

# Transgenic Alteration of Sow Milk

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High production of milk and its components are necessary to allow maximal growth of developing piglets. In this study, transgenic pigs were produced containing the  $\alpha$ -lactalbumin gene, whose product is a potential limiting component in the production of milk. Two lines of transgenic pigs were produced to analyze the effects that overproduction of the milk protein  $\alpha$ -lactalbumin may have on milk production and piglet growth. Transgenic pigs were produced through microinjection of the bovine  $\alpha$ -lactalbumin gene. The gene construct contained 2.0 kb of 5' flanking region, the 2.0 kb coding region and 329 bp of 3' flanking region. Sows hemizygous for the transgene produced as much as 0.9 g of bovine  $\alpha$ -lactalbumin per liter of pig milk. The production of the bovine protein caused approximately a 50 % increase in the total  $\alpha$ -lactalbumin concentration in pig milk throughout lactation. The concentration of bovine  $\alpha$ -lactalbumin was highest on day 0 and 5 of lactation and decreased as lactation progressed. The ratio of bovine to porcine  $\alpha$ -lactalbumin changed during the sow's lactation. This ratio was 4.3 to 1 on day 0 of lactation, but by day 20 of lactation the ratio was 0.43 to 1. This suggested that the bovine transgene and the endogenous porcine gene were under slightly different control mechanisms. The higher level of total  $\alpha$ -lactalbumin present on day 0 of lactation was

correlated with higher lactose percentage on day 0 in transgenic sows (3.8 %) as compared to controls (2.6 %) ( $P < 0.01$ ). Although there was also a trend for higher lactose percentage in transgenic sows on day 5 and 10 of lactation, no significant differences were observed. These data suggest that  $\alpha$ -lactalbumin is limiting early in lactation of swine. Furthermore, higher concentrations of  $\alpha$ -lactalbumin early in lactation may boost milk output.