

Pre- and postnatal differential gene expression with relevance for meat and carcass traits in pigs ? a review

Klaus Wimmers*, Eduard Murani, Siriluck Ponsuksili

Research Institute for the Biology of Farm Animals, FBN Dummerstorf, Wilhelm-Stahl-Allee 2, 18916 Dummerstorf, Germany

Abstract :

Pre- and postnatal processes determine the final outcome of breeding of pigs in terms of traits related to carcass and meat quality at slaughter. In particular, the number of myofibers and to a large extent their metabolic and contractile properties, which also influence their size, are determined prenatally during the process of myogenesis. By this, postnatal muscle growth and parameters of meat quality are modulated. The metabolic balance, biochemical and biophysical preslaughter properties of muscle prior to slaughter determine the process of maturation of muscle to meat. Thus, differential regulation of the abundance of transcripts of biological networks in prenatal and postnatal muscle affect biochemical processes of meat maturation. In general, because the traits of interest are typically not expressed at prenatal stages, no direct relationship between phenotype and gene expression pattern can be established. However, trait-related differential expression within any prenatal developmental stage can be assessed based on known estimated breeding values, known QTL-genotypes and/or based on breed differences. Expression profiles of muscle at slaughter can directly be linked to meat quality. A suitable experimental design of "matched samples" is the discordant sib pair design. Here it is exemplarily discussed that differentially expressed transcript profiles of *M. longissimus dorsi* at prenatal and postnatal stages offer an insight into the biological processes in the live muscle that affect the process of meat maturation and finally meat quality.

Key Word :

microarray, transcriptome, meat quality, muscle, myogenesis

Volume 28, Number 2, - 2010