Three Types of Polymorphisms in Exon 14 in Porcine Mx1 Gene

Takeya Morozumi[1], Cece Sumantri[2], Emiko Nakajima[1], Eiji Kobayashi[3], Atushi Asano[4], Takao Oishi, Tadayoshi Mitsuhashi[3], Tomomasa Watanabe[4] and Noriyuki Hamasima

(1) The Second Research Division, STAFF Institute, 446-1 Ippaizuka, Kamiyokoba, Tsukuba, Ibaraki, 305-0854, Japan

(2) Laboratory of Animal Breeding and Genetics, Faculty of Animal Science, Bogor Agricultural University, Dramaga Bogor, Indonesia

(3) Department of Animal Breeding and Genetics, National Institute of Animal Industry, Tukuba, Ibaraki, Japan

(4) Laboratory of Experimental Animal Science, Graduate School of Veterinary Medicine, Hokkaido University, Sapporo, Japan

Abstract: Much is known about the antiviral activity of Mx proteins in species such as mouse and human. In the mouse, loss of resistibility to influenza virus has been shown to be due to specific polymorphisms in the *Mx* gene. This gene is therefore an interesting candidate gene for disease resistance in farm animals. The porcine *Mx1* gene has already been identified and characterized based on its homology with mouse *Mx1*; however, until now no evidence of polymorphisms in the porcine gene has been reported. In this study, we have found two new polymorphisms in exon 14 of porcine *Mx1* by DNA sequencing and confirmed their presence in different breeds, using polymerase chain reaction (PCR)–restriction fragment length polymorphisms (RFLP) with NarI and NaeI restriction enzymes. On the basis of the deduced amino acid sequence, one allele contains a deletion that may result in a frameshift to yield several amino acid substitutions and extension of the carboxyl terminal region of Mx1 protein. The deletion allele, *Mx1* ^{c}, was found to be segregating in Landrace, Berkshire, Duroc, Hampshire, and Yucatan miniature pig. A second point mutation, *Mx1* ^{b}, was detected in Meishan and two Vietnamese native pig breeds. All other breeds tested were fixed for the *Mx1* ^{a} allele that is identical to the sequence reported previously. It will be interesting to determine if the *Mx1* ^{c} deletion is associated with variation in resistance to the myxovirus family in the pig.

swine - *Mx1* - PCR–RFLP - polymorphism - exon - sequencing