Assignment¹ of the porcine MAM domain containing glycosylphosphatidylinositol anchor 1 (MDGA1) gene on chromosome 7q11→13 by in situ hybridisation and somatic hybrid panel mappingS. Kierstein,^a U. Peters,^b S. Kollers,^c R. Fries,^c and B. Brenig^b^aInternational Livestock Research Institute, Nairobi (Kenya)^bInstitute of Veterinary Medicine, Georg August University of Göttingen, Göttingen (Germany)^cChair of Animal Breeding and Molecular Genetics, Technical University of Munich, Munich (Germany)¹ To our knowledge this is the first time this gene has been mapped.

Rationale and significance

In course of a genome analysis project with the aim to map and characterize type I markers on porcine Chromosome 7 we mapped the porcine MDGA1 (MAM domain containing glycosylphosphatidylinositol anchor 1) gene. The human orthologue was only recently described and the original name GPIM (GPI and MAM protein) has received the above official gene name and symbol (De Juan et al., 2002). The MDGA1 gene appears to be highly conserved among mammals. The protein contains several immune-globulin (Ig) domains, one fibronectin (FnIII) domain, and one MAM (meprin, A5 protein, receptor protein-tyrosine phosphatase mu) domain. According to these structural features, showing characteristics of a cell adhesion molecule, the protein is possibly involved in cell-cell communication and tumor progression.

Materials and methods

A porcine genomic PAC library (IVM PAC 714, Al-Bayati et al., 1999) was screened by PCR. PAC DNA was isolated with Qiagen Plasmid purification Kit according to the manufactures instructions. Sequencing was carried out on a LI-COR DNA Sequencer Model 4000L (MWG) as described previously (Middendorf et al., 1992). Chromosomal localization of the PAC clone was ascertained by fluorescence in situ hybridization (FISH) as

Figure 1. Chromosomal assignment of the porcine mut gene by FISH. Signals were detected on chromosome 7q11-q13.

described elsewhere (Jang et al., 1997; Solinas-Toldo et al., 1995) and confirmed by PCR analysis of a porcine × rodent somatic cell hybrid panel (Yerle et al., 1996). PCR results were analyzed using the interpreting web pages at INRA (<http://www.toulouse.inra.fr/lgc/pig/pcr/pcr.htm>).

Fluorescence in situ hybridisation

Probe name(s): A13B5 Probe type: porcine genomic PAC clone
Insert size: app. 80 kb Vector: pCYPAC2
Proof of authenticity: sequence accession # AJ459295, AJ459296

Hybrid panel analysis

Primer names and sequences: B5for, 5'-gaccgtgacatgtgtgcc-3'
B5rev, 5'-gaccgtgacatgtgtgcc-3'

PCR conditions: 2 min 95 °C
30 cycles 45 s 95 °C
 45 s 56 °C
 60 s 72 °C

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Results

Mapping data

Most precise location: 7q11-q13

Regional mapping results

CR analysis of the somatic porcine × rodent hybrid panel showed the following distribution of the gene within the 27 hybrids 01000 00001 11000 10000 10101 00. The statistical evaluation revealed a significant correlation between the MGDA1 gene and chromosome 7. The regions with the highest probability were q12-q23 and q26 with identical probability and correlation values of 0.45 and 0.82, respectively. The distribution of fragments of the porcine chromosome 7 does not enable the distinction between these two regions. However, the FISH data correspond to the region q11-q13 and therefore exclude q26.

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