

Japanese Chin Coat Color DNA Study

an update and information page for the owners of Japanese Chin who have contributed DNA brushes to the study

This pdf was prepared in February 2021 from a webpage first mounted on October 21, 2006 and last updated on June 1, 2008 by Sheila Schmutz, PhD

The Study

We are grateful to [Leanne Bertani, M.D.](#) for coordinating the samples, photos, consent forms, etc. for this study conducted on behalf of the Japanese Chin Club of America, who funded the study. We also thank the dogs and their owners who contributed to the study. The dogs donated DNA via cheek brushes, hair clippings and posed for the photographs.

The 11 DNA brushes arrived in Saskatoon at our lab by October, 2006. Two more arrived a few months later. The collection represents a wide variety of coat colors, but as we've discovered, probably not all the possible colors that occur.

Call names that were provided will be used, not the registered names of the dogs. Generic information is posted on this site/document. Specific information was emailed to the owner of a specific dog.

The coat colors listed for Japanese Chin include:

- black & white
- tricolor
- sable and white
- red and white
- lemon and white
- brown and white (not accepted in American showrings)

The major question asked was do both "e/e" clear red and "a^y/-" sable red occur in Japanese Chin? Therefore the first DNA test run was to detect "e/e".



Lilly was the first Chin whose brush arrived. She tested E/e which means her reddish color is of the sable type caused by an a^v allele. Her owners say she has a few black hairs intermingled amongst her red ones, which is another typical feature of sable red dogs. These are not obvious on the photo however.



Elmo, shown above left, is considered lemon whereas YaYa, above right, is considered red. Both tested e/e or clear red. The difference in shade is caused by another gene. **Ruby**, below, is also e/e clear red.



Elmo, YaYa, and Ruby all tested a'/a' at the agouti gene. Why aren't they black-and-tan then? That's because e/e is epistatic or masks any allele at any other locus that causes black hair anywhere on the body.



Tootie, shown on the left, is another Chin that tested e/e or clear red. She is a'/a' and so is actually a sable red too. Although most sables, like Lilly above have a few black hairs, because Tootie is " e/e " these would not occur in her.

BLACK

Baby, below left, is a black dog with white, typically. She tested E/e at *MC1R* and must have one K^B allele and one k^y allele. Although she tested a'/a' , her K^B allele prevents her tan points from showing.



Rudy, above right, is another black and white dog. However he tested E/E at *MC1R* and K^B/K^B . He is a^y/a^y , but again his sable is masked because he has a K^B allele.

BROWN



Marik, above left, is the sire of Czar who is a brown and white pup, above right. Both tested E/e . Marik is therefore a sable red. Czar must have one K^B allele since he is brown, whereas Marik would be k^y/k^y . Marik tested a^y/a^y . Since a^y is dominant to a^l and he is k^y/k^y , his sable coloration is what shows.

Czar tested a^y/a^y , or homozygous for sable but isn't showing sable coloration. That is because he is K^B/k^y and the K^B masks the alleles of the agouti gene.

Czar is the only Japanese Chin in this group that tested b/b at the *TYRP1* locus. Both his b alleles are the b^s allele. His sire, Marik is the only other dog that had a b allele.

The ASIP or A gene



Tink is a black-and-tan dog with white, typically called a tricolor, above left. She tested E/e at *MC1R* and a^t/a^t . She also tested k^y/k^y , as expected, which allows her tan points to show.

Meeego, above right, shows minimal tan markings. This often is the case with dogs with this much white. (this dog didn't contribute DNA to this study, however.)

The Chin in this study all had either a^t or a^y alleles. The a or recessive black allele is typically only in herding breeds, so not surprisingly, was not found in Chin. Because a^y is dominant to a^t , it is not found in dogs with tan markings, also known as –and-tan.

White Spotting

What gene causes the white markings of Japanese Chin? Karlsson et al. (2007) reported that the gene *MITF* caused white markings in some breeds. We therefore expanded this study to include many breeds and indeed the same mutation that causes piebald to extreme white spotting in their report, is present in all Chin. Since this pattern is "fixed" in Chin, i.e. all have it, they also are all s/s .



Links

Dog Coat Color Genetics Main Page

<http://munster.sasktelwebsite.net/DogColor/dogcolorgenetics.html>

Colors of the Japanese Chin Coat Color by Leanne Bertani, Adrienne Wilder, JP Yousha

https://pdf.japanesechinclub.org/simple_document.php?subfolder=&doc=ChinColorStudy2007.pdf#page=1

Japanese Chin Club of America

www.japanesechinonline.org

Japanese Chin Club of Canada

<https://www.japanesechinclubofcanada.com/>

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