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*Guoyao Wu, Fuller W. Bazer,
Timothy A. Cudd, Cynthia J.
Meininger, and Thomas E.
Spencer. September 2004.
"Maternal Nutrition and Fetal
Development". **Journal of
Nutrition.** 134(9): 2169-2172*

Suboptimal nutrition during gestation is a significant problem in animal agriculture. For example, nutrient uptake by ewes grazing in the western United States is less than 50 percent of the National Research Council's recommended

requirement. Grazing ewes that do not receive supplemental nutrition lose a significant amount of body weight during pregnancy, thereby seriously compromising their health, the growth of their fetuses, and postpartum milk production. In pigs, a disproportionate supply of nutrients along the length of the uterus results in 15-20 percent of piglets with low-birth-weight whose postnatal survival and growth rates are severely reduced. Moreover, nutrient restriction during critical periods of embryonic and fetal development may impair growth and health throughout postnatal life and perhaps even into the next generation. This may indicate that poor performance of livestock during postnatal growth may be a consequence of fetal growth restriction. Using funding support from the NRI, Dr. Wu and co-workers at Texas A&M University discovered an unusual abundance of specific amino acids (the building blocks of protein) in the fetuses of pregnant pigs and sheep. Some of these amino acids can account for more than 50 percent of the total amino acids present during various periods of gestation. One of them is used extensively by the fetal pig for growth, while the placenta uses another to support maximal development. Most recently, Dr. Wu's research team found that arginine, an essential amino acid, is particularly rich in placental fluid at early gestation. The high concentrations of the arginine-family amino acids in the conceptus are associated with the highest rates of conceptus growth during pregnancy. Results from this work will contribute to an improved understanding of the mechanisms regulating conceptus growth and development. This will be beneficial for developing new management strategies to prevent or treat intrauterine growth retardation in agriculturally important animals and improve pregnancy outcome in humans as well.

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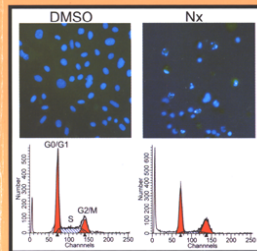
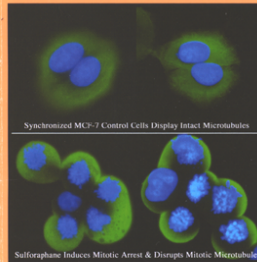
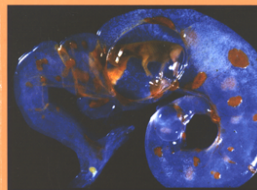
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