOLISM CAUSED BY SWINE INFLUENZA VIRUS INFECTION IN PIGS PRE-INFECTED WITH MYCOPLASMA HYOPNEUMONIAE

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Abstract

Because nutritional status and inflammation are strongly connected, 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 is modified by experimental conditions.

Two groups of 8 SPF pigs were intra-tracheally inoculated with Mhp and H1N1 21 days apart. One group was fed *ad libitum* whereas the other one was applied a 40% feed restriction one week before H1N1 infection. One mock-inoculated and one mock-restrained 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, the same amount of a standardized meal was given to all animals and serial blood samples were performed during 4 hours for measuring plasma nutrient concentrations. Pigs were slaughtered 7 days post-H1N1 infection. Clinical signs were observed throughout the study.

Both feed restriction and infection modified postprandial kinetics of glucose and amino acid concentrations showing dramatic changes in nutrient metabolism. Glucose, arginine and threonine plasma concentrations were lower in infected pigs revealing an increased utilization. The decreased threonine concentrations in infected pigs might be related to the greater concentrations in plasma immunoglobulins, which are rich in this amino acid. Feed restriction hardly modified the plasma nutrient response to infection. However, feed-restricted pigs presented a shorter hyperthermia as well as a positive mean weight gain over the 3 first days following H1N1 infection as compared to animals fed *ad libitum* which lost weight during that period.

This trial confirmed that feeding practices could be a strategy to prepare animals to overcome an influenza infection.