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## Comparison of the cytokine profiles after LPS injection between two lines of goats selected for functional longevity

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## Session 85

## Theatre 9

Genetic determinism of resilience to unrecorded challenges in pigs

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Selection of animals able to maintain their performance under variable environmental conditions is needed. Pigs in selection farms are raised in a monitored and controlled environment (e.g. temperature). However, pigs could be exposed to challenges/disturbances unrecorded and from unknown origin. Therefore, resilience in pigs remains important. The probability of the occurrence of an unrecorded environmental challenge at a given day was estimated from daily feed intake (DFI) data, and the genetic determinism of resilience to such events was evaluated. In total, 186,242 DFI records recorded automatically from 2,517 Large White males were used. The pedigree involved 5,649 individuals. For each day (within each batch), the probability of the occurrence of a challenge was computed via a mixture model. As a result, unrecorded events of environmental challenges affecting pigs' DFI were identified. Days with a high probability of having a high coefficient of variation (CV) were related to the occurrence of an environmental challenge. The probabilities (p) of high CV (stressful day) were used as a covariate in a reaction norm model (RNM) as an environmental descriptor, ranging from a non-challenging environment (p=0) to a challenging one (p=1). Variance components were estimated using the average information restricted maximum likelihood method. The mean probability of being a day with a high CV was 0.10; thus most of the days have a low probability of the occurrence of a challenge. The genetic correlation between level and slope was  $0.06 \pm 0.13$  in RNM. This value suggests that selecting for decreased DFI would have a minimal effect on the animal's sensitivity to challenging environmental conditions.

## Session 85

## Theatre 10

Comparison of the cytokine profiles after LPS injection between two lines of goats selected for functional longevity

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The present article aims to explore the phenotypic variability of inflammatory reactions and compare them between two lines of goats. Hyper-selection based on the functional longevity of bucks successfully created two groups of goats with different lifespans (High\_LGV and Low\_LGV). Primiparous goats from the two divergent lines were injected intravenously with LPS (lipopolysaccharide) to stimulate inflammation. Blood was sampled at hours: -72, 0 (injection), 2, 4, 6, 8, 10, 12, 24, 48, 72, and 144. The concentration of 14 cytokines was measured: IFN $\gamma$ , IL-1 $\alpha$ , IL-1 $\beta$ , IL-4, IL-6, IL-10, IL-8, IL-17 $\alpha$ , IL36RA, IP10, MIP1 $\alpha$ , MIP1 $\beta$ , TNF $\alpha$  and VEGFA. The experiment was carried out in two experimental farms (n=83 goats). Results showed that the LPS injection induced a significant increase in several cytokines. The cytokines profiles were different between farms, highlighting different inflammatory backgrounds that could be related to different farm managements. The two longevity lines had different profiles for several cytokines within each farm. Most of the differences between lines were not consistent across farms, showing a potential GxE interaction. However, the increase of IL-6 was stronger among Low\_LGV goats in both farms. These results strengthen our understanding of the immune reactions implied in animal resilience and longevity. This study has received funding from the European Union's Horizon 2020 program SMARTER (agreement No 772787) and APIS-GENE (Paris, France).