

**THEME 7 | NONRUMINANT NUTRITION AND PRODUCTION**

**An inflammatory challenge caused by *Escherichia coli* lipopolysaccharide alters branched-chain amino acids metabolism in growing pigs**

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Pigs reared in commercial conditions are often exposed to sanitary challenges. Consequently, the immune system interacts with regulatory and metabolic mechanisms to maintain animal homeostasis and integrity. For instance, a redistribution of nutrients from growth to the immune responses have been widely reported in challenged animals including pigs. However, little is known on the effects of immune system activation on amino acids metabolism in growing pigs. The aim of this study was then to evaluate the effects of an inflammatory challenge caused by repeated injections of *Escherichia coli* lipopolysaccharide (LPS) on the branched-chain amino acids leucine, isoleucine and valine. Fourteen growing pigs fitted with a jugular catheter were housed in a temperature-controlled room in which ambient temperature was maintained constant at 24°C. The experimental period lasted 17 days that was subdivided in a seven days period before and a 10 days period during the inflammatory challenge that consisted in five repeated injections of LPS at two days intervals. The initial dose of 30 µg/kg of body weight was increased by 12% at each subsequent injection. Before the LPS-challenge (baseline), and 24h after the second (T1) and the fourth (T2) LPS injections, 300 g of feed was given to pigs previously fasted overnight and serial blood samples were taken over four-hours to measure plasma amino acids concentrations. Amino acids postprandial concentrations were analyzed using the linear MIXED procedure of SAS including the fixed effects of time points (baseline, T1 or T2). According to our results, pigs had lower ( $P < 0.05$ ) postprandial concentrations of leucine, isoleucine and valine during than before the LPS challenge. The lower plasma concentrations of the branched-chain amino acids might be associated to their increased transamination and oxidation to be used as energy source during the inflammatory challenge to support the synthesis of immune system compounds and others immune actions such as the fever response. These results suggest that the requirements for branched-chain amino acids is increased in response to inflammatory stimuli and that the supplementation of these amino acids might be advantageous in pigs exposed to immune and/or sanitary challenges.

**Keywords:** amino acids, nutrition, postprandial metabolism, physiology, sanitary challenge

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