

Six Degrees of Lassie: The population genetics of the collie dog

By Felice L. Bedford, Ph.D.

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Recent research on the genetics of dog breeds finds new information pertaining to the origins of our favorite furry friend, the collie.

The collie's closest genetic relative is the Shetland sheepdog. This may come as no surprise to you because the Shetland wears the same luxurious fur coat as the rough collie. However, these types of overlapping traits often turn out to be superficial, arising independently in different breeds that are unrelated to one another. In this case though, the physical resemblance between the dogs turns out to be more than fur deep.

Thirteen additional breeds are found to be in the same genetic clade as the collie. The closest cluster consists of the Australian Shephard, Cardigan and Pembroke Welsh corgis, border collie, kelpie, bearded collie, Australian cattle dog, and the old English sheepdog. This means that every single collie, Shetland, corgi and so on in the world shares a common canine ancestor who lived just a few hundred years ago, much like how you share a great great grandparent from the 1800s with your cousins. A few hundred years is very recent in dog history compared to the initial domestication from wolves more than 10,000 years ago.

Beside perhaps a herding instinct, do breeds of the collie clan have anything else in common from all their shared genetic variants? The more distant members of the UK rural clade (the official name of the collie clan), for example, greyhound, Scottish deerhound and borzoi, are especially thought provoking. Shared genes can produce common behaviors, physical

features, diseases, or just be a silent remnant of common geographic origin. No one has really delved into that question yet for this big 15-member clan. Perhaps the next time you are missing a dose of collie, you can try playing with, say, a Scottish deer hound and see if anything feels familiar. Let me know!

In a presentation of the “Genealogy of Dogs” 60 years ago, before modern genotyping was possible, there was instead said to be three siblings of the collie on the “family tree of 114 dog breeds”, the German Shepard dog (now known to be distant), the briard (also distant) and the old English sheepdog (remains a close cousin), Interestingly though, the German shepherd dog does have a notable relation to the collie; it turns out each is connected to the Australian shepherd. This was found using a type of genetic comparison that I like to call Six Degrees of Lassie, named after the game Six Degrees of Kevin Bacon.

As with the connection to the German Shepard dog, the most interesting findings about the collie from genetic analyses may come from the Six Degrees of Lassie comparisons to breeds from other clades. A lucky collie (or Shetland sheepdog) was a founder of the Nova Scotia duck tolling retriever. Thus, collie’s genes live on in every member of that breed. Could there be a resemblance visible in the photos shown below? In addition, intriguingly, the collie shares a genetic variant with a very new breed of dog, the chinook, and likely the very ancient rare breed, Xoloitzcuintli. The mystery of how gene flow came about has yet to be completely unraveled.

Interested in solving this and other collie capers? DNA tests for dogs are now available commercially just like the popular tests for people that use saliva to discern genetic ancestry. Genetic tests can include autosomal DNA, the majority of DNA inherited from both parents, as well as mitochondrial DNA (mtDNA) that you and

your pup get only from your respective human and canine moms. I have started extending my human mtDNA studies due in large part to my undeniable adoration for the collie.

References and photo credits

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Nova Scotia duck tolling retriever photo by Scottyten, Jan. 1 2005 Reprinted under the [Creative Commons Attribution 3.0 Unported](https://creativecommons.org/licenses/by/3.0/) license.
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