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Degradation of the environmental hygiene could alter growth rate and induce a systemic inflammatory response. Inflammation and oxidative stress are correlated pathways. Oxidative stress generally arises when antioxidant defenses are overhelmed by increased production of reactive oxygen species (ROS). Importantly, selection for residual feed intake (RFI) in growing pigs, a measure of feed efficiency, may also impact mitochondria ROS production. This study aimed at investigating systemic and tissue antioxidant capacities of pigs divergently selected for RFI and housed in poor or good hygiene conditions. During a 6-week challenge period, growing pigs of low (n=99) or high (n=73) RFI lines were housed in dirty (n=89) or in clean (n=83) conditions; half of the pigs were then killed to collect blood and tissues. The remaining pigs were transferred in a clean environment for an additional 8-week period (resilience), after what blood and tissues were collected. Poor hygiene conditions resulted in greater plasma levels of diacron reactive oxygen metabolite (dROM reflecting the amount of hydroperoxides), and a lower total antioxidant plasma capacity (ferric reducing ability [FRAP]). The increase in dROM to FRAP ratio observed in response to poor hygiene conditions was greater in the high RFI pigs than in the low RFI pigs. Poor hygiene conditions also activated antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT) and glutathione reductase (GSH-Rx) in perirenal adipose tissue, while SOD activity was decreased and CAT and GSH-Rx activities did not change in the liver of pigs raised in poor hygiene conditions. High RFI pigs exhibited higher activities of CAT and GSH-Rx in perirenal fat when compared with low RFI pigs, with no difference between lines in the liver. After the resilience period in clean conditions, there were no differences between pigs in plasma levels of oxidative and antioxidant markers. At that stage, antioxidant enzyme activities were higher in perirenal fat and liver of pigs having being challenged during early growth. In conclusion, poor hygiene conditions increased systemic oxidative stress and immediately activated antioxidant enzymes in adipose tissue, while liver responses seemed to be delayed. A greater susceptibility to systemic oxidative stress was also suggested for the less efficient (high RFI) pigs. Research has received funding from the EU FP7 program (PROHEALTH, grant agreement no. 613574). K. Sierzant received a grant from Wroclaw University (Faculty of Biology and Animal Science; program KNOW).