RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Effect of pregnant gilt zinc and lipid supplementation on neonatal piglet brain myelination and preweaning mortality, **NPB #09-024**

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Date Submitted: 6/15/2010

Scientific Abstract

Preweaning mortality of piglets ranges from 10 to 20% and appears to be increasing as sows are selected for increased litter size. Myelination of the brain is reduced in low birth weight piglets and it has been hypothesized that this may contribute to poor preweaning survival, especially in larger litters where low birth weight piglets occur at greater frequency. The effect of Gromega and/or zinc supplementation of gestating gilts on myelination of the brain stem, cerebellum and spinal cord of the smallest piglets in each litter was tested by measuring myelin basic protein or myelin cholesterol, glucocerebrosides, phosphatidylethanolamine, phosphatidylcholine and sphingomyelin in isolated myelin membranes from these brain regions. Gilts were mated and fed either a control diet, a diet supplemented with 1.09% Gromega, a diet supplemented with 0.07% Zinc Sulfate or a diet supplemented with both Gromega and Zinc Sulfate from day 80 of gestation until farrowing. On day 1 after farrowing, piglets were weighed and the smallest piglet in each litter was sacrificed and blood was collected. Brain, cerebellum, brain stem, full and empty stomach (to calculate stomach content weight) and heart weights were recorded. Brain stem, cerebellum and spinal cord tissues were collected and myelin membranes were isolated. Myelin basic proteins and myelin lipids were measured using SDS-PAGE and Thin layer chromatography, respectively, followed by densitometry. Blood was assayed for immunoglobulin G using a new rapid assay, the “immunocrit”, developed for this purpose. Results indicated a weak correlation ($r = 0.23$, $P < 0.05$) between immunocrit and brain stem high molecular weight myelin basic protein, suggesting that brain stem myelination may contribute to nursing ability. There was also a Gromega by zinc supplementation interaction ($P < 0.05$) on brain stem high molecular weight myelin basic protein. Despite this, there were no effects of dietary supplementation on weight of the stomach contents, immunocrit or preweaning survival and there was no relationship between any myelin measurement and preweaning survival.