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LD In Pigs: Differences Between China And Europe

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Linkage disequilibrium (LD) may reveal much about domestication and breed history. Using information from three genomic regions, each around 1 to 3 cM in size, and a total of 371 single nucleotide polymorphisms, the levels and patterns of LD were assessed in ten pig breeds from China, ten from Europe and a European wild boar population. Results show that the extent of LD is dramatically different between the European and Chinese breeds. Most European breeds show high LD up to 2 cM and haploblocks can be as large as 400 kb. By contrast, Chinese breeds have a much smaller extent of LD up to 0.05 cM and haploblocks generally do not exceed 10kb. The European wild boar showed an intermediate level of LD. Chinese breeds show higher level of haplotype diversity and share high frequent haplotypes with Large White, Landrace and Duroc.

We conclude that there are consistent differences in the extent of LD between these two areas of independent pig domestication: Europe and China. Two reasons may explain this difference. First, the European ancestral stock may have had higher levels of LD, which is supported by the high level of LD in the population of European wild boar. Second, modern breeding programs probably resulted in higher LD in many European pigs through selection and maintenance of small effective populations. Large White, Landrace and Duroc show evidence of past introgression from Chinese breeds.