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# Analysis of the origin and spread of the domestic dog using Y-chromosome DNA and mtDNA sequence data

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## Akademisk avhandling

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## Abstract

The domestic dog was probably the first domesticated animal, and the only one to spread to all continents in ancient times. The dog is one of the most phenotypically diverse animals, a result of human selection throughout dog history. Studies of the genetic origins and early spread of domestic dogs is important to gather information about biological and cultural mechanisms behind domestication but also to investigate early human history.

The step from a hunter and gatherer lifestyle to farming is one of the most important steps in human history. In this thesis I will present work aimed at understanding both domestic dog origins and dispersal. In order to be able to investigate dog origins based on a second haploid chromosome we identified 14,437 bp of Y-chromosomal DNA sequence. Based on this we show that dogs in Asia south of Yangtze River (ASY) has the highest genetic diversity and was founded from a large number of wolf founders confirming earlier mtDNA results. Early dog dispersal is tightly coupled to human history with the dog brought along as a cultural item. We have for the first time investigated the dog dispersal into Polynesia and Australia and our data can be used as evidence for a more complex settlement of Polynesia than earlier indicated from archaeological and linguistic studies. Analysis of Y-chromosome SNPs in Australian dingoes confirms earlier mtDNA genetic studies that the dingo is part of the domestic dog phylogeny and was founded from a small population of domestic dogs. We have also for the first time investigated the dog population on Madagascar and our data strongly indicates a mainland African origin for the Madagascan dogs. Finally, we have investigated the American dog population sampled from throughout the continent and also for the first time included putative indigenous breed dogs such as Chihuahua and Pero Sín Pelo del Peru, and the free-ranging Carolina dogs from southern USA. Our data clearly indicates a primarily Old World origin for the indigenous breed dogs and also for the free-ranging Carolina dogs in USA. We can also for the first time present evidence for continuity between the ancient and extant dog population with e.g. exclusive sharing of a haplotype between a modern sample of Chihuahua and an ancient Mexican sample.

Keywords: mtDNA, domestication, Y-chromosome, SNP, ASY, dog, dingo

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