Rapid Communication: StuI Restriction Fragment Length Polymorphism at the Porcine Bone Morphogenetic Protein 5 (BMP5) Locus

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Keywords
Pig, Bone Morphogenetic Protein, RFLP

Disciplines
Agriculture | Animal Sciences | Genetics and Genomics

Comments
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Rapid Communication: StuI Restriction Fragment Length Polymorphism at the Porcine Bone Morphogenetic Protein 5 (BMP5) Locus

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Source and Description of Probe. A 2.2-kb human cDNA clone for bone morphogenetic protein 5 (BMP5) was excised from the clone U2-16 (Celeste et al., 1990).

Method of Detection. DNA was isolated from whole blood and digested with StuI. Fragments were separated by agarose gel electrophoresis and alkaline vacuum-transferred to charged nylon membranes. Hybridizations were at 65°C for 16 to 20 h (10% dextran sulfate, .5 M NaCl, .05 M sodium phosphate, pH 6.5, 5x Denhardt's, .5% SDS, 100 µg/mL sonicated denatured salmon sperm DNA). Final washes were at 60°C in .7x SSC, .5% SDS for 15 to 20 min.

Description of Polymorphism. Hybridization of the StuI-digested DNA with labeled human BMP5 DNA revealed polymorphic fragments of 5.1 and 5.4 kb. Monomorphic fragments of 13.5, 10.9, 7.0, and 2.9 kb were also detected.

Inheritance Pattern. Autosomal Mendelian inheritance of the 5.1- and 5.4-kb fragments was observed in 41 pigs from three two- and three-generation reference families (Figure 1).

Frequency. Analysis of 44 unrelated pigs from seven breeds indicated allelic frequencies of .94 and .06 for the 5.1- and 5.4-kb fragments, respectively (Table 1).

Comments. BMP5 is one protein in a three-member family of transforming growth factor B (TGF-β) family of growth and differentiation factors that are most closely related to the bone-inductive molecule BMP-2.

Table 1. Percentage of BMP5 genotypes in several breeds

<table>
<thead>
<tr>
<th>Breed</th>
<th>No.</th>
<th>5.1/5.1</th>
<th>5.1/5.4</th>
<th>5.4/5.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chester White</td>
<td>6</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Duroc</td>
<td>6</td>
<td>67</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Hampshire</td>
<td>9</td>
<td>78</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Landrace</td>
<td>12</td>
<td>92</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Meishan</td>
<td>5</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minzhu</td>
<td>2</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>4</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

5.1 = 5.1-kb BMP5 fragment, 5.4 = 5.4-kb BMP5 fragment.

Figure 1. A Minzhu × Hampshire two-generation family with sire (S), dam (D) and F1 offspring. The monomorphic 2.9-kb fragment is not shown.

Key Words: Pig, Bone Morphogenetic Protein, RFLP


Literature Cited


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