

Understanding mismarks

Color oddities (“*mismarks*”) have occurred from time to time and have been well documented throughout the breed history of the purebred Labrador Retriever. Such mismarks have includes black and tan markings, brindling, some white markings and ring-around-the-tail markings. It is unknown as to whether mismarks appear because of recessive genes from generations ago or whether they are the result of a spontaneous mutation.

Although mismarks occur naturally in Labradors, these mismarks are rare. They are not mixed breeds but are 100% Labrador. We at Trinity Labradors feel strongly that mismarks should never be deliberately bred, although we understand that there are plenty of breeders around that would be happy to breed these “rare dogs” to charge a higher price.

Black and Tan Markings

Early breeding records indicate that a Labrador puppy with tan points on the ears, muzzle, and above the eyes would occasionally be whelped to pure-bred Labrador parents. Breeders attributed this to previous interbreeding of Labradors with Gordon Setters during the early history of the breed. Because this trait was considered undesirable as a characteristic of the breed, breeders chose not to breed individuals expressing the trait in hopes of reducing frequency of its expression in future offspring.



Black & Tan

Today, it is recognized that tan points are controlled by the “at” allele of the A locus and that it is recessive to most of the alleles found at the A locus of Labs. Because this allele is recessive, it may be passed through many generations before a breeder is aware that the allele is present. In order for the allele to be expressed, a carrier would have to be bred to another carrier of this same allele and both parents would have to be carriers of the wild-type (E+) Mc1 receptor. This explains the low frequency of expression of this trait in the current Labrador population.

Brindling describes alternating expression of black and red color in the hair throughout the coat. There are several possible causes for this fault that occasionally appears in Labs. One cause may be attributed to the “ebr” allele that controls brindling in many other breeds of dogs. For expression of this trait, both sire and dam would have to carry the mutant “ebr” allele, which is recessive to the “E” allele, but more dominant than the mutant “e” allele for yellow.



Brindling

Alternatively, brindling in Labs may be the result of what geneticists call a *mosaic*. A mosaic indicates differences in the somatic tissue of heterozygotes that come about during mitotic division of somatic cells (recall from above that somatic cells are those that make-up the body). There are two possible ways by which an individual may become a mosaic. The first is called chromosome nondisjunction by which during division into daughter cells, one of the chromosomes fails to separate from its duplicated chromosome. As a result, one daughter cell receives an extra chromosome and the other receives an unpartnered-chromosome.

The second way that a mosaic may be produced is called chromosome loss by which the chromosome containing the dominant allele gets left behind when the daughter cell's nucleus reconstitutes.

In either situation described above, the daughter cells of these altered somatic cells will contain the same alterations. As a result, one will observe a mosaic or brindled pattern of normal color mixed with color produced by the altered somatic cells. This condition has been reported in a Lab showing mosaic black and yellow coat color. When this Lab was bred to other Labs of normal coat colors of black, chocolate, or yellow, it was determined that the variation in color was not due to a mutated E locus allele (like the “ebr” allele) because none of the offspring demonstrated this phenotype. Rather, this coat characteristic was attributed to a chromosomal alteration as described above.



Mosaic

Therefore, the brindling phenotype rarely observed in Labs might be the result of a stable allele mutation (such as the “ebr” allele), or a random somatic chromosome mutation involving the E or B loci.

White Hair Conditions in Labs

First, we want to let you know that white hairs on a Labrador are not all are considered mismarks. Some white is permissible under the AKC standard and is fairly common. The standard says, “A small white spot on the chest is permissible, but no desirable”. The bottom line is that you can show a dog with a white spot on its chest if it is “small”, however, that spot will be penalized to some degree by some judges. A large spot will be penalized by most, and a “blaze” or white front would definitely be penalized and would be considered a mismatch.

There are several conditions that can produce white hair in Labs. Some of these conditions are determined by color genes and others may be caused by environmental factors that effect melanin production. Certainly white hairs and even patches are easily traced throughout the history of the Labrador Retriever.

White Spots

To analyze the reason why some black Labs have only a few white hairs on their chests or undersides, while others have white spots or patches, it is best to first understand that all Labs are white (the condition of having no melanin). The gene loci for color control both the color of the pigment as well as the distribution of melanocytes throughout the body of the Lab. Therefore, in a black Lab, although color is determined by alleles at the B locus, alleles at the A and E loci determine even distribution of the color over the entire surface of the coat. Labs that carry an allele other than “As” at the A locus, have a greater likelihood of expressing more white hairs than those Labs that do carry “As”. Therefore, although all Labs should be homozygous for the S allele at the S gene locus, some may still express white hairs on the chest, bottom of the feet and under the arms and groin areas.



White On Chest

Bolo marks are named after English dual Champion Banchory Bolo, who produced this mark in many of his puppies. The mark often goes away or is hidden by black hairs when the puppy grows up. These marks are not considered a true mismark.



Bolo Mark

Ring around the Tail and Two-Toned Appearance in Black Labs

We hope this article helps in the understanding of mismarks within the Labrador breed. It is the opinion of us at Trinity Labradors that true purebred Labradors with mismarks are extremely rare and should be removed from breeding stock.

Buyer Beware!!

Labrador puppies with odd markings could absolutely be mixed-bred puppies. If you consider a mismarked Labrador please educate yourself and make sure the breeder is someone you trust. Remember, the whole litter will probably NEVER be mismarked. Please don't ever let a breeder convince you that a mismarked puppy is worth more money than the rest of the litter because it is "rare".