

## **Polymorphisms in pattern recognition receptors and their relationship to infections in pigs**

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### **Abstract**

Pattern recognition receptors (PRRs), including Toll-like receptors (TLRs), are sensing receptors for molecules derived from bacteria, viruses and fungi. Many cases that polymorphisms in PRR genes affect immune response and disease susceptibility have been known in humans and mice. Nonsynonymous polymorphisms abounded also in porcine TLR genes, particularly in the region corresponding to the ectodomain of TLRs expressed on the cell surface. Intracellular TLRs such as TLR3, TLR7, and TLR8, and other intracellular PRRs, such as peptidoglycan receptor NOD2 and viral RNA receptors RIG-I and MDA5, also possessed nonsynonymous polymorphisms in pigs. Several polymorphisms in PRRs influenced molecular function such as ligand recognition. As for NOD2, two of the SNPs detected affected the ligand recognition; one of the SNPs abrogated the molecular function, while the other increased the response to the ligand. Furthermore, porcine TLR2 molecule with SNP C406G, located in the region corresponding to a leucine-rich repeat in the ectodomain, failed to respond to MALP-2 as well as heat-killed *Mycoplasma hyopneumoniae* (Mhp). These polymorphisms in PRR genes may be related to the disease susceptibility of pigs. In fact, pigs with SNP C406G showed a tendency to contract pneumonia in an Mhp-positive farm. We propose a possibility of pig breeding aiming at disease resistance by selection of alleles in PRR genes that affect pathogen recognition.