Rapid Communication: Restriction Fragment Length Polymorphisms at the Porcine Transporter Associated with Antigen Processing 1 (TAP1) Locus

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Abstract

Source and Description of Probe. A 2.7-kb human cDNA clone for TAP1 was excised from the XbaI site of the plasmid pRSV.5neo (Spies et al., 1990). Method of Detection. Hybridizations were performed at 65°C for 16 to 20 h (10% dextran sulfate, 7% SDS, 0.263 M Na₂HPO₄, 1% BSA, 1 mM EDTA, 100 pg/mL sonicated denatured salmon sperm DNA). Final washes were done at 65°C in 0.7x SSC, 0.5% SDS for 15 to 20 min.

Keywords
Pigs, Major Histocompatibility Complex, Antigens, Polymorphism, Genetic Markers

Disciplines
Agriculture | Animal Sciences | Genetics and Genomics

Comments
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Method of Detection. Hybridizations were performed at 65°C for 16 to 20 h (10% dextran sulfate, 7% SDS, 0.263 M Na2HPO4, 1% BSA, 1 mM EDTA, 100 μg/mL sonicated denatured salmon sperm DNA). Final washes were done at 65°C in 0.7x SSC, 0.5% SDS for 15 to 20 min.

Description of Polymorphism. Hybridization of SstI digests with the human TAP1 probe revealed three fragments. The 9.8-kb and 7.2-kb fragments were polymorphic, and the 4.2-kb fragment was monomorphic. Hybridization of NcoI digests with the human TAP1 probe revealed four fragments. The 2.8-kb fragment was polymorphic and the 6.1-, 3.6-, and 1.8-kb fragments were monomorphic. No polymorphisms were detected for the TAP1 locus in unrelated pigs using XbaI (16 pigs), PvuII (16 pigs), or RsaI (16 pigs).

Inheritance Pattern. Autosomal Mendelian segregation of the 9.8-kb and the 7.2-kb SstI polymorphic fragments was observed in 34 pigs in a three-generation Meishan-Landrace reference family. Autosomal Mendelian segregation of the 2.8-kb NcoI fragment was observed in 27 pigs in a three-generation Meishan-Hampshire reference family.

Frequency. Analysis of 42 unrelated pigs from seven breeds produced estimated allelic frequencies of .45 for the 9.8-kb SstI fragment and .55 for the 7.2-kb SstI fragment (Table 1). Additionally, the polymorphic 2.8-kb NcoI fragment was found in 66% of the Hampshires tested (six of nine unrelated pigs) but was absent in all other breeds tested (32 pigs from six breeds).

Comments. The human transporter associated with antigen processing 1 (TAP1) gene is located in the major histocompatibility complex (MHC) class II region and is involved in control of the cell surface expression of MHC class I antigens. The TAP1 protein product is homologous to mammalian and bacterial ATP-dependent transport proteins and is also a member of a superfamily of transport proteins. TAP1 is the standard nomenclature for all species, but this locus has also been called HAM1, mtp1, Y3, FSp1, and RING4 (Monaco, 1992).

Literature Cited


Key Words: Pigs, Major Histocompatibility Complex, Antigens, Polymorphism, Genetic Markers

Table 1. Percentage of SstI TAP1 genotypes in several breeds

<table>
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<tr>
<th>Breed</th>
<th>n</th>
<th>9.8/9.8</th>
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<th>7.2/7.2</th>
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<td>87</td>
</tr>
<tr>
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<td>Chester White</td>
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<td>20</td>
<td>80</td>
</tr>
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</table>

19.8-kb SstI fragment.
27.2-kb SstI fragment.

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