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Paulo Henrique Reis Furtado Campos, Nathalie Le Floc'H, Jean Noblet,
David Renaudeau

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Physiological responses of growing pigs to high ambient temperature and/or health challenges

P.H.R.F. Campos¹, N. Le Floc^{h2}, J. Noblet² and D. Renaudeau²

¹Federal University of Jequitinhonha and Mucuri Valleys (UFVJM), Animal Science, Rodovia MGT 367, km 583, no. 5000, 39100-000, Diamantina, MG, Brazil, ²UMR 1348 PEGASE, Agrocampus Ouest, INRA, Domaine de la Prise, 35590 Saint-Gilles, France; paulo.campos@ufvjm.edu.br

Global warming will be one of the most important challenges facing livestock production over the next decades. In such a scenario, pig production will be affected because of the high sensitivity of pigs to high ambient temperatures as a consequence of both their limited capacity to dissipate heat and the high metabolic heat production of modern lean genotypes. In addition, pig production will be presumably more challenged by the effects of high ambient temperatures due to its important development in developing countries mainly located in tropical and subtropical areas. However, high temperature is not the unique factor impairing the sustainability and profitability of pig production. In commercial conditions, pigs have been more and more exposed to health challenges due to intensification of animal production and higher stocking density. Furthermore, the association of high relative humidity and high ambient temperature, that usually occurs in tropical and subtropical areas, benefits the proliferation and dissemination of vectors and/or pathogens (viruses, bacteria, parasites and fungi) resulting in a higher environmental pathogenic pressure. As a consequence, the immune system is activated which induces a cascade of physiological and metabolic responses that, in turn, have usually a negative impact on growth and feed efficiency. Although the specific effects of high ambient temperature and disease on animal physiology and performance have been well documented in literature, little is known about the associated effects of both factors. This understanding may contribute to a better quantification and comprehension of the physiological and metabolic disturbances occurring in practical conditions of pig production in tropical areas and, more generally, in many other geographic areas that will be impacted by the perspective of global warming. Some recent studies suggest that growing pigs previously acclimated to high ambient temperature had an improved capacity to limit the physiological and metabolic disturbances caused by an inflammatory challenge induced by repeated administrations of *Escherichia coli* lipopolysaccharide. Therefore, the objective of this work is to provide an overview of recent research advances (1) on the physiological responses of growing pigs during acclimation to high ambient temperature; and (2) on the potential effects of high ambient temperature on the ability of growing pigs to resist, cope or recover to health challenges.