

# "KIMBER"

## LABRADOODLES OF MONTANA BLU KIMBER KISSES



DNA Test Report

Test Date: January 30th, 2020

embk.me/labradoodlesofmontanablukimberkis

### BREED MIX



### GENETIC STATS

Predicted adult weight: **23 lbs**

Genetic age: **16 human years**

Based on the date of birth you provided

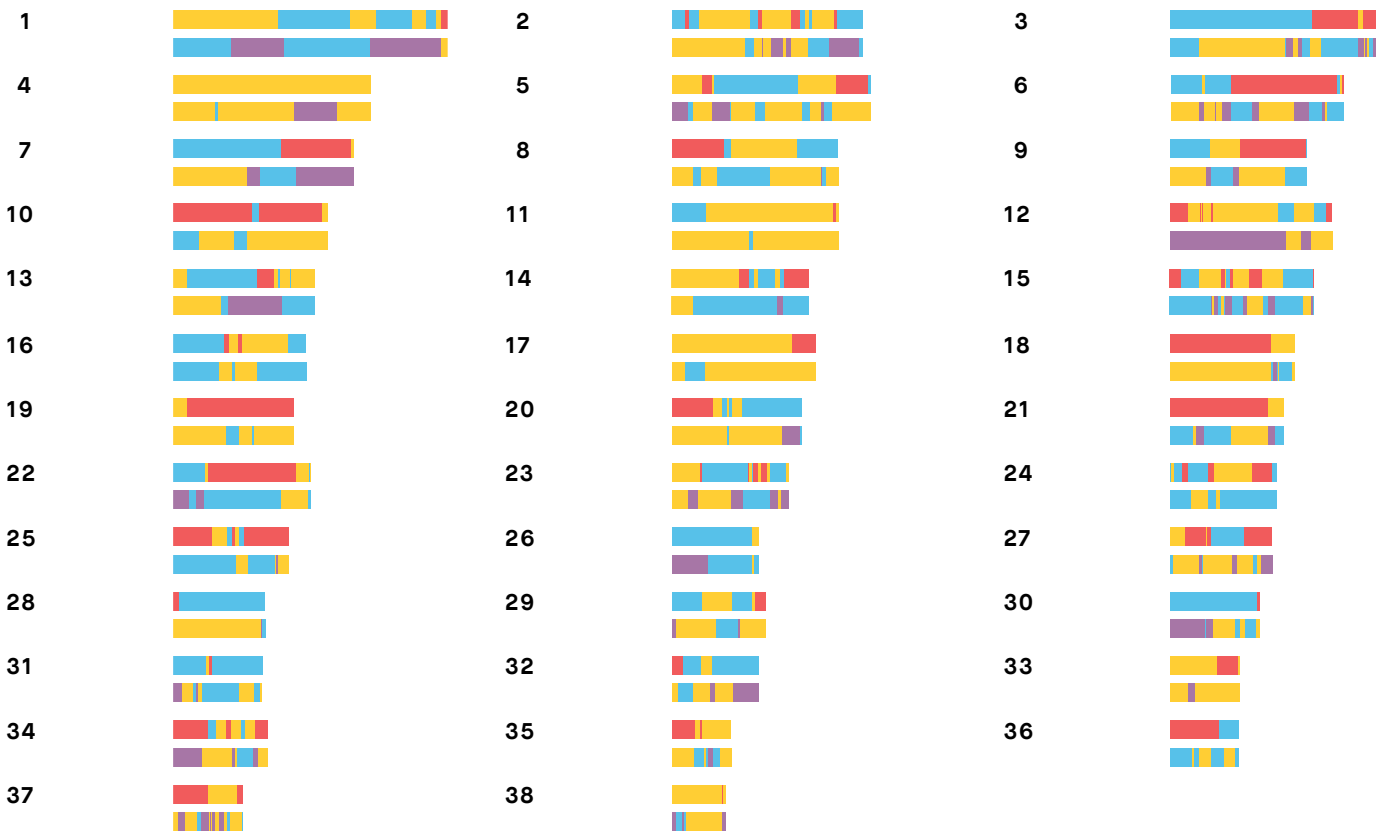
### TEST DETAILS

Kit number: EM-4838180

Swab number: 31001811410489

### BREED MIX BY CHROMOSOME

Our advanced test identifies from where Kimber inherited every part of the chromosome pairs in her genome.



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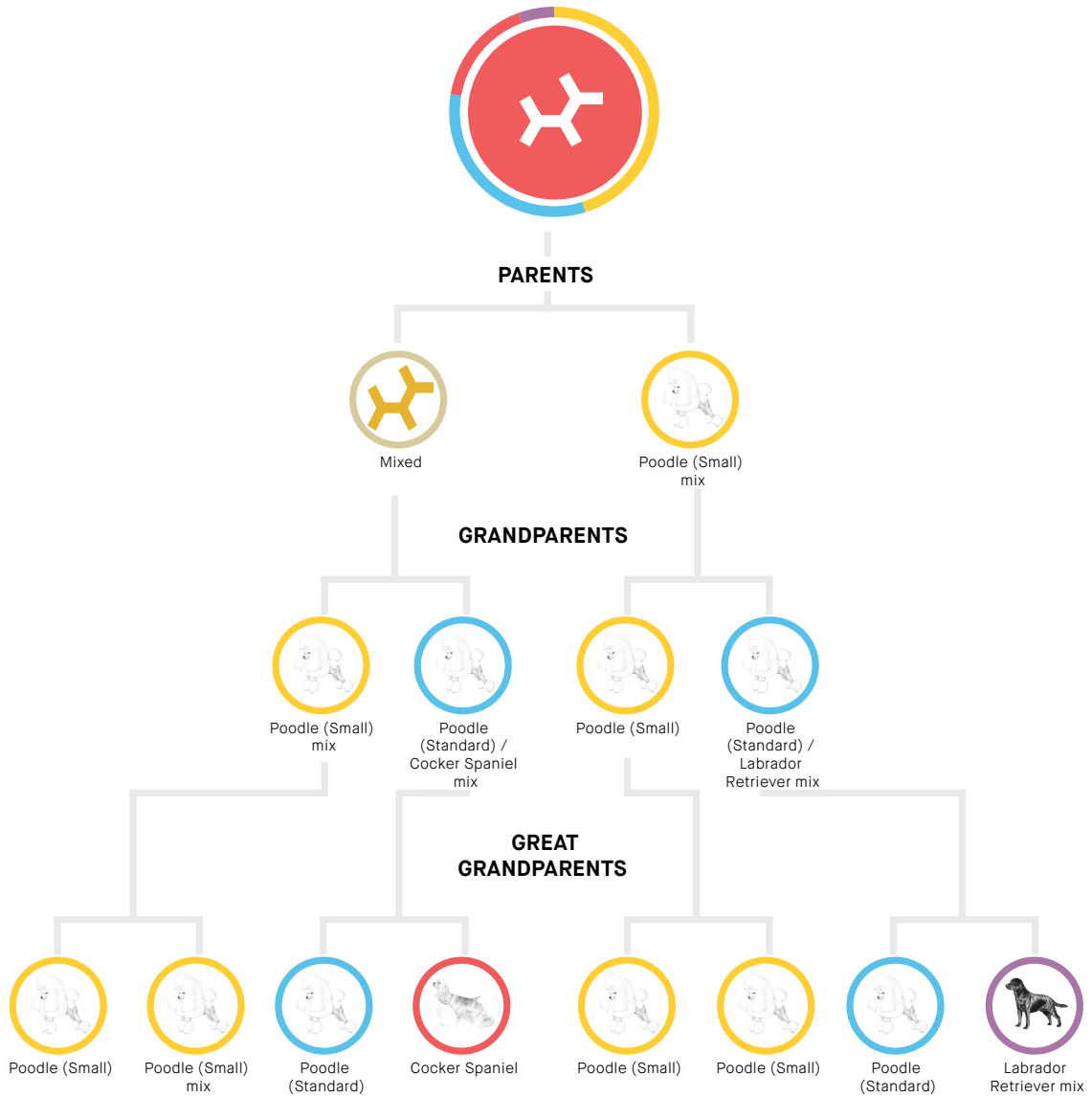


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### FAMILY TREE



Our algorithms predict this is the most likely family tree to explain Kimber's breed mix, but this family tree may not be the only possible one.



### POODLE (SMALL)



Miniature and toy poodles are varieties of the poodle breed which originated in Germany in the 15th century. Unlike the larger standard poodle (>15 inches tall), these small poodles were not developed for hunting---except for truffles!---and were generally used as lap dogs and companions. Small poodles are frequently used to create designer dogs like Schnoodles and Maltipoos with low-shedding, hypoallergenic coats. All poodles are highly intelligent and energetic, and need daily exercise and stimulation. They are overall healthy dogs, although heritable eye disease, epilepsy and allergies are relatively common, and toy poodles also have a heightened risk of accidents/trauma due to their small size.

#### Alternative Names

Toy Poodle, Miniature Poodle

#### Fun Fact

Although Toy Poodles are the most popular dog breed in Japan, Poodles as a group are the eight most popular breed in the US, with miniature poodles being the most common variety.

### RELATED BREEDS



**Poodle**  
(Standard)  
Sibling breed



**Maltese**  
Cousin breed



**Havanese**  
Cousin breed



**Bichon Frise**  
Cousin breed

### POODLE (STANDARD)



The Standard Poodle is a popular, water-loving dog used for centuries as a bird dog and popular pet. Poodles were established in Germany by the 15th century. Oddly enough, they are the national dog breed of France, and they were the most popular breed of dog in the United States throughout the 1960s and 70s. They're still quite popular today, owing to their intelligence, trainability, and non-shedding coats. Although well-known for their fancy fur, they're one of the most intelligent breeds of dog and require a lot of exercise and stimulation.

#### Fun Fact

From 1989 to 1991, John Suter raced a team of Poodles in the Iditarod. Although his teams placed in the back half of the pack, he managed to win \$2,000 in prize money before retiring his poodle team. The Iditarod has since changed its rules to specify that only northern dog breeds can compete.

#### RELATED BREEDS



**Poodle (Toy)**  
Sibling breed



**Poodle (Miniature)**  
Sibling breed



**Maltese**  
Cousin breed

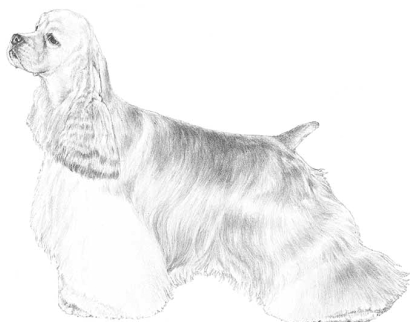


**Havanese**  
Cousin breed



**Bichon Frise**  
Cousin breed

### COCKER SPANIEL



#### Fun Fact

A Cocker Spaniel named Lupo is the pet of the Duke and Duchess of Cambridge, also known as Prince William and Kate Middleton.

A beloved family dog, the popular Cocker Spaniel is a cheerful and merry breed. The Cocker Spaniel derives from the Spaniel family, originating in Spain with references dating back to the 14th century. By the 1800s, Spaniels were split between toy dogs and large hunting dogs. The Cocker Spaniel was named after its excellence in hunting woodcock. Although Spaniels were located in England for hundreds of years, they were not considered an individual breed until 1892 when the English Kennel Club recognized the Cocker Spaniel as an official breed. However, before this, English Cockers were being imported to America and were recognized by the AKC as an official breed in 1887. It was not until 1936 that they gained recognition by the AKC as English Cocker Spaniels, which were bigger than the American-type Cocker Spaniels. In 1938, a motion was passed not to breed the two types of Spaniels, which finally led to the distinction of Cocker Spaniels as their own breed. It may come as a surprise the Cocker Spaniels are sporting dogs, whose ability to adapt to household living may deceive you of their impressive agility and obedience skills. They are strong performers in conformation shows, while also capable of field work, portraying their well-rounded nature. The Cocker Spaniel is a soft and affectionate breed, that appreciates time and attention with the family. It should be noted that although they thrive on human interaction, the Cocker Spaniel's hunting instincts can kick in when out exercising so remember to keep them on a leash in a non-enclosed area. Due to their soft and gentle nature, a Cocker Spaniel can easily become nervous in unknown scenarios or with harsher training methods which can result in barking and sometimes submissive urination (be prepared!). The Cocker Spaniel is a visually impressive breed, whose thick and heavy coat requires constant grooming to prevent knots and tangles developing. It is common for Cocker Spaniels to seek professional assistance in keeping their pooch well groomed. This beloved family dog ranks as the 30th most popular breed.

#### RELATED BREEDS



**English Cocker Spaniel**  
Sibling breed



**Sussex Spaniel**  
Cousin breed

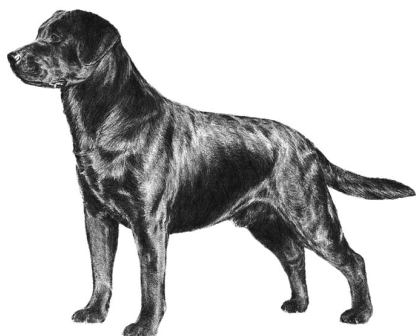


**English Springer Spaniel**  
Cousin breed



**Cavalier King Charles Spaniel**  
Cousin breed

### LABRADOR RETRIEVER



The Labrador Retriever has been the most popular AKC breed in the United States every year for the past 25 years. Their origins have been traced to the St. John's dog, named for the capital city of the Canadian province "Newfoundland and Labrador." The St. John's was developed from imported European dogs for fishing and hunting on the island of Newfoundland in the 18th century. During the 19th century St John's were bred in England and developed into the Labradors we know and love. Labradors were recognized as a breed by the British Kennel Club in 1903 and by the AKC in 1917. With their friendly dispositions and weatherproof build, they are terrific family dogs and outdoor companions. Most Labradors are very active with an appetite to match, and need plenty of exercise. Labradors often love to swim. Their double-coated weather-resistant fur can cause heavy shedding. Great hunting dogs and popular household companions, Labrador Retrievers are also employed as guide dogs and search-and-rescue dogs.

#### Fun Fact

We're pretty sure Labradors came from the island of Newfoundland, and many experts believe that the Newfoundland breed was developed in neighboring Labrador! By our calculations, there are 10 times as many Labradors in North America than there are people living in Labrador and Newfoundland.

#### RELATED BREEDS



**Flat-Coated Retriever**  
Sibling breed



**Golden Retriever**  
Sibling breed



**Chesapeake Bay Retriever**  
Cousin breed



**Newfoundland**  
Cousin breed

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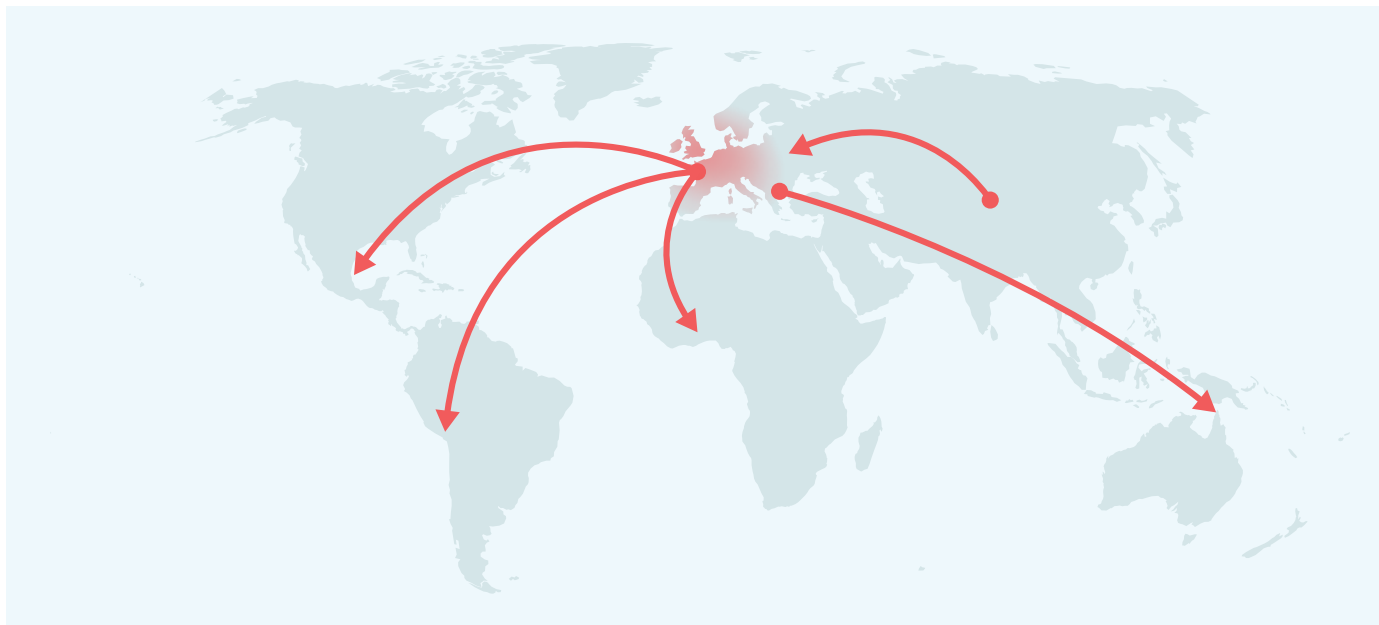


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### MATERNAL LINE



Through Kimber's mitochondrial DNA we can trace her mother's ancestry back to where dogs and people first became friends. This map helps you visualize the routes that her ancestors took to your home. Their story is described below the map.

#### HAPLOGROUP: A1a

A1a is the most common maternal lineage among Western dogs. This lineage traveled from the site of dog domestication in Central Asia to Europe along with an early dog expansion perhaps 10,000 years ago. It hung around in European village dogs for many millennia. Then, about 300 years ago, some of the prized females in the line were chosen as the founding dogs for several dog breeds. That set in motion a huge expansion of this lineage. It's now the maternal lineage of the overwhelming majority of Mastiffs, Labrador Retrievers and Gordon Setters. About half of Boxers and less than half of Shar-Pei dogs descend from the A1a line. It is also common across the world among village dogs, a legacy of European colonialism.

#### HAPLOTYPE: A382

Part of the large A1a haplogroup, this haplotype occurs most frequently in Labrador Retrievers, Golden Retrievers, and Chesapeake Bay Retrievers.

### TRAITS: COAT COLOR

| TRAIT   | RESULT   |
|---|--|
| <b>E Locus (MC1R)</b> <p>The E Locus determines if and where a dog can produce dark (black or brown) hair. Dogs with two copies of the recessive <b>e</b> allele do not produce dark hairs at all, and will be "red" over their entire body. The shade of red, which can range from a deep copper to yellow/gold to cream, is dependent on other genetic factors including the Intensity (I) Locus, which has yet to be genetically mapped. In addition to determining if a dog can develop dark hairs at all, the E Locus can give a dog a black "mask" or "widow's peak," unless the dog has overriding coat color genetic factors. Dogs with one or two copies of the <b>Em</b> allele usually have a melanistic mask (dark facial hair as commonly seen in the German Shepherd and Pug). Dogs with no copies of <b>Em</b> but one or two copies of the <b>Eg</b> allele usually have a melanistic "widow's peak" (dark forehead hair as commonly seen in the Afghan Hound and Borzoi, where it is called either "grizzle" or "domino").</p> | <b>Can have a melanistic mask (E<sup>m</sup>E)</b>   |
| <b>K Locus (CBD103)</b> <p>The K Locus <b>K<sup>B</sup></b> allele "overrides" the A Locus, meaning that it prevents the A Locus genotype from affecting coat color. For this reason, the <b>K<sup>B</sup></b> allele is referred to as the "dominant black" allele. As a result, dogs with at least one <b>K<sup>B</sup></b> allele will usually have solid black or brown coats (or red/cream coats if they are <b>ee</b> at the E Locus) regardless of their genotype at the A Locus, although several other genes could impact the dog's coat and cause other patterns, such as white spotting. Dogs with the <b>k<sup>Y</sup>k<sup>Y</sup></b> genotype will show a coat color pattern based on the genotype they have at the A Locus. Dogs who test as <b>K<sup>B</sup>k<sup>Y</sup></b> may be brindle rather than black or brown.</p>   | <b>More likely to have a mostly solid black or brown coat (K<sup>B</sup>K<sup>B</sup>)</b> |
| <b>A Locus (ASIP)</b> <p>The A Locus controls switching between black and red pigment in hair cells, but it will only be expressed in dogs that are not <b>ee</b> at the E Locus and are <b>k<sup>Y</sup>k<sup>Y</sup></b> at the K Locus. Sable (also called "Fawn") dogs have a mostly or entirely red coat with some interspersed black hairs. Agouti (also called "Wolf Sable") dogs have red hairs with black tips, mostly on their head and back. Black and tan dogs are mostly black or brown with lighter patches on their cheeks, eyebrows, chest, and legs. Recessive black dogs have solid-colored black or brown coats.</p>   | <b>Not expressed (a<sup>t</sup>a<sup>t</sup>)</b>  |



### TRAITS: COAT COLOR (CONTINUED)

| TRAIT   | RESULT  |
|---|---|
| <b>D Locus (MLPH)</b><br><br>Dogs with two copies of the <b>d</b> allele will have all black pigment lightened ("diluted") to gray, or brown pigment lightened to lighter brown in their hair, skin, and sometimes eyes. There are many breed-specific names for these dilute colors, such as "blue", "charcoal", "fawn", "silver", and "Isabella". Note that dilute dogs have a higher incidence of Color Dilution Alopecia, especially in certain breeds. Dogs with one copy of the <b>d</b> allele will not be dilute, but can pass the <b>d</b> allele on to their puppies.   | <b>Dark areas of hair and skin are not lightened (DD)</b> |
| <b>B Locus (TYRP1)</b><br><br>Dogs with two copies of the <b>b</b> allele produce brown pigment instead of black in both their hair and skin. Dogs with one copy of the <b>b</b> allele will produce black pigment, but can pass the <b>b</b> allele on to their puppies. E Locus <b>ee</b> dogs that carry two <b>b</b> alleles will have red or cream coats, but have brown noses, eye rims, and footpads (sometimes referred to as "Dudley Nose" in Labrador Retrievers). "Liver" or "chocolate" is the preferred color term for brown in most breeds; in the Doberman Pinscher it is referred to as "red".                        | <b>Black or gray hair and skin (Bb)</b>                   |
| <b>Saddle Tan (RALY)</b><br><br>The "Saddle Tan" pattern causes the black hairs to recede into a "saddle" shape on the back, leaving a tan face, legs, and belly, as a dog ages. The Saddle Tan pattern is characteristic of breeds like the Corgi, Beagle, and German Shepherd. Dogs that have the <b>II</b> genotype at this locus are more likely to be mostly black with tan points on the eyebrows, muzzle, and legs as commonly seen in the Doberman Pinscher and the Rottweiler. This gene modifies the A Locus <b>a<sup>t</sup></b> allele, so dogs that do not express <b>a<sup>t</sup></b> are not influenced by this gene. | <b>Not expressed (II)</b>                                 |

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### TRAITS: COAT COLOR (CONTINUED)

#### TRAIT

#### RESULT

##### M Locus (PMEL)

Merle coat patterning is common to several dog breeds including the Australian Shepherd, Catahoula Leopard Dog, and Shetland Sheepdog, among many others. Merle arises from an unstable SINE insertion (which we term the "M\*" allele) that disrupts activity of the pigmentary gene PMEL, leading to mottled or patchy coat color. Dogs with an **M\*m** result are likely to be phenotypically merle or could be "phantom" merle, that is, they have a merle allele that does not affect coat color. Dogs with an **M\*M\*** result are likely to be phenotypically merle or double merle. Dogs with an **mm** result have no merle alleles and are unlikely to have a merle coat pattern.

Note that Embark does not currently distinguish between the recently described cryptic, atypical, atypical+, classic, and harlequin merle alleles. Our merle test only detects the presence, but not the length of the SINE insertion. We do not recommend making breeding decisions on this result alone. Please pursue further testing for allelic distinction prior to breeding decisions.

**One merle allele, likely to appear merle or "phantom merle" (M\*m)**

**Note:** This locus includes several alleles. At the time this dog was genotyped Embark we could not distinguish all of the possible alleles.

### TRAITS: OTHER COAT TRAITS

| TRAIT   | RESULT  |
|---|---|
| <b>Furnishings (RSPO2) LINKAGE</b>  |   |
| Dogs with one or two copies of the <b>F</b> allele have "furnishings": the mustache, beard, and eyebrows characteristic of breeds like the Schnauzer, Scottish Terrier, and Wire Haired Dachshund. A dog with two <b>I</b> alleles will not have furnishings, which is sometimes called an "improper coat" in breeds where furnishings are part of the breed standard. The mutation is a genetic insertion which we measure indirectly using a linkage test highly correlated with the insertion.                                 | <b>Likely furnished (mustache, beard, and/or eyebrows) (FF)</b> |
| <b>Coat Length (FGF5)</b>   |   |
| The FGF5 gene is known to affect hair length in many different species, including cats, dogs, mice, and humans. In dogs, the <b>T</b> allele confers a long, silky haircoat as observed in the Yorkshire Terrier and the Long Haired Whippet. The ancestral <b>G</b> allele causes a shorter coat as seen in the Boxer or the American Staffordshire Terrier. In certain breeds (such as Corgi), the long haircoat is described as "fluff."   | <b>Likely long coat (TT)</b>                                    |
| <b>Shedding (MC5R)</b>  |   |
| Dogs with at least one copy of the ancestral <b>C</b> allele, like many Labradors and German Shepherd Dogs, are heavy or seasonal shedders, while those with two copies of the <b>T</b> allele, including many Boxers, Shih Tzus and Chihuahuas, tend to be lighter shedders. Dogs with furnished/wire-haired coats caused by RSPO2 (the furnishings gene) tend to be low shedders regardless of their genotype at this gene.   | <b>Likely light shedding (CT)</b>                               |
| <b>Coat Texture (KRT71)</b>   |   |
| Dogs with a long coat and at least one copy of the <b>T</b> allele have a wavy or curly coat characteristic of Poodles and Bichon Frises. Dogs with two copies of the ancestral <b>C</b> allele are likely to have a straight coat, but there are other factors that can cause a curly coat, for example if they at least one <b>F</b> allele for the Furnishings (RSPO2) gene then they are likely to have a curly coat. Dogs with short coats may carry one or two copies of the <b>T</b> allele but still have straight coats. | <b>Likely curly coat (TT)</b>                                   |
| <b>Hairlessness (SGK3)</b>  |   |
| Hairlessness in the American Hairless Terrier arises from a mutation in the SGK3 gene. Dogs with the <b>ND</b> genotype are likely to be hairless while dogs with the <b>NN</b> genotype are likely to have a normal coat.  | <b>Very unlikely to be hairless (NN)</b>                        |

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### TRAITS: OTHER COAT TRAITS (CONTINUED)

| TRAIT   | RESULT                                   |
|---|--|
| <b>Hairlessness (FOXI3) LINKAGE</b>   |  |
| <p>A duplication in the FOXI3 gene causes hairlessness over most of the body as well as changes in tooth shape and number. This mutation occurs in Peruvian Inca Orchid, Xoloitzcuintli (Mexican Hairless), and Chinese Crested (other hairless breeds have different mutations). Dogs with the <b>NDup</b> genotype are likely to be hairless while dogs with the <b>NN</b> genotype are likely to have a normal coat. The <b>DupDup</b> genotype has never been observed, suggesting that dogs with that genotype cannot survive to birth. Please note that this is a linkage test, so it may not be as predictive as direct tests of the mutation in some lines.</p>   | <b>Very unlikely to be hairless (NN)</b> |
| <b>Oculocutaneous Albinism Type 2 (SLC45A2) LINKAGE</b>   |  |
| <p>Dogs with two copies <b>DD</b> of this deletion in the SLC45A2 gene have oculocutaneous albinism type 2 (OCA2), also known as Doberman Z Factor Albinism, a recessive condition characterized by severely reduced or absent pigment in the eyes, skin, and hair. Affected dogs sometimes suffer from vision problems due to lack of eye pigment (which helps direct and absorb ambient light) and are prone to sunburn. Dogs with a single copy of the deletion <b>ND</b> will not be affected but can pass the mutation on to their offspring. This particular mutation can be traced back to a single white Doberman Pinscher born in 1976, and it has only been observed in dogs descended from this individual. Please note that this is a linkage test, so it may not be as predictive as direct tests of the mutation in some lines.</p> | <b>Likely not albino (NN)</b>            |

### TRAITS: OTHER BODY FEATURES

| TRAIT   | RESULT                                      |
|---|---|
| <b>Muzzle Length (BMP3)</b><br><br>Dogs in medium-length muzzle (mesocephalic) breeds like Staffordshire Terriers and Labradors, and long muzzle (dolichocephalic) breeds like Whippet and Collie have one, or more commonly two, copies of the ancestral <b>C</b> allele. Dogs in many short-length muzzle (brachycephalic) breeds such as the English Bulldog, Pug, and Pekingese have two copies of the derived <b>A</b> allele. At least five different genes affect muzzle length in dogs, with BMP3 being the only one with a known causal mutation. For example, the skull shape of some breeds, including the dolichocephalic Scottish Terrier or the brachycephalic Japanese Chin, appear to be caused by other genes. Thus, dogs may have short or long muzzles due to other genetic factors that are not yet known to science.   | <b>Likely medium or long muzzle (CC)</b>    |
| <b>Tail Length (T)</b><br><br>Whereas most dogs have two <b>C</b> alleles and a long tail, dogs with one <b>G</b> allele are likely to have a bobtail, which is an unusually short or absent tail. This mutation causes natural bobtail in many breeds including the Pembroke Welsh Corgi, the Australian Shepherd, and the Brittany Spaniel. Dogs with <b>GG</b> genotypes have not been observed, suggesting that dogs with the <b>GG</b> genotype do not survive to birth. Please note that this mutation does not explain every natural bobtail! While certain lineages of Boston Terrier, English Bulldog, Rottweiler, Miniature Schnauzer, Cavalier King Charles Spaniel, and Parson Russell Terrier, and Dobermans are born with a natural bobtail, these breeds do not have this mutation. This suggests that other unknown genetic mutations can also lead to a natural bobtail. | <b>Likely normal-length tail (CC)</b>       |
| <b>Hind Dewclaws (LMBR1)</b><br><br>Common in certain breeds such as the Saint Bernard, hind dewclaws are extra, nonfunctional digits located midway between a dog's paw and hock. Dogs with at least one copy of the <b>T</b> allele have about a 50% chance of having hind dewclaws. Note that other (currently unknown to science) mutations can also cause hind dewclaws, so some <b>TT</b> or <b>TC</b> dogs will have hind dewclaws.  | <b>Unlikely to have hind dew claws (CC)</b> |

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### TRAITS: OTHER BODY FEATURES (CONTINUED)

| TRAIT  | RESULT   |
|--|--|
| <p><b>Blue Eye Color (ALX4) LINKAGE</b></p> <p>Embark researchers discovered this large duplication associated with blue eyes in Arctic breeds like Siberian Husky as well as tri-colored (non-merle) Australian Shepherds. Dogs with at least one copy of the duplication (<b>Dup</b>) are more likely to have at least one blue eye. Some dogs with the duplication may have only one blue eye (complete heterochromia) or may not have blue eyes at all; nevertheless, they can still pass the duplication and the trait to their offspring. <b>NN</b> dogs do not carry this duplication, but may have blue eyes due to other factors, such as merle. Please note that this is a linkage test, so it may not be as predictive as direct tests of the mutation in some lines.</p> | <p><b>Less likely to have blue eyes (NN)</b></p> |
| <p><b>Back Muscling &amp; Bulk, Large Breed (ACSL4)</b></p> <p>The <b>T</b> allele is associated with heavy muscling along the back and trunk in characteristically "bulky" large-breed dogs including the Saint Bernard, Bernese Mountain Dog, Greater Swiss Mountain Dog, and Rottweiler. The "bulky" <b>T</b> allele is absent from leaner shaped large breed dogs like the Great Dane, Irish Wolfhound, and Scottish Deerhound, which are fixed for the ancestral <b>C</b> allele. Note that this mutation does not seem to affect muscling in small or even mid-sized dog breeds with notable back muscling, including the American Staffordshire Terrier, Boston Terrier, and the English Bulldog.</p>   | <p><b>Likely normal muscling (CC)</b></p>        |

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### TRAITS: BODY SIZE

| TRAIT  | RESULT                   |
|--|--------------------------|
| <b>Body Size (IGF1)</b><br>The I allele is associated with smaller body size.        | <b>Smaller (II)</b>      |
| <b>Body Size (IGFR1)</b><br>The A allele is associated with smaller body size.       | <b>Larger (GG)</b>       |
| <b>Body Size (STC2)</b><br>The A allele is associated with smaller body size.        | <b>Smaller (AA)</b>      |
| <b>Body Size (GHR - E191K)</b><br>The A allele is associated with smaller body size. | <b>Intermediate (GA)</b> |
| <b>Body Size (GHR - P177L)</b><br>The T allele is associated with smaller body size. | <b>Larger (CC)</b>       |

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### TRAITS: PERFORMANCE

#### TRAIT

#### RESULT

##### Altitude Adaptation (EPAS1)

This mutation causes dogs to be especially tolerant of low oxygen environments (hypoxia), such as those found at high elevations. Dogs with at least one **A** allele are less susceptible to "altitude sickness." This mutation was originally identified in breeds from high altitude areas such as the Tibetan Mastiff.

**Normal altitude tolerance (GG)**

##### Appetite (POMC) LINKAGE

This mutation in the POMC gene is found primarily in Labrador and Flat Coated Retrievers. Compared to dogs with no copies of the mutation (**NN**), dogs with one (**ND**) or two (**DD**) copies of the mutation are more likely to have high food motivation, which can cause them to eat excessively, have higher body fat percentage, and be more prone to obesity. Read more about the genetics of POMC, and learn how you can contribute to research, in our blog post ([embarkvet.com/resources/blog/pomc-dogs](http://embarkvet.com/resources/blog/pomc-dogs)). We measure this result using a linkage test.

**Normal food motivation (NN)**



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### TRAITS: GENETIC DIVERSITY

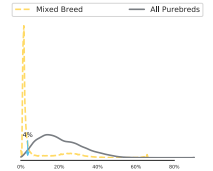
#### TRAIT

#### RESULT

##### Coefficient Of Inbreeding

Our genetic COI measures the proportion of your dog's genome where the genes on the mother's side are identical by descent to those on the father's side.

4%

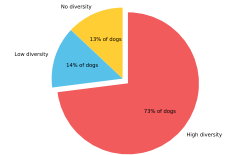


##### MHC Class II - DLA DRB1

A Dog Leukocyte Antigen (DLA) gene, DRB1 encodes a major histocompatibility complex (MHC) protein involved in the immune response. Some studies have shown associations between certain DRB1 haplotypes and autoimmune diseases such as Addison's disease (hypoadrenocorticism) in certain dog breeds, but these findings have yet to be scientifically validated.

#### High Diversity

How common is this amount of diversity in mixed breed dogs:

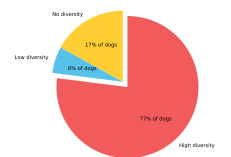


##### MHC Class II - DLA DQA1 and DQB1

DQA1 and DQB1 are two tightly linked DLA genes that code for MHC proteins involved in the immune response. A number of studies have shown correlations of DQA-DQB1 haplotypes and certain autoimmune diseases; however, these have not yet been scientifically validated.

#### High Diversity

How common is this amount of diversity in mixed breed dogs:



# "KIMBER"

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### CLINICAL TOOLS

These clinical genetic traits can inform clinical decisions and diagnoses. These traits do not predict a disease state or increased risk for disease. We currently assess one clinical tool: Alanine Aminotransferase Activity.

#### **Alanine Aminotransferase Activity result: Low Normal**

Labradoodles of Montana Blu Kimber Kisses has one copy of a variant associated with reduced ALT activity as measured on veterinary blood chemistry panels. Please inform your veterinarian that Labradoodles of Montana Blu Kimber Kisses has this genotype, as ALT is often used as an indicator of liver health and Labradoodles of Montana Blu Kimber Kisses is likely to have a lower than average resting ALT activity. As such, an increase in Labradoodles of Montana Blu Kimber Kisses's ALT activity could be evidence of liver damage, even if it is within normal limits by standard ALT reference ranges.

#### More information on Alanine Aminotransferase Activity:

The liver enzyme alanine aminotransferase, or ALT, is one of several values your veterinarian measures on routine blood work to gauge liver health. Dogs with one or more copies of the "A" allele are likely to have a lower baseline ALT activity ("low normal") than dogs with zero copies of the "A" allele ("normal"). This means that your veterinarian may recommend blood work to establish an individualized baseline ALT value during an annual wellness exam or before starting certain medications. You and your veterinarian would then be able to monitor your dog for any deviation from this established baseline. Please note that this mutation should never cause an increase in your dog's ALT activity and does not cause liver disease. If your dog has high ALT activity, please consult your veterinarian.

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### HEALTH

Good news! Kimber did not test positive for any of the genetic conditions that Embark screens for.

0

AT RISK

0

CARRIER

### OTHER CONDITIONS

Good news! Kimber tested clear for 27 genetic conditions that are common in her breed mix.

- Von Willebrand Disease Type I (VWF)
- Canine Elliptocytosis (SPTB Exon 30)
- Progressive Retinal Atrophy, prcd  
Progressive rod-cone degeneration (PRCD Exon 1)
- Progressive Retinal Atrophy - crd4/cord1 (RPGRIP1)
- Macular Corneal Dystrophy, MCD (CHST6)
- Autosomal Recessive Hereditary Nephropathy, Familial Nephropathy, ARHN (COL4A4 Exon 3)
- GM2 Gangliosidosis (HEXB, Poodle Variant)
- Degenerative Myelopathy, DM (SOD1A)
- Narcolepsy (HCRTR2 Intron 6)
- Centronuclear Myopathy (PTPLA)
- Myotubular Myopathy 1, X-linked Myotubular Myopathy, XL-MTM (MTM1, Labrador Variant)
- Oculoskeletal Dysplasia 1, Dwarfism-Retinal Dysplasia, OSD1 (COL9A3, Labrador Retriever)
- Chondrodystrophy and Intervertebral Disc Disease, CDDY/IVDD, Type I IVDD (FGF4 retrogene - CFA12)
- Congenital Macrothrombocytopenia (TUBB1 Exon 1, Cavalier King Charles Spaniel Variant)
- Pyruvate Kinase Deficiency (PKLR Exon 7 Labrador Variant)
- Golden Retriever Progressive Retinal Atrophy 2, GR-PRA2 (TTC8)
- Achromatopsia (CNGA3 Exon 7 Labrador Retriever Variant)
- Hyperuricosuria and Hyperuricemia or Urolithiasis, HUU (SLC2A9)
- Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM Whippet and English Springer Spaniel Variant)
- Alexander Disease (GFAP)
- Neonatal Encephalopathy with Seizures, NEWS (ATF2)
- Hereditary Sensory Autonomic Neuropathy, Acral Mutilation Syndrome, AMS (GDNF-AS)
- Exercise-Induced Collapse (DNM1)
- Congenital Myasthenic Syndrome (COLQ)
- Hereditary Nasal Parakeratosis (SUV39H2)
- Osteochondrodysplasia, Skeletal Dwarfism (SLC13A1)
- Skeletal Dysplasia 2, SD2 (COL11A2)

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### FULL TEST PANEL

Kimber is also clear of 154 other genetic health conditions that Embark tests for.

To help ensure healthy breeds, every test includes analysis of our full panel of over 160 genetic health conditions.

The following pages list out all the other genetic health conditions that Kimber tested clear for.

### CLEAR CONDITIONS

- MDR1 Drug Sensitivity (MDR1) (Chromosome 14)
- P2Y12 Receptor Platelet Disorder (P2RY12) (Chromosome 23)
- Factor IX Deficiency, Hemophilia B (F9 Exon 7, Terrier Variant) (Chromosome X)
- Factor IX Deficiency, Hemophilia B (F9 Exon 7, Rhodesian Ridgeback Variant) (Chromosome X)
- Factor VII Deficiency (F7 Exon 5) (Chromosome 22)
- Factor VIII Deficiency, Hemophilia A (F8 Exon 10, Boxer Variant) (Chromosome X)
- Factor VIII Deficiency, Hemophilia A (F8 Exon 11, Shepherd Variant 1) (Chromosome X)
- Factor VIII Deficiency, Hemophilia A (F8 Exon 1, Shepherd Variant 2) (Chromosome X)
- Thrombopathia (RASGRP2 Exon 5, Basset Hound Variant) (Chromosome 18)
- Thrombopathia (RASGRP2 Exon 8) (Chromosome 18)
- Thrombopathia (RASGRP2 Exon 5, American Eskimo Dog Variant) (Chromosome 18)
- Von Willebrand Disease Type III, Type III vWD (VWF Exon 4) (Chromosome 27)
- Von Willebrand Disease Type II, Type II vWD (VWF) (Chromosome 27)
- Canine Leukocyte Adhesion Deficiency Type III, LAD3 (FERMT3) (Chromosome 18)
- Glanzmann's Thrombasthenia Type I (ITGA2B Exon 12) (Chromosome 9)
- May-Hegglin Anomaly (MYH9) (Chromosome 10)
- Prekallikrein Deficiency (KLKB1 Exon 8) (Chromosome 16)
- Pyruvate Kinase Deficiency (PKLR Exon 5) (Chromosome 7)
- Pyruvate Kinase Deficiency (PKLR Exon 7 Pug Variant) (Chromosome 7)
- Pyruvate Kinase Deficiency (PKLR Exon 7 Beagle Variant) (Chromosome 7)
- Pyruvate Kinase Deficiency (PKLR Exon 10) (Chromosome 7)
- Trapped Neutrophil Syndrome (VPS13B) (Chromosome 13)
- Ligneous Membranitis, LM (PLG) (Chromosome 1)
- Platelet factor X receptor deficiency, Scott Syndrome (TMEM16F) (Chromosome 27)
- Methemoglobinemia CYB5R3 (Chromosome 10)
- Congenital Hypothyroidism (TPO, Tenterfield Terrier Variant) (Chromosome 17)
- Complement 3 Deficiency, C3 Deficiency (C3) (Chromosome 20)
- Severe Combined Immunodeficiency (PRKDC) (Chromosome 29)
- Severe Combined Immunodeficiency (RAG1) (Chromosome 18)
- X-linked Severe Combined Immunodeficiency (IL2RG Variant 1) (Chromosome X)
- X-linked Severe Combined Immunodeficiency (IL2RG Variant 2) (Chromosome X)
- Progressive Retinal Atrophy, rcd1 Rod-cone dysplasia, rcd1 (PDE6B Exon 21 Irish Setter Variant) (Chromosome 3)
- Progressive Retinal Atrophy, rcd3 Rod-cone dysplasia, rcd3 (PDE6A) (Chromosome 4)
- Progressive Retinal Atrophy, CNGA (CNGA1 Exon 9) (Chromosome 13)
- Progressive Retinal Atrophy (CNGB1) (Chromosome 2)
- Progressive Retinal Atrophy (SAG) (Chromosome 25)
- Golden Retriever Progressive Retinal Atrophy 1, GR-PRA1 (SLC4A3) (Chromosome 37)
- Progressive Retinal Atrophy, crd1 (PDE6B) (Chromosome 3)

### CLEAR CONDITIONS

- Progressive Retinal Atrophy, crd2 (IQCB1) (Chromosome 33)
- Collie Eye Anomaly, Choroidal Hypoplasia, CEA (NHEJ1) (Chromosome 37)
- Achromatopsia (CNGA3 Exon 7 German Shepherd Variant) (Chromosome 10)
- Autosomal Dominant Progressive Retinal Atrophy (RHO) (Chromosome 20)
- Canine Multifocal Retinopathy cmr1 (BEST1 Exon 2) (Chromosome 18)
- Canine Multifocal Retinopathy cmr2 (BEST1 Exon 5) (Chromosome 18)
- Canine Multifocal Retinopathy cmr3 (BEST1 Exon 10 Deletion) (Chromosome 18)
- Canine Multifocal Retinopathy cmr3 (BEST1 Exon 10 SNP) (Chromosome 18)
- Glaucoma Primary Open Angle Glaucoma (ADAMTS10 Exon 9) (Chromosome 20)
- Glaucoma Primary Open Angle Glaucoma (ADAMTS10 Exon 17) (Chromosome 20)
- Glaucoma Primary Open Angle Glaucoma (ADAMTS17 Exon 11) (Chromosome 3)
- Glaucoma Primary Open Angle Glaucoma (ADAMTS17 Exon 2) (Chromosome 3)
- Hereditary Cataracts, Early-Onset Cataracts, Juvenile Cataracts (HSF4 Exon 9 Shepherd Variant) (Chromosome 5)
- Primary Lens Luxation (ADAMTS17) (Chromosome 3)
- Congenital Stationary Night Blindness (RPE65) (Chromosome 6)
- 2,8-Dihydroxyadenine Urolithiasis, 2,8-DHA Urolithiasis (APRT) (Chromosome 5)
- Cystinuria Type I-A (SLC3A1) (Chromosome 10)
- Cystinuria Type II-A (SLC3A1) (Chromosome 10)
- Cystinuria Type II-B (SLC7A9) (Chromosome 1)
- Polycystic Kidney Disease, PKD (PKD1) (Chromosome 6)
- Primary Hyperoxaluria (AGXT) (Chromosome 25)
- Protein Losing Nephropathy, PLN (NPHS1) (Chromosome 1)
- X-Linked Hereditary Nephropathy, XLHN (COL4A5 Exon 35, Samoyed Variant 2) (Chromosome X)
- Primary Ciliary Dyskinesia, PCD (CCDC39 Exon 3) (Chromosome 34)
- Congenital Keratoconjunctivitis Sicca and Ichthyosiform Dermatitis, Dry Eye Curly Coat Syndrome, CKCSID (FAM83H Exon 5) (Chromosome 13)
- X-linked Ectodermal Dysplasia, Anhidrotic Ectodermal Dysplasia (EDA Intron 8) (Chromosome X)
- Renal Cystadenocarcinoma and Nodular Dermatofibrosis, RCND (FLCN Exon 7) (Chromosome 5)
- Canine Fucosidosis (FUCA1) (Chromosome 2)
- Glycogen Storage Disease Type II, Pompe's Disease, GSD II (GAA) (Chromosome 9)
- Glycogen Storage Disease Type IA, Von Gierke Disease, GSD IA (G6PC) (Chromosome 9)
- Glycogen Storage Disease Type IIIA, GSD IIIA (AGL) (Chromosome 6)
- Mucopolysaccharidosis Type I, MPS I (IDUA) (Chromosome 3)
- Mucopolysaccharidosis Type IIIA, Sanfilippo Syndrome Type A, MPS IIIA (SGSH Exon 6 Variant 1) (Chromosome 9)
- Mucopolysaccharidosis Type IIIA, Sanfilippo Syndrome Type A, MPS IIIA (SGSH Exon 6 Variant 2) (Chromosome 9)
- Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 5) (Chromosome 6)
- Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 3) (Chromosome 6)
- Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM Wachtelhund Variant) (Chromosome 27)
- Lagotto Storage Disease (ATG4D) (Chromosome 20)

### CLEAR CONDITIONS

- Neuronal Ceroid Lipofuscinosis 1, NCL 1 (PPT1 Exon 8) (Chromosome 15)
- Neuronal Ceroid Lipofuscinosis 2, NCL 2 (TPP1 Exon 4) (Chromosome 21)
- Neuronal Ceroid Lipofuscinosis 1, Cerebellar Ataxia, NCL-A (ARSG Exon 2) (Chromosome 9)
- Neuronal Ceroid Lipofuscinosis 1, NCL 1 (CLN5 Border Collie Variant) (Chromosome 22)
- Neuronal Ceroid Lipofuscinosis 6, NCL 6 (CLN6 Exon 7) (Chromosome 30)
- Neuronal Ceroid Lipofuscinosis 8, NCL 8 (CLN8 English Setter Variant) (Chromosome 37)
- Neuronal Ceroid Lipofuscinosis (MFSD8) (Chromosome 19)
- Neuronal Ceroid Lipofuscinosis (CLN8 Australian Shepherd Variant) (Chromosome 37)
- Neuronal Ceroid Lipofuscinosis 10, NCL 10 (CTSD Exon 5) (Chromosome 18)
- Neuronal Ceroid Lipofuscinosis (CLN5 Golden Retriever Variant) (Chromosome 22)
- Adult-Onset Neuronal Ceroid Lipofuscinosis (ATP13A2, Tibetan Terrier Variant) (Chromosome 2)
- Late Onset Neuronal Ceroid Lipofuscinosis (ATP13A2, Australian Cattle Dog Variant) (Chromosome 2)
- GM1 Gangliosidosis (GLB1 Exon 15 Shiba Inu Variant) (Chromosome 23)
- GM1 Gangliosidosis (GLB1 Exon 15 Alaskan Husky Variant) (Chromosome 23)
- GM1 Gangliosidosis (GLB1 Exon 2) (Chromosome 23)
- GM2 Gangliosidosis (HEXA) (Chromosome 30)
- Globoid Cell Leukodystrophy, Krabbe disease (GALC Exon 5) (Chromosome 8)
- Autosomal Recessive Amelogenesis Imperfecta, Familial Enamel Hypoplasia (Italian Greyhound Variant) (Chromosome 13)
- Autosomal Recessive Amelogenesis Imperfecta, Familial Enamel Hypoplasia (Parson Russell Terrier Variant) (Chromosome 13)
- Persistent Mullerian Duct Syndrome, PMDS (AMHR2) (Chromosome 27)
- Deafness and Vestibular Syndrome of Dobermans, DVDob, DINGS (MYO7A) (Chromosome 21)
- Shar-Pei Autoinflammatory Disease, SPAID, Shar-Pei Fever (MTBP) (Chromosome 13)
- Alaskan Husky Encephalopathy, Subacute Necrotizing Encephalomyelopathy (SLC19A3) (Chromosome 25)
- Cerebellar Abiotrophy, Neonatal Cerebellar Cortical Degeneration, NCCD (SPTBN2) (Chromosome 18)
- Cerebellar Ataxia, Progressive Early-Onset Cerebellar Ataxia (SEL1L) (Chromosome 8)
- Cerebellar Hypoplasia (VLDLR) (Chromosome 1)
- Spinocerebellar Ataxia, Late-Onset Ataxia, LoSCA (CAPN1) (Chromosome 18)
- Spinocerebellar Ataxia with Myokymia and/or Seizures (KCNJ10) (Chromosome 38)
- Benign Familial Juvenile Epilepsy, Remitting Focal Epilepsy (LGI2) (Chromosome 3)
- Fetal-Onset Neonatal Neuroaxonal Dystrophy (MFN2) (Chromosome 2)
- Hypomyelination and Tremors (FNIP2) (Chromosome 15)
- Shaking Puppy Syndrome, X-linked Generalized Tremor Syndrome (PLP) (Chromosome X)
- Neuroaxonal Dystrophy, NAD (Spanish Water Dog Variant) (Chromosome 8)
- Neuroaxonal Dystrophy, NAD (Rottweiler Variant) (Chromosome 5)
- L-2-Hydroxyglutaricaciduria, L2HGA (L2HGDH) (Chromosome 0)
- Polyneuropathy, NDRG1 Greyhound Variant (NDRG1 Exon 15) (Chromosome 13)
- Polyneuropathy, NDRG1 Malamute Variant (NDRG1 Exon 4) (Chromosome 13)
- Progressive Neuronal Abiotrophy, Canine Multiple System Degeneration, CMSD (SERAC1 Exon 15) (Chromosome 1)



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### CLEAR CONDITIONS

- Progressive Neuronal Abiotrophy, Canine Multiple System Degeneration, CMSD (SERAC1 Exon 4) (Chromosome 1)
- Juvenile Laryngeal Paralysis and Polyneuropathy, Polyneuropathy with Ocular Abnormalities and Neuronal Vacuolation, POANV (RAB3GAP1, Rottweiler Variant) (Chromosome 19)
- Juvenile-Onset Polyneuropathy, Leonberger Polyneuropathy 1, LPN1 (LPN1, ARHGEF10) (Chromosome 16)
- Spongy Degeneration with Cerebellar Ataxia 1, SDCA1, SeSAME/EAST Syndrome (KCNJ10) (Chromosome 38)
- Spongy Degeneration with Cerebellar Ataxia 2, SDCA2 (ATP1B2) (Chromosome 5)
- Dilated Cardiomyopathy, DCM1 (PDK4) (Chromosome 14)
- Dilated Cardiomyopathy, DCM2 (TTN) (Chromosome 36)
- Long QT Syndrome (KCNQ1) (Chromosome 18)
- Muscular Dystrophy Cavalier King Charles Spaniel Variant 1 (Chromosome X)
- Muscular Dystrophy Muscular Dystrophy (DMD Pembroke Welsh Corgi Variant) (Chromosome X)
- Muscular Dystrophy Muscular Dystrophy (DMD Golden Retriever Variant) (Chromosome X)
- Inherited Myopathy of Great Danes (BIN1) (Chromosome 19)
- Myostatin Deficiency, Bully Whippet Syndrome (MSTN) (Chromosome 37)
- Myotonia Congenita (CLCN1 Exon 7) (Chromosome 16)
- Myotonia Congenita (CLCN1 Exon 23) (Chromosome 16)
- Hypocatalasia, Acatlasemia (CAT) (Chromosome 18)
- Pyruvate Dehydrogenase Deficiency (PDP1) (Chromosome 29)
- Malignant Hyperthermia (RYR1) (Chromosome 1)
- Imlerslund-Grasbeck Syndrome, Selective Cobalamin Malabsorption (CUBN Exon 53) (Chromosome 2)
- Imlerslund-Grasbeck Syndrome, Selective Cobalamin Malabsorption (CUBN Exon 8) (Chromosome 2)
- Lunde Hund Syndrome (LEPREL1) (Chromosome 34)
- Congenital Myasthenic Syndrome (CHAT) (Chromosome 28)
- Episodic Falling Syndrome (BCAN) (Chromosome 7)
- Dystrophic Epidermolysis Bullosa (COL7A1) (Chromosome 20)
- Ectodermal Dysplasia, Skin Fragility Syndrome (PKP1) (Chromosome 7)
- Ichthyosis, Epidermolytic Hyperkeratosis (KRT10) (Chromosome 9)
- Ichthyosis (PNPLA1) (Chromosome 12)
- Ichthyosis (SLC27A4) (Chromosome 9)
- Ichthyosis (NIPAL4) (Chromosome 4)
- Focal Non-Epidermolytic Palmoplantar Keratoderma, Pachyonychia Congenita (KRT16) (Chromosome 9)
- Hereditary Footpad Hyperkeratosis (FAM83G) (Chromosome 5)
- Musladin-Lueke Syndrome (ADAMTSL2) (Chromosome 9)
- Bald Thigh Syndrome (IGFBP5) (Chromosome 37)
- Cleft Lip and/or Cleft Palate (ADAMTS20) (Chromosome 27)
- Hereditary Vitamin D-Resistant Rickets (VDR) (Chromosome 27)
- Osteogenesis Imperfecta, Brittle Bone Disease (COL1A2) (Chromosome 14)
- Osteogenesis Imperfecta, Brittle Bone Disease (SERPINH1) (Chromosome 21)
- Osteogenesis Imperfecta, Brittle Bone Disease (COL1A1) (Chromosome 9)

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### CLEAR CONDITIONS

- Craniomandibular Osteopathy, CMO (SLC37A2) (Chromosome 5)
- Chondrodystrophy, Norwegian Elkhound and Karelian Bear Dog Variant (ITGA10) (Chromosome 17)