

**11. Effect of litter size on mammary gland amino acid uptake in lactating sows.** T.T. Nielsen\*, N.L. Trotter, C. Bellaver, H.H. Stein and R.A. Easter. University of Illinois, Urbana, USA.

Twelve multiparous sows (parity  $\geq 3$ ) were used to determine the relationship between litter size and daily uptake of lysine, threonine, leucine, isoleucine and valine by the mammary gland. Sows were given ad libitum access to a corn-soy diet formulated to contain 0.9% lysine. Each sow was randomly assigned to one of the following litter sizes: 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14. Piglets were cross-fostered within two days after farrowing to obtain the desired litter size. Sows were fitted with catheters in the carotid and main mammary vein on either day 5 or 6 of lactation. The interval between days 8 and 26 of lactation was divided into six 3-day

periods. During each period, milk and arterio-venous blood samples were collected and milk production measured. Plasma and defatted milk samples were analysed for free and total amino acid concentrations, respectively. Lysine was used to estimate daily plasma flow through the mammary gland according to the metabolic Fick method. Daily amino acid uptakes (g/day) were calculated using plasma arterio-venous differences (g/ml) and plasma flow estimates (ml/day). Uptake of lysine, threonine, leucine, isoleucine and valine increased linearly ( $P < 0.05$ ) with increasing litter size. Parameter estimates (slopes; grams amino acid uptake per day per piglet) were  $2.08 \pm 0.29$  for lysine ( $P = 0.002$ ),  $1.02 \pm 0.26$  for threonine ( $P = 0.02$ ),  $2.77 \pm 0.57$  for leucine ( $P = 0.008$ ),  $1.56 \pm 0.41$  for isoleucine ( $P = 0.02$ ), and  $1.59 \pm 0.15$  for valine ( $P = 0.04$ ). Uptake of lysine and threonine increased quadratically ( $P < 0.05$ ) from days 8 to 26, with maximum uptake occurring between days 17 to 20. In contrast, no significant quadratic relationship was found for leucine ( $P = 0.09$ ), isoleucine ( $P = 0.12$ ), or valine ( $P = 0.22$ ). In conclusion, uptake of amino acids by the porcine mammary gland can be predicted from litter size, and maximum uptake of lysine and threonine is achieved between days 17 and 20 of lactation.