

# Effect of heat challenge on peripheral blood mononuclear cell viability: comparison of a tropical and a temperate pig breed

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## Introduction

We evaluated the effect of heat challenge on peripheral mononuclear blood cells (PBMC) isolated from Creole (CR) and Large White (LW) pigs, on cell viability, concanavalin A-induced proliferation and heat shock proteins (HSP) mRNA expression.

## Material and methods

PBMC from CR and LW growing pigs of 7 to 12-weeks of age were isolated, cultured for 9 hours at 37°C, and thereafter subjected to one of the three trials. In trial 1, cells from 18 CR pigs and 18 LW pigs were exposed to 42°C or 45°C for 2, 4, 6 and 9 hours and cell viability was monitored. In trial 2, we evaluated mitogen-induced proliferation of PBMC from 5 CR pigs and 5 LW pigs after heat challenge for 2 and 9 hours at 45°C followed by 24 hour-stimulation at 37°C with concanavalin A. The aim of trial 3 was to measure induction of HSP70.2 and HSP90 mRNA expression in PBMC from 5 CR pigs and 5 LW pigs after heat challenge at 45°C for 3, 6 and 9 hours.

## Results

Viability was affected by breed and temperature ( $P < 0.01$ ) but no effect of breed  $\times$  temperature or breed  $\times$  exposure time interactions was observed. The decrease in viability caused by heat challenge was greater for LW than for CR pigs. For mitogen-stimulated PBMC, incubation at 45°C reduced lymphoblastogenesis equally for both breeds ( $P < 0.001$ ). Heat challenge for 6 hours at 45°C induced significant expression of HSP70.2 mRNA ( $P < 0.05$ ) but no effect of exposure time was observed. Induction of HSP90 mRNA increased after heat challenge for 3 hours, and then decreased at 6 and 9 hours in both breeds ( $P < 0.01$ ). A significant effect of exposure time was observed ( $P < 0.05$ ). No effect of breed and breed  $\times$  exposure time was observed for both HSP.

In conclusion, breed differences in resistance to heat challenge at the whole organism scale is reflected at the cellular level. Neither HSP70.2 nor HSP90 mRNA expression level could explain this effect.

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