

Acknowledgment

This study was supported by a grant from the Ministry of Health and Welfare(0405-BC02-0604-0004).

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Received 28 February 2006; revised 16 March 2006, 23 March 2006; accepted: 23 March 2006
 doi: 10.1111/j.1399-0039.2006.00612.x

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New DLA class II alleles and haplotypes identified in an Alaskan husky dog family

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Key words: DLA; dogs; MHC; new alleles

The canine Major Histocompatibility Complex (MHC) plays a central role in immune response. Variation in the class II genes, DLA-DRB1,

Four new DLA alleles were identified in an Alaskan husky Dog family. Two of the alleles are similar to wolf alleles.

DQA1 and DQB1, has been documented in many studies (1, 2). More recently, extensive interbreed but minimal intrabreed variation has been noted (3, 4). The MHC is likely to influence immune mediated diseases, and recent research has shown DLA allele associations with canine rheumatoid arthritis (5) and hypothyroidism (6). Screening new breeds of dogs often reveals new DLA alleles (2).

Routine screening of Alaskan husky dogs, as part of the state outreach science programme, identified a new DLA-DQA1 allele, DQA1*01801, in one animal. We obtained DNA samples from the father and three littermates. The mother was unavailable for testing.

When the family was typed for three DLA class II loci, the new DQA1 allele was found to be on a haplotype with new DRB1 and DQB1 alleles (DRB1*07001 and DQB1*05001), inherited by two of four pups from the father. Interestingly the father also carried a second new DRB1 allele (DRB1*07801), which was inherited by the other two pups. In total the father had four new alleles. Figure 1 shows the haplotypes and their inheritance within the family.

DRB1*07001 is most similar to DRB1*06401 (an allele previously

only found in wolves), with eight amino acid differences. DRB1*07801 is most similar to DRB1*02001 (a commonly found allele in dogs) with six amino acid differences.

DQA1*01801 is most similar to DQA1*01101 and DQA1*01301 (both alleles previously only found in wolves), with one and two amino acid differences, respectively.

DQB1*05001 is most similar to DQB1*01501 (an allele with a wide breed distribution in dogs) with four amino acid differences.

While most dog sled owners actively avoid crossbreeding with wolves, since they have too many characteristics that are undesirable in sled dogs, these data suggest that husky alleles share as much similarity to wolf alleles as to dog alleles.

Accession numbers: DLA-DRB1*07001 (AM075474), DLA-DRB1*07801 (AM075482), DLA-DQA1*01801 (AM182471), DLA-DQB1*05001 (AM182474). Allele names have been officially assigned by the DLA nomenclature committee. Sequence alignments are available from <http://www.ebi.ac.uk/ipd/mhc/dLa/index.html>.

Acknowledgments

This work was supported by grants from the National Science Foundation (0346770) and

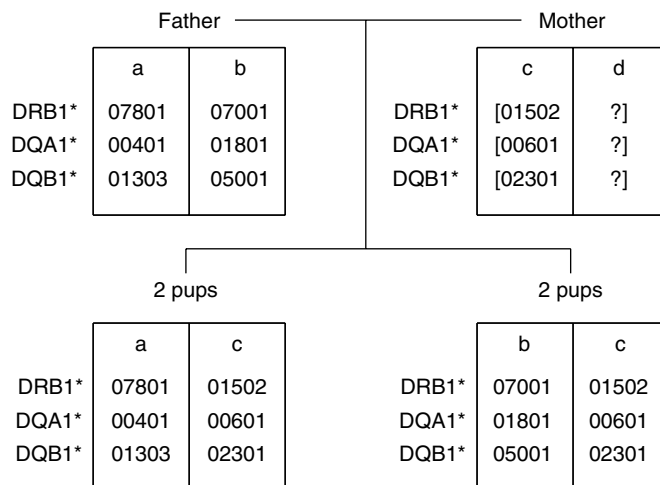


Figure 1 Inheritance of DLA haplotypes in a husky dog family.

the National Institutes of Health (NCRR-2 P20 RR016466).

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Received 31 January 2006; revised 2 March
 2006; accepted 22 March 2006
 doi: 10.1111/j.1399-0039.2006.00610.x

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