



Worried About Pig Stress? Research Offers Reassurance

By Geoff Geddes, for Swine Innovation Porc

If you think rush hour is stressful, you've never seen a pig pen at feeding time. In fact, pigs face a range of stressors as part of their daily routine. From social factors such as feeding competition and aggression, to environmental forces like extreme temperatures, reduced space and new environments, stress is ever present. Apart from its impact on the animal's immune system and general health, it also affects animal growth performance and meat quality while increasing injuries and the cost of production. Because pig stress leads to financial stress for producers, research is seeking solutions in an area of growing interest to many industries: genetics.

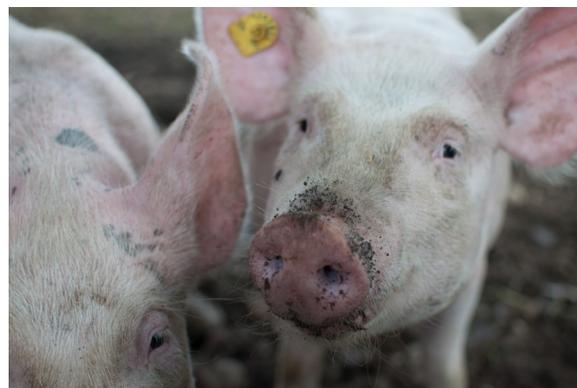
Interestingly, the road to a stress solution for the pig industry began with mice.

A favorite pair of genes

"In some previous research, we found that when we removed two specific genes from mice [Luman and a modifier gene called LRF], we increased their stress tolerance," said Dr. Ray Lu, Associate Professor - Molecular & Cellular Biology Department at the University of Guelph.

With the current focus on animal welfare in agriculture, and the fact that mice and pigs have very similar hormonal regulation, Dr. Lu sought to apply those findings to the pork industry.

"Producers today are looking for leanness and fast growth, sometimes at the expense of health. In launching this pilot project, we looked at whether some pigs have a naturally occurring genetic variation that allows them to better deal with stress."



So far, this project has identified seven SNPs in pigs that link to stress tolerance or sensitivity. Photo by Mali Maeder from Pexels.

Test anxiety

In the first part of the project, researchers ran a behavior test to examine how pigs respond to stressful stimuli. Since cortisone is one of the main hormones released by the adrenal gland in response to stress, they measured its levels in the pigs before and after the test. They then collected hormone data on the test pigs at important time points such as weaning and transportation. Finally, they did genetic testing to locate differences that might relate to stress tolerance.

Thus far, this project has identified seven SNPs (the most common type of genetic variation) in pigs that link to stress tolerance or sensitivity. Researchers also found one gene variant that is absent in Large White breeds, yet is present in a pig known for its good temperament.

LOWER STRESS MEANS GREATER IMMUNITY AND LESS ANTIBIOTIC USE... BECAUSE STRESS IS LINKED TO METABOLISM, IT COULD PLAY A ROLE IN RAISING FEED EFFICIENCY AND IMPACTING THE FATNESS OR LEANNESS OF PIGS, SOMETHING THE MARKET REALLY CARES ABOUT.

“The Meishan is a breed of domestic pig native to China. In addition to large litter sizes, it’s distinguished by its ability to resist stress. Whether that particular gene is behind this has yet to be determined, but it presents an exciting possibility.”

Given the potential benefits of selecting for pigs that are more stress resistant, there’s a lot to be excited about. Lower stress means greater immunity and less antibiotic use, and because stress is linked to metabolism, it could play a role in raising feed efficiency and impacting the fatness or leanness of pigs, something the market really cares about.

As is often the case with cutting edge technology, the potential is significant, but so too are the concerns from some corners.

“If we find genetic variations that make pigs more docile, we could use a new technology called CRIPR-CAS genome editing to transfer such naturally existing, beneficial genetic variance into breeding herds. That would save decades of time when compared to traditional breeding. This new precise genetic technology may take the whole industry by storm, as it does not involve gene transfer or transgenics as with a GMO [genetically modified organism]. This technology is so new, though, that the public really doesn’t understand it yet and may perceive it as being the same as a GMO.”

In fact, this is just gene editing, the same process that some American and Chinese researchers used to make PRRS-resistant pigs.

While educating the public about the difference is important, Dr. Lu said we can’t put research on hold until the lesson is learned.

“I know the market may not be ready for this, but if we don’t keep working on it, by the time people are ready we’ll be years behind other countries. If you’re going to keep producing the best pigs in the world, you can’t be the one playing catch up.”

Now THAT would be something to stress about. ☹️

For more information....

To learn more about the work described in this article, please contact Dr. Ray Lu at: rlu@uoguelph.ca

You may find additional resources related to the project *A pilot study to establish a gene panel for the identification of low-stress pigs* by consulting our website:

swineinnovationporc.ca/research-technology

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