

SWINE HEALTH

Title: Genetic resistance to porcine reproductive respiratory syndrome virus (PRRSV) - **NPB #02-191**

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Abstract: An experiment was conducted at the University of Nebraska with the objective of determining whether genetic variation in response to PRRS virus (PRRSV) exists. The long-term objective is to identify procedures to select for genetic resistance to PRRSV. A total of 400 pigs, 200 from the Nebraska Index (I) line and 200 Duroc-Hampshire (DH) crosses, by 83 sires and 163 dams were used. One-half of the pigs were infected with PRRSV at 26 days of age. A littermate to each challenged pig served as a control. Blood was drawn from each pig on days 0, 4, 7, and 14 to measure viremia, a measure of the pig's ability to replicate the virus. Body weight and body temperature were recorded each day. On day 14, pigs were sacrificed, lungs were scored for lesions, and blood, lung, lymph, and spleen tissue were collected. Results indicate possible underlying genetic variation in response to the virus. Body temperature was normal in unchallenged pigs, increasing from day 0 to 14 in both populations. However, temperature in DH pigs challenged with PRRSV increased more rapidly and remained higher than in I pigs, indicating that I pigs were more resistant to the effects of the virus. This fact was supported by the pattern of growth. Unchallenged DH pigs gained 1.5 lb., roughly 22% more, in 14 days than I pigs. But quite a different response occurred in PRRSV-challenged pigs. Pigs from both populations gained very little weight in the first seven days, but in the next seven days I pigs gained nearly twice as much weight as DH pigs. Viremia level was significantly less for I pigs than DH pigs. All pigs replicated virus, but some replicated it at a very low rate whereas others had extremely high replication rates. Some pigs that replicated PRRSV at high rates showed all the symptoms of PRRS (low weight gain, high temperature, lung lesions). Other pigs replicated PRRSV at high rates but showed only mild or no symptoms of PRRS. The other extremes also existed as there were pigs that replicated the virus at very low rates and showed almost no symptoms of PRRS, and pigs that replicated the virus at low rates but showed mild to severe PRRS symptoms. There were only 3-5 pigs in each of these extreme categories, but these are ones that interest us most for further genetics research. Our long-term goal is to isolate RNA from tissues collected from these pigs and look for genes that are expressed differently. RNA is the chemical that takes the message contained in the DNA, the chemical component of the gene, and puts the gene's action into effect in the animal's cells.

Tissue from the littermate controls will be used to determine whether expression differences are in response to the virus, or whether there are underlying genetic differences that are expressed independent of presence of PRRSV. Results at this point indicate that underlying genetic variation in response to PRRS exists. However, much work is still needed to determine the nature of this variation and how to best exploit it in a selection program.

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