1994

Rapid Communication: SacI Restriction Fragment Length Polymorphism in a Porcine Vascular Cellular Adhesion Molecule (VCAM1) Gene

J. M. Helm
Iowa State University

C. B. Schmitz
Iowa State University

Christopher K. Tuggle
Iowa State University, cktuggle@iastate.edu

Max F. Rothschild
Iowa State University, mfrothsc@iastate.edu

Rapid Communication: SacI Restriction Fragment Length Polymorphism in a Porcine Vascular Cellular Adhesion Molecule (VCAM1) Gene

Abstract

Probe Source and Description. A randomly selected 1.3-kb cDNA clone (S28) was isolated from a porcine spleen library (CLONTECH j. Amplification and hybridization analysis (previously described; Tuggle and Schmitz, 1994) indicated S28 was specifically expressed in spleen. A 504-bp BgZII-BarnHI subclone of S28 was sequenced and identified as a porcine vascular cellular adhesion molecule (VCAM) cDNA fragment with 82, 73, and 72% identity to human, mouse, and rat VCAM1, respectively.

Keywords

Porcine, VCAM1, RFLP

Published December 11, 2014

Rapid Communication: *Sac*I Restriction Fragment Length Polymorphism in a Porcine Vascular Cellular Adhesion Molecule (VCAM1) Gene[1,2]

J. M. Helm, C. B. Schmitz, C. K. Tuggle, and M. F. Rothschild[3]

Department of Animal Science, Iowa State University, Ames 50011-3135

Probe Source and Description. A randomly selected 1.3-kb cDNA clone (S28) was isolated from a porcine spleen library (CLONTECH). Amplification and hybridization analysis (previously described; Tuggle and Schmitz, 1994) indicated S28 was specifically expressed in spleen. A 504-bp *Bgl*II-*Bam*HI subclone of S28 was sequenced and identified as a porcine vascular cellular adhesion molecule (**VCAM**) cDNA fragment with 82, 73, and 72% identity to human, mouse, and rat VCAM1, respectively.

Method of Detection. Swine genomic DNA was isolated from blood, digested with *Sac*I, electrophoresed on agarose gels, and transferred to charged nylon membranes. Blots were hybridized with the radioactively labeled VCAM1 fragment at 65°C in 10% dextran sulfate, 1% SDS, .05 *M* sodium phosphate, 5× Denhardt's, and 100 μg/mL salmon sperm DNA and washed at 65°C with .5× SSC/.1% SDS.

Description of Polymorphism. The described VMAC1 probe detected two fragments, 5.2 kb and 8.5 kb, in *Sac*I genomic DNA digests (Figure 1). Further RFLP analysis revealed a *Taq*I polymorphism and monomorphic patterns with *Xba*I, *Rsa*I, *Pvu*II, *Nco*I, *Stu*I, and *Msp*I.

Inheritance Pattern. Autosomal Mendelian inheritance of these fragments was demonstrated in five Meishan × Duroc, Hampshire, or Landrace three-generation families from the Iowa State University reference population.

Frequency. Animals from five American breeds (Chester White, Duroc, Hampshire, Landrace White, and Yorkshire, n = 54) were all homozygous for the 8.5-kb fragment. The 5.2-kb fragment occurred only in Chinese breeds (Meishan, Minzhu, and Fengjing, n = 34) and the allele frequency of the 5.2-kb fragment was .29. Genotype frequencies for Chinese breeds were as follows: 8.5 kb/8.5 kb, Meishan (.48), Minzhu (.40), and Fengjing (.67); 8.5 kb/5.2 kb, Meishan (.48), Minzhu (.40), and Fengjing (.33); and 5.2 kb/5.2 kb, Meishan (.04) and Minzhu (.20).

Comments. VCAM1 is a member of the immunoglobulin gene family and mediates lymphocyte-specific adhesion. VCAM1 expression is induced by cytokine activation of damaged vascular endothelium (Carlos et al., 1990).

Probe Availability. The porcine VCAM1 probe is available from C. K. Tuggle.

Literature Cited

Carlos, T. M., B. R. Schwartz, N. L. Kovach, E. Yee, M. Rosso, L. Osborn, G. Chi-Rosso, B. Newman, R. Lobb, and J. M. Harlan. 1990. Vascular cell adhesion molecule-1 mediates lymphocyte adherence to cytokine-activated human endothelial cells. Blood 76:965.

Tuggle, C. K., and C. B. Schmitz. 1994. Cloning and characterization of pig muscle cDNAs by an expressed sequence tag approach. Anim. Biotechnol. (In press).

Key Words: Porcine, VCAM1, RFLP

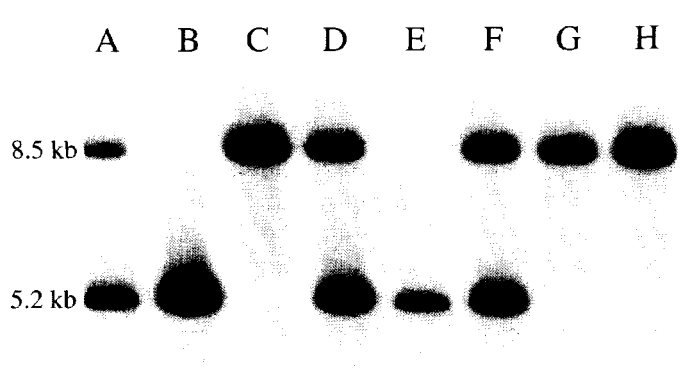

Figure 1. *Sac*I VCAM1 genotypes in offspring produced from a 8.5-kb/5.2-kb × 8.5-kb/5.2-kb F_1 mating. Lanes A, D, and F represent the 8.5-kb/5.2-kb genotype; C, G, and H represent the 8.5-kb/8.5-kb genotype; and B and E represent the 5.2-kb/5.2-kb genotype.

[1]Journal paper no. J-15835 of the Iowa Agric. and Home Econ. Exp. Sta., Ames. Project no. 3083 and 3043.

[2]This project was supported in part by the USDA and the Iowa Pork Producers. The authors thank J. Newton for blood collection, R. Larson and S. Kenealy for DNA isolations and D. Vaske for valuable discussions.

[3]To whom correspondence should be addressed.

Received May 12, 1994.
Accepted July 18, 1994.