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Mapping of Genes Expressed in Activated Porcine Peyer's Patch

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The intestinal tract is the largest interface between an animal and its environment, and is colonized by up to 400 species of commensal bacteria. The gut absorbs nutrients under immunologic tolerance while selectively developing host defenses against enteric pathogens. It has evolved mechanisms which allow it to coexist benignly with resident flora while effectively recognizing and clearing pathogenic microorganisms. Peyer's patches are discrete areas of organized lymphoid tissue with defined B and T lymphocyte areas that are located in the lamina propria and submucosa of the small intestine. Due to its specialized structure, adaptation for antigen sampling, and the induction of immune responses, the jejunal Peyer's patch-containing mucosa is more susceptible to pathogen invasion and uptake and is the ideal intestinal tissue in which to examine the full range of gut-associated lymphoid tissue immune function. To determine chromosomal location for genes expressed in porcine Peyer's patches, PCR-based mapping of ESTs isolated from a porcine Peyer's

patch-specific cDNA library was performed across a 6500 rad swine radiation hybrid panel. Greater than 125 ESTs were mapped with a lod score > 6.0. Of these ESTs, approximately 63% matched known genes (<e-25), 26% matched genes of unknown function, and 11% had no match to sequences in the public mammalian databases. Real-time PCR and microarray analysis confirmed altered regulation of transcripts for the majority of these ESTs. Comparative mapping information for 91% of the unknown ESTs was identified in silico by sequence match to human chromosomes. Mapping of the porcine ESTs validates the unknown and novel sequences identified in our Peyer's patch cDNA libraries. Placement of these ESTs on the porcine map will assist in development of high density and comparative genetic maps for positional cloning and identification of genes responsible for immune function in the gut. This work was supported in part by USDA grants 35204-12665 to M.S.R. and 35205-12840 to M.P.M., and the Univ. of MN, College of Veterinary Medicine to B.S.T.