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Acute social stress modulates immune traits in pig's high- and low-responders to ACTH stimulation

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Pig husbandry is known as an intensive breeding system. Piglets are submitted to multiple stressful events such as early weaning, successive mixing and crowding. The two main stress responsive systems are hypothalamo-pituitary-adrenocortical (HPA) and sympatho-adrenomedullary (SAM) axes, releasing respectively cortisol and catecholamines. In this study, we wondered whether selecting piglets with a strong HPA axis could increase resistance to stressors. For this purpose, we submitted 90 piglets, issued from an ongoing genetic selection on HPA axis strength, to a one-hour mixing with unfamiliar conspecifics and monitored neuroendocrine and immune parameters. As expected, acute social stress increased plasma catecholamine and cortisol levels as well as a significant leukocyte mobilization, which is thought to prepare the organism to cope with an immune challenge. Detailed flow cytometry analyses demonstrated lymphocyte demargination with a specific recruitment of CD8 α^+ T cells. In addition, one-hour mixing decreased LPS-induced IL-8, TNF α and IL-10 secretions in whole-blood assays and reduced mononuclear cell phagocytosis. For most parameters, except CD4⁺ CD8 α^- T cell number and LPS-induced TNF α secretion, high- and low-responders to ACTH behaved similarly. Interestingly, a principal component analysis highlighted that stress effects were less pronounced on piglets with a strong HPA axis. Altogether, our data demonstrated that acute social stress alters immune competence of piglets, which brings new insights in favor of good farming practices. Finally, genetic selection of pigs on HPA axis strength might increase resilience to stressors but future studies are warranted to validate this hypothesis at the end of selection.

Biography

Elodie Bacou is currently a PhD student. She has studied Biological Sciences at the University of Tours and Nantes. The lab where she works is situated in Oniris also known as Nantes-Atlantic College of Veterinary Medicine and Food Sciences.

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