

## **Genetic analyses of blood metabolites and amino acids in blood serum in pigs.**

*K.H. Martinsen<sup>1,2</sup>, C. Brekke<sup>3</sup>, A. Nordborg<sup>4</sup>, E. Grindflek<sup>1,2</sup>*

*<sup>1</sup> Norsvin SA, Storhamargata 44, 2317 Hamar, Norway; <sup>2</sup> Topigs Norsvin, Meerendonkweg 25, 's-Hertogenbosch, Netherlands; <sup>3</sup> Norwegian University of Life Sciences, P.O. Box 5003, 1432 Ås, Norway, <sup>4</sup> SINTEF, P.O. Box 4760 Torgarden, 7465 Trondheim, Norway*

In pig production, resilience is an individual's ability to cope or recover rapidly from a wide range of disruptive challenges back to the original level of normal health, fertility, and production. However, recording resilience in nucleus herds is challenging, as the health status is high, and natural disease challenges rarely occur.

To find new methods for measuring resilience on selection candidates, the main goal of this study was to investigate potential bio markers for resilience to disease and investigate potential genetic variation in these markers. Blood samples were collected for 922 dam line pigs at the nucleus boar testing station. The samples were taken at entry of the test station, when the animals were weighted, ear tagged and vaccinated.

All serum samples were analysed with a targeted analysis, liquid chromatography with tandem mass spectrometry (LC-MS). Univariate genetic analyses were run for each metabolite to identify genetic variation, using linear animal models. Bivariate genetic analyses were run to obtain genetic correlations to growth and a resilience related trait, root mean square error of daily feed intake (RMSE\_DFI).

Heritabilities ranged from 0.05 to 0.46 for the different amino acids, and the heritability for blood serotonin and kynurenine was  $0.28 \pm 0.15$  and  $0.38 \pm 0.14$ , respectively. No significant genetic correlations were identified between RMSE\_DFI and different amino acids, serotonin, or kynurenine. However, a significant correlation between serotonin and growth was identified ( $-0.7 \pm 0.23$ ) and between tyrosine and growth ( $0.7 \pm 0.21$ ).

The results suggested that level of specific metabolites and amino acids in blood was heritable, but it was not possible to identify genetic relationships between the metabolites and resilience (measured as RMSE\_DFI) in this data set. Further genetic analyses between the metabolites and other health related traits such as osteochondrosis, longevity and exterior will be performed.