# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## BREED ANCESTRY

**Saarloos Wolfdog : 100.0%**

## GENETIC STATS

Predicted adult weight: **67 lbs**

Life stage: **Young adult**

Based on your dog's date of birth provided.

## TEST DETAILS

Kit number: EM-17983364

Swab number: 31220610201385

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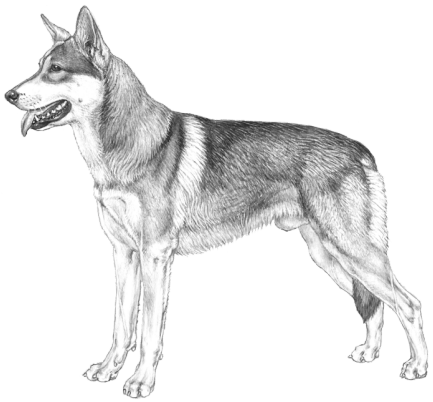
## SAARLOOS WOLFDOG



**Fun Fact**

At the time of his death in the late 1960s, Leendert Saarloos was still the sole overseer of the Sarloos Wolfdog breed.

Sarloos Wolfdogs are a Dutch breed of dog that are actually the result of the careful breeding of wolf/dog hybrids. In fact, they are the breed of dog that, according to a study conducted in 2015, contain the most genetic similarity to wolves. Sarloos Wolfdogs were created by, and subsequently named after, a Dutch man named Leendert Saarloos. In the 1930s, Leendert wanted to create a working dog that was similar to the German Shepherd but that would be more resilient and less domesticated. He decided that the best way to do this was to crossbreed German Shepherds with Grey Wolves, and thus the Sarloos Wolfdog was born. Sarloos Wolfdogs definitely look like wolves. As one can probably imagine, Sarloos Wolfdogs are not an appropriate breed for people who do not have extensive experience as dog owners, especially of large and strong breeds. They are primarily bred as pets, but they certainly aren't the breed for everyone. They are intelligent and need a great deal of early socialization in order to make good companions for the home. They still have a very strong "pack mentality" and will constantly look for guidance and direction from their owners. They will be better behaved and balanced with strong training and early exposure to various settings. While this is true for all breeds, it is especially important for Sarloos Wolfdogs. Sarloos Wolfdogs love other dogs and will actually do better in a multi-dog household. They are good with children provided that they are socialized with them as pups; however, remember that they are large and rambunctious dogs and shouldn't be left unattended with children of any age, especially very young children. Sarloos Wolfdogs will thrive in a suburban or rural home, but they are not well suited to apartment or city living. They need a lot of space to run around and a great deal of physical exercise. If not given proper mental and physical stimulation, they can become bored and destructive—and they can do quite a bit of damage to household items from shoes to couches. They will suffer if left home alone all day, so prospective owners who work long hours should reconsider getting a Sarloos Wolfdog unless they have other dogs at home to keep them company. Sarloos Wolfdogs are still a very rare

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## MATERNAL LINE

Through Etta James Ayla'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: E**

Haplogroup E is a very rare maternal line, present primarily in Northern breed dogs and dogs with some level of recent gray wolf ancestry.

**HAPLOTYPE: E11**

The E haplogroup in general is not common. It has been found in dogs with some level of background mixing with its wolf-like ancestors.

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## TRAITS: COAT COLOR

| TRAIT | RESULT |
|---|---|
| **E Locus (MC1R)**<br><br>The E Locus determines if and where a dog can produce dark (black or brown) hair. Dogs with two copies of the recessive **e** 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 loci. 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 **Em** allele usually have a melanistic mask (dark facial hair as commonly seen in the German Shepherd and Pug). Dogs with no copies of **Em** but one or two copies of the **Eg** 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"). | **No dark mask or grizzle (EE)** |
| **K Locus (CBD103)**<br><br>The K Locus $\mathbf{K^B}$ allele "overrides" the A Locus, meaning that it prevents the A Locus genotype from affecting coat color. For this reason, the $\mathbf{K^B}$ allele is referred to as the "dominant black" allele. As a result, dogs with at least one $\mathbf{K^B}$ allele will usually have solid black or brown coats (or red/cream coats if they are **ee** 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 $\mathbf{k^y k^y}$ genotype will show a coat color pattern based on the genotype they have at the A Locus. Dogs who test as $\mathbf{K^B k^y}$ may be brindle rather than black or brown. | **More likely to have a patterned haircoat ($k^y k^y$)** |

# ETTA JAMES AYLA



## TRAITS: COAT COLOR (CONTINUED)

| TRAIT | RESULT |
|---|---|
| **Intensity Loci LINKAGE**<br><br>Areas of a dog's coat where dark (black or brown) pigment is not expressed either contain red/yellow pigment, or no pigment at all. Five locations across five chromosomes explain approximately 70% of red pigmentation "intensity" variation across all dogs. Dogs with a result of **Intense Red Pigmentation** will likely have deep red hair like an Irish Setter or "apricot" hair like some Poodles, dogs with a result of **Intermediate Red Pigmentation** will likely have tan or yellow hair like a Soft-Coated Wheaten Terrier, and dogs with **Dilute Red Pigmentation** will likely have cream or white hair like a Samoyed. Because the mutations we test may not directly cause differences in red pigmentation intensity, we consider this to be a linkage test. | **Any light hair likely white or cream (Dilute Red Pigmentation)** |
| **A Locus (ASIP)**<br><br>The A Locus controls switching between black and red pigment in hair cells, but it will only be expressed in dogs that are not **ee** at the E Locus and are **$k^y k^y$** 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. | **Agouti (Wolf Sable) coat color pattern ($a^w a^w$)** |
| **D Locus (MLPH)**<br><br>The D locus result that we report is determined by two different genetic variants that can work together to cause diluted pigmentation. These are the common **d** allele, also known as **"d1"**, and a less common allele known as **"d2"**. Dogs with two **d** alleles, regardless of which variant, 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 in certain breeds, dilute dogs have a higher incidence of Color Dilution Alopecia. Dogs with one **d** allele will not be dilute, but can pass the **d** allele on to their puppies. To view your dog's **d1** and **d2** test results, click the "SEE DETAILS" link in the upper right hand corner of the "Base Coat Color" section of the Traits page, and then click the "VIEW SUBLOCUS RESULTS" link at the bottom of the page. | **Dark areas of hair and skin are not lightened (DD)** |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## TRAITS: COAT COLOR (CONTINUED)

| TRAIT | RESULT |
|---|---|
| **Cocoa (HPS3)**<br><br>Dogs with the **coco** genotype will produce dark brown pigment instead of black in both their hair and skin. Dogs with the **Nco** genotype will produce black pigment, but can pass the **co** allele on to their puppies. Dogs that have the **coco** genotype as well as the **bb** genotype at the B locus are generally a lighter brown than dogs that have the **Bb** or **BB** genotypes at the B locus. | **No co alleles, not expressed (NN)** |
| **B Locus (TYRP1)**<br><br>Dogs with two copies of the **b** allele produce brown pigment instead of black in both their hair and skin. Dogs with one copy of the **b** allele will produce black pigment, but can pass the **b** allele on to their puppies. E Locus **ee** dogs that carry two **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". | **Black or gray hair and skin (Bb)** |
| **Saddle Tan (RALY)**<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 **II** 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 $\mathbf{a^t}$ allele, so dogs that do not express $\mathbf{a^t}$ are not influenced by this gene. | **Not expressed (NN)** |
| **S Locus (MITF)**<br><br>The S Locus determines white spotting and pigment distribution. MITF controls where pigment is produced, and an insertion in the MITF gene causes a loss of pigment in the coat and skin, resulting in white hair and/or pink skin. Dogs with two copies of this variant will likely have breed-dependent white patterning, with a nearly white, parti, or piebald coat. Dogs with one copy of this variant will have more limited white spotting and may be considered flash, parti or piebald. This MITF variant does not explain all white spotting patterns in dogs and other variants are currently being researched. Some dogs may have small amounts of white on the paws, chest, face, or tail regardless of their S Locus genotype. | **Likely to have little to no white in coat (SS)** |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## TRAITS: COAT COLOR (CONTINUED)

| TRAIT | RESULT |
|---|---|
| **M Locus (PMEL)**<br><br>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 "non-expressing" merle, meaning that the merle pattern is very subtle or not at all evident in their coat. 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.<br><br>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. | **No merle alleles (mm)** |
| **R Locus (USH2A) LINKAGE**<br><br>The R Locus regulates the presence or absence of the roan coat color pattern. Partial duplication of the USH2A gene is strongly associated with this coat pattern. Dogs with at least one **R** allele will likely have roaning on otherwise uniformly unpigmented white areas. Roan appears in white areas controlled by the S Locus but not in other white or cream areas created by other loci, such as the E Locus with **ee** along with Dilute Red Pigmentation by I Locus (for example, in Samoyeds). Mechanisms for controlling the extent of roaning are currently unknown, and roaning can appear in a uniform or non-uniform pattern. Further, non-uniform roaning may appear as ticked, and not obviously roan. The roan pattern can appear with or without ticking. | **Likely no impact on coat pattern (Rr)** |
| **H Locus (Harlequin)**<br><br>This pattern is recognized in Great Danes and causes dogs to have a white coat with patches of darker pigment. A dog with an **Hh** result will be harlequin if they are also **M*m** or **M*M*** at the M Locus and are not **ee** at the E locus. Dogs with a result of **hh** will not be harlequin. This trait is thought to be homozygous lethal; a living dog with an **HH** genotype has never been found. | **No harlequin alleles (hh)** |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## TRAITS: OTHER COAT TRAITS

| TRAIT | RESULT |
|---|---|
| **Furnishings (RSPO2) LINKAGE**<br>Dogs with one or two copies of the **F** allele have "furnishings": the mustache, beard, and eyebrows characteristic of breeds like the Schnauzer, Scottish Terrier, and Wire Haired Dachshund. A dog with two **I** 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. | **Likely unfurnished (no mustache, beard, and/or eyebrows) (II)** |
| **Coat Length (FGF5)**<br>The FGF5 gene is known to affect hair length in many different species, including cats, dogs, mice, and humans. In dogs, the **T** allele confers a long, silky haircoat as observed in the Yorkshire Terrier and the Long Haired Whippet. The ancestral **G** 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." | **Likely short or mid-length coat (GG)** |
| **Shedding (MC5R)**<br>Dogs with at least one copy of the ancestral **C** allele, like many Labradors and German Shepherd Dogs, are heavy or seasonal shedders, while those with two copies of the **T** 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. | **Likely heavy/seasonal shedding (CC)** |
| **Hairlessness (FOXI3) LINKAGE**<br>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 **NDup** genotype are likely to be hairless while dogs with the **NN** genotype are likely to have a normal coat. The **DupDup** 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. | **Very unlikely to be hairless (NN)** |
| **Hairlessness (SGK3)**<br>Hairlessness in the American Hairless Terrier arises from a mutation in the SGK3 gene. Dogs with the **DD** result are likely to be hairless. Dogs with the **ND** genotype will have a normal coat, but can pass the **D** | **Very unlikely to be hairless (NN)** |

# ETTA JAMES AYLA



## TRAITS: OTHER COAT TRAITS (CONTINUED)

| TRAIT | RESULT |
|---|---|
| **Oculocutaneous Albinism Type 2 (SLC45A2) LINKAGE**<br><br>Dogs with two copies **DD** of this deletion in the SLC45A2 gene have oculocutaneous albinism (OCA), 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 **ND** 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. | **Likely not albino (NN)** |
| **Coat Texture (KRT71)**<br><br>Dogs with a long coat and at least one copy of the **T** allele have a wavy or curly coat characteristic of Poodles and Bichon Frises. Dogs with two copies of the ancestral **C** 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 **F** 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 **T** allele but still have straight coats. | **Likely straight coat (CC)** |

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## TRAITS: OTHER BODY FEATURES

| TRAIT | RESULT |
|---|---|
| **Muzzle Length (BMP3)**<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 **C** allele. Dogs in many short-length muzzle (brachycephalic) breeds such as the English Bulldog, Pug, and Pekingese have two copies of the derived **A** 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. | **Likely medium or long muzzle (CC)** |
| **Tail Length (T)**<br><br>Whereas most dogs have two **C** alleles and a long tail, dogs with one **G** 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 **GG** genotypes have not been observed, suggesting that dogs with the **GG** genotype do not survive to birth.<br>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. | **Likely normal-length tail (CC)** |
| **Hind Dewclaws (LMBR1)**<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 **T** 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 **CC** or **TC** dogs will have hind dewclaws. | **Likely to have hind dew claws (CT)** |

# ETTA JAMES AYLA



## TRAITS: OTHER BODY FEATURES (CONTINUED)

| TRAIT | RESULT |
|---|---|
| **Blue Eye Color (ALX4) LINKAGE**<br><br>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 (**Dup**) 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. **NN** 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. | **Less likely to have blue eyes (NN)** |
| **Back Muscling & Bulk, Large Breed (ACSL4)**<br><br>The **T** 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" **T** allele is absent from leaner shaped large breed dogs like the Great Dane, Irish Wolfhound, and Scottish Deerhound, which are fixed for the ancestral **C** 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. | **Likely normal muscling (CC)** |

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## TRAITS: BODY SIZE

| TRAIT | RESULT |
|---|---|
| **Body Size (IGF1)**<br>The **I** allele is associated with smaller body size. | **Larger (NN)** |
| **Body Size (IGFR1)**<br>The **A** allele is associated with smaller body size. | **Larger (GG)** |
| **Body Size (STC2)**<br>The **A** allele is associated with smaller body size. | **Larger (TT)** |
| **Body Size (GHR - E191K)**<br>The **A** allele is associated with smaller body size. | **Larger (GG)** |
| **Body Size (GHR - P177L)**<br>The **T** allele is associated with smaller body size. | **Larger (CC)** |

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## TRAITS: PERFORMANCE

| TRAIT | RESULT |
|---|---|
| **Altitude Adaptation (EPAS1)**<br>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**<br>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 (https://embarkvet.com/resources/blog/pomc-dogs/). We measure this result using a linkage test. | **Normal food motivation (NN)** |

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## HEALTH REPORT

**How to interpret Etta James Ayla's genetic health results:**

If Etta James Ayla inherited any of the variants that we tested, they will be listed at the top of the Health Report section, along with a description of how to interpret this result. We also include all of the variants that we tested Etta James Ayla for that we did not detect the risk variant for.

**A genetic test is not a diagnosis**

This genetic test does not diagnose a disease. Please talk to your vet about your dog's genetic results, or if you think that your pet may have a health condition or disease.

**Summary**

Etta James Ayla is not at increased risk for the genetic health conditions that Embark tests.

**Clear results**

**Breed-relevant** (11)

**Other** (244)

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## BREED-RELEVANT RESULTS

Research studies indicate that these results are more relevant to dogs like Etta James Ayla, and may influence her chances of developing certain health conditions.

| | |
|---|---|
| Anhidrotic Ectodermal Dysplasia (EDA Intron 8) | Clear |
| Canine Leukocyte Adhesion Deficiency Type III, CLAD III (FERMT3, German Shepherd Variant) | Clear |
| Day Blindness (CNGA3 Exon 7, German Shepherd Variant) | Clear |
| Degenerative Myelopathy, DM (SOD1A) | Clear |
| Hemophilia A (F8 Exon 11, German Shepherd Variant 1) | Clear |
| Hemophilia A (F8 Exon 1, German Shepherd Variant 2) | Clear |
| Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 3, German Shepherd Variant) | Clear |
| Multiple Drug Sensitivity (ABCB1) | Clear |
| Platelet Factor X Receptor Deficiency, Scott Syndrome (TMEM16F) | Clear |
| Renal Cystadenocarcinoma and Nodular Dermatofibrosis (FLCN Exon 7) | Clear |
| Urate Kidney & Bladder Stones (SLC2A9) | Clear |

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## OTHER RESULTS

Research has not yet linked these conditions to dogs with similar breeds to Etta James Ayla. Review any increased risk or notable results to understand her potential risk and recommendations.

| | |
|---|---|
| 2-DHA Kidney & Bladder Stones (APRT) | Clear |
| Acral Mutilation Syndrome (GDNF-AS, Spaniel and Pointer Variant) | Clear |
| Alaskan Husky Encephalopathy (SLC19A3) | Clear |
| Alaskan Malamute Polyneuropathy, AMPN (NDRG1 SNP) | Clear |
| Alexander Disease (GFAP) | Clear |
| ALT Activity (GPT) | Clear |
| Autosomal Dominant Progressive Retinal Atrophy (RHO) | Clear |
| Bald Thigh Syndrome (IGFBP5) | Clear |
| Bernard-Soulier Syndrome, BSS (GP9, Cocker Spaniel Variant) | Clear |
| Bully Whippet Syndrome (MSTN) | Clear |
| Canine Elliptocytosis (SPTB Exon 30) | Clear |
| Canine Fucosidosis (FUCA1) | Clear |
| Canine Leukocyte Adhesion Deficiency Type I, CLAD I (ITGB2, Setter Variant) | Clear |
| Canine Multifocal Retinopathy, cmr1 (BEST1 Exon 2) | Clear |
| Canine Multifocal Retinopathy, cmr2 (BEST1 Exon 5, Coton de Tulear Variant) | Clear |
| Canine Multifocal Retinopathy, cmr3 (BEST1 Exon 10 Deletion, Finnish and Swedish Lapphund, Lapponian Herder Variant) | Clear |
| Canine Multiple System Degeneration (SERAC1 Exon 4, Chinese Crested Variant) | Clear |
| Canine Multiple System Degeneration (SERAC1 Exon 15, Kerry Blue Terrier Variant) | Clear |

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## OTHER RESULTS

| | |
|---|---|
| Cardiomyopathy and Juvenile Mortality (YARS2) | Clear |
| Centronuclear Myopathy, CNM (PTPLA) | Clear |
| Cerebellar Hypoplasia (VLDLR, Eurasier Variant) | Clear |
| Chondrodystrophy (ITGA10, Norwegian Elkhound and Karelian Bear Dog Variant) | Clear |
| Cleft Lip and/or Cleft Palate (ADAMTS20, Nova Scotia Duck Tolling Retriever Variant) | Clear |
| Cleft Palate, CP1 (DLX6 intron 2, Nova Scotia Duck Tolling Retriever Variant) | Clear |
| Cobalamin Malabsorption (CUBN Exon 8, Beagle Variant) | Clear |
| Cobalamin Malabsorption (CUBN Exon 53, Border Collie Variant) | Clear |
| Collie Eye Anomaly (NHEJ1) | Clear |
| Complement 3 Deficiency, C3 Deficiency (C3) | Clear |
| Congenital Cornification Disorder (NSDHL, Chihuahua Variant) | Clear |
| Congenital Hypothyroidism (TPO, Rat, Toy, Hairless Terrier Variant) | Clear |
| Congenital Hypothyroidism (TPO, Tenterfield Terrier Variant) | Clear |
| Congenital Hypothyroidism with Goiter (TPO Intron 13, French Bulldog Variant) | Clear |
| Congenital Hypothyroidism with Goiter (SLC5A5, Shih Tzu Variant) | Clear |
| Congenital Macrothrombocytopenia (TUBB1 Exon 1, Cairn and Norfolk Terrier Variant) | Clear |
| Congenital Myasthenic Syndrome, CMS (COLQ, Labrador Retriever Variant) | Clear |
| Congenital Myasthenic Syndrome, CMS (COLQ, Golden Retriever Variant) | Clear |

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## OTHER RESULTS

| | |
|---|---|
| Congenital Myasthenic Syndrome, CMS (CHAT, Old Danish Pointing Dog Variant) | Clear |
| Congenital Myasthenic Syndrome, CMS (CHRNE, Jack Russell Terrier Variant) | Clear |
| Congenital Stationary Night Blindness (LRIT3, Beagle Variant) | Clear |
| Congenital Stationary Night Blindness (RPE65, Briard Variant) | Clear |
| Craniomandibular Osteopathy, CMO (SLC37A2) | Clear |
| Craniomandibular Osteopathy, CMO (SLC37A2 Intron 16, Basset Hound Variant) | Clear |
| Cystinuria Type I-A (SLC3A1, Newfoundland Variant) | Clear |
| Cystinuria Type II-A (SLC3A1, Australian Cattle Dog Variant) | Clear |
| Cystinuria Type II-B (SLC7A9, Miniature Pinscher Variant) | Clear |
| Day Blindness (CNGB3 Deletion, Alaskan Malamute Variant) | Clear |
| Day Blindness (CNGA3 Exon 7, Labrador Retriever Variant) | Clear |
| Day Blindness (CNGB3 Exon 6, German Shorthaired Pointer Variant) | Clear |
| Deafness and Vestibular Syndrome of Dobermans, DVDob, DINGS (MYO7A) | Clear |
| Demyelinating Polyneuropathy (SBF2/MTRM13) | Clear |
| Dental-Skeletal-Retinal Anomaly (MIA3, Cane Corso Variant) | Clear |
| Diffuse Cystic Renal Dysplasia and Hepatic Fibrosis (INPP5E Intron 9, Norwich Terrier Variant) | Clear |
| Dilated Cardiomyopathy, DCM (RBM20, Schnauzer Variant) | Clear |
| Dilated Cardiomyopathy, DCM1 (PDK4, Doberman Pinscher Variant 1) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Dilated Cardiomyopathy, DCM2 (TTN, Doberman Pinscher Variant 2) | Clear |
| Disproportionate Dwarfism (PRKG2, Dogo Argentino Variant) | Clear |
| Dry Eye Curly Coat Syndrome (FAM83H Exon 5) | Clear |
| Dystrophic Epidermolysis Bullosa (COL7A1, Central Asian Shepherd Dog Variant) | Clear |
| Dystrophic Epidermolysis Bullosa (COL7A1, Golden Retriever Variant) | Clear |
| Early Bilateral Deafness (LOXHD1 Exon 38, Rottweiler Variant) | Clear |
| Early Onset Adult Deafness, EOAD (EPS8L2 Deletion, Rhodesian Ridgeback Variant) | Clear |
| Early Onset Cerebellar Ataxia (SEL1L, Finnish Hound Variant) | Clear |
| Ehlers Danlos (ADAMTS2, Doberman Pinscher Variant) | Clear |
| Enamel Hypoplasia (ENAM Deletion, Italian Greyhound Variant) | Clear |
| Enamel Hypoplasia (ENAM SNP, Parson Russell Terrier Variant) | Clear |
| Episodic Falling Syndrome (BCAN) | Clear |
| Exercise-Induced Collapse, EIC (DNM1) | Clear |
| Factor VII Deficiency (F7 Exon 5) | Clear |
| Factor XI Deficiency (F11 Exon 7, Kerry Blue Terrier Variant) | Clear |
| Familial Nephropathy (COL4A4 Exon 3, Cocker Spaniel Variant) | Clear |
| Familial Nephropathy (COL4A4 Exon 30, English Springer Spaniel Variant) | Clear |
| Fanconi Syndrome (FAN1, Basenji Variant) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Fetal-Onset Neonatal Neuroaxonal Dystrophy (MFN2, Giant Schnauzer Variant) | Clear |
| Glanzmann's Thrombasthenia Type I (ITGA2B Exon 13, Great Pyrenees Variant) | Clear |
| Glanzmann's Thrombasthenia Type I (ITGA2B Exon 12, Otterhound Variant) | Clear |
| Globoid Cell Leukodystrophy, Krabbe disease (GALC Exon 5, Terrier Variant) | Clear |
| Glycogen Storage Disease Type IA, Von Gierke Disease, GSD IA (G6PC, Maltese Variant) | Clear |
| Glycogen Storage Disease Type IIIA, GSD IIIA (AGL, Curly Coated Retriever Variant) | Clear |
| Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM, Whippet and English Springer Spaniel Variant) | Clear |
| Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM, Wachtelhund Variant) | Clear |
| GM1 Gangliosidosis (GLB1 Exon 2, Portuguese Water Dog Variant) | Clear |
| GM1 Gangliosidosis (GLB1 Exon 15, Shiba Inu Variant) | Clear |
| GM1 Gangliosidosis (GLB1 Exon 15, Alaskan Husky Variant) | Clear |
| GM2 Gangliosidosis (HEXA, Japanese Chin Variant) | Clear |
| GM2 Gangliosidosis (HEXB, Poodle Variant) | Clear |
| Golden Retriever Progressive Retinal Atrophy 1, GR-PRA1 (SLC4A3) | Clear |
| Golden Retriever Progressive Retinal Atrophy 2, GR-PRA2 (TTC8) | Clear |
| Goniodysgenesis and Glaucoma, Pectinate Ligament Dysplasia, PLD (OLFM3) | Clear |
| Hemophilia A (F8 Exon 10, Boxer Variant) | Clear |
| Hemophilia B (F9 Exon 7, Terrier Variant) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Hemophilia B (F9 Exon 7, Rhodesian Ridgeback Variant) | Clear |
| Hereditary Ataxia, Cerebellar Degeneration (RAB24, Old English Sheepdog and Gordon Setter Variant) | Clear |
| Hereditary Cataracts (HSF4 Exon 9, Australian Shepherd Variant) | Clear |
| Hereditary Footpad Hyperkeratosis (FAM83G, Terrier and Kromfohrlander Variant) | Clear |
| Hereditary Footpad Hyperkeratosis (DSG1, Rottweiler Variant) | Clear |
| Hereditary Nasal Parakeratosis (SUV39H2 Intron 4, Greyhound Variant) | Clear |
| Hereditary Nasal Parakeratosis, HNPK (SUV39H2) | Clear |
| Hereditary Vitamin D-Resistant Rickets (VDR) | Clear |
| Hypocatalasia, Acatalasemia (CAT) | Clear |
| Hypomyelination and Tremors (FNIP2, Weimaraner Variant) | Clear |
| Hypophosphatasia (ALPL Exon 9, Karelian Bear Dog Variant) | Clear |
| Ichthyosis (NIPAL4, American Bulldog Variant) | Clear |
| Ichthyosis (ASPRV1 Exon 2, German Shepherd Variant) | Clear |
| Ichthyosis (SLC27A4, Great Dane Variant) | Clear |
| Ichthyosis, Epidermolytic Hyperkeratosis (KRT10, Terrier Variant) | Clear |
| Ichthyosis, ICH1 (PNPLA1, Golden Retriever Variant) | Clear |
| Inflammatory Myopathy (SLC25A12) | Clear |
| Inherited Myopathy of Great Danes (BIN1) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Inherited Selected Cobalamin Malabsorption with Proteinuria (CUBN, Komondor Variant) | Clear |
| Intervertebral Disc Disease (Type I) (FGF4 retrogene - CFA12) | Clear |
| Intestinal Lipid Malabsorption (ACSL5, Australian Kelpie) | Clear |
| Junctional Epidermolysis Bullosa (LAMA3 Exon 66, Australian Cattle Dog Variant) | Clear |
| Junctional Epidermolysis Bullosa (LAMB3 Exon 11, Australian Shepherd Variant) | Clear |
| Juvenile Epilepsy (LGI2) | Clear |
| Juvenile Laryngeal Paralysis and Polyneuropathy (RAB3GAP1, Rottweiler Variant) | Clear |
| Juvenile Myoclonic Epilepsy (DIRAS1) | Clear |
| L-2-Hydroxyglutaricaciduria, L2HGA (L2HGDH, Staffordshire Bull Terrier Variant) | Clear |
| Lagotto Storage Disease (ATG4D) | Clear |
| Laryngeal Paralysis (RAPGEF6, Miniature Bull Terrier Variant) | Clear |
| Late Onset Spinocerebellar Ataxia (CAPN1) | Clear |
| Late-Onset Neuronal Ceroid Lipofuscinosis, NCL 12 (ATP13A2, Australian Cattle Dog Variant) | Clear |
| Leonberger Polyneuropathy 1 (LPN1, ARHGEF10) | Clear |
| Leonberger Polyneuropathy 2 (GJA9) | Clear |
| Lethal Acrodermatitis, LAD (MKLN1) | Clear |
| Leukodystrophy (TSEN54 Exon 5, Standard Schnauzer Variant) | Clear |
| Ligneous Membranitis, LM (PLG) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Limb Girdle Muscular Dystrophy (SGCD, Boston Terrier Variant) | Clear |
| Limb-Girdle Muscular Dystrophy 2D (SGCA Exon 3, Miniature Dachshund Variant) | Clear |
| Long QT Syndrome (KCNQ1) | Clear |
| Lundehund Syndrome (LEPREL1) | Clear |
| Macular Corneal Dystrophy, MCD (CHST6) | Clear |
| Malignant Hyperthermia (RYR1) | Clear |
| May-Hegglin Anomaly (MYH9) | Clear |
| Methemoglobinemia (CYB5R3, Pit Bull Terrier Variant) | Clear |
| Methemoglobinemia (CYB5R3) | Clear |
| Microphthalmia (RBP4 Exon 2, Soft Coated Wheaten Terrier Variant) | Clear |
| Mucopolysaccharidosis IIIB, Sanfilippo Syndrome Type B, MPS IIIB (NAGLU, Schipperke Variant) | Clear |
| Mucopolysaccharidosis Type IIIA, Sanfilippo Syndrome Type A, MPS IIIA (SGSH Exon 6, Dachshund Variant) | Clear |
| Mucopolysaccharidosis Type IIIA, Sanfilippo Syndrome Type A, MPS IIIA (SGSH Exon 6, New Zealand Huntaway Variant) | Clear |
| Mucopolysaccharidosis Type VI, Maroteaux-Lamy Syndrome, MPS VI (ARSB Exon 5, Miniature Pinscher Variant) | Clear |
| Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 5, Terrier Brasileiro Variant) | Clear |
| Muscular Dystrophy (DMD, Cavalier King Charles Spaniel Variant 1) | Clear |
| Muscular Dystrophy (DMD, Golden Retriever Variant) | Clear |
| Musladin-Lueke Syndrome, MLS (ADAMTSL2) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Myasthenia Gravis-Like Syndrome (CHRNE, Heideterrier Variant) | Clear |
| Myotonia Congenita (CLCN1 Exon 23, Australian Cattle Dog Variant) | Clear |
| Myotonia Congenita (CLCN1 Exon 7, Miniature Schnauzer Variant) | Clear |
| Narcolepsy (HCRTR2 Exon 1, Dachshund Variant) | Clear |
| Narcolepsy (HCRTR2 Intron 4, Doberman Pinscher Variant) | Clear |
| Narcolepsy (HCRTR2 Intron 6, Labrador Retriever Variant) | Clear |
| Nemaline Myopathy (NEB, American Bulldog Variant) | Clear |
| Neonatal Cerebellar Cortical Degeneration (SPTBN2, Beagle Variant) | Clear |
| Neonatal Encephalopathy with Seizures, NEWS (ATF2) | Clear |
| Neonatal Interstitial Lung Disease (LAMP3) | Clear |
| Neuroaxonal Dystrophy, NAD (VPS11, Rottweiler Variant) | Clear |
| Neuroaxonal Dystrophy, NAD (TECPR2, Spanish Water Dog Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 1, NCL 1 (PPT1 Exon 8, Dachshund Variant 1) | Clear |
| Neuronal Ceroid Lipofuscinosis 10, NCL 10 (CTSD Exon 5, American Bulldog Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 2, NCL 2 (TPP1 Exon 4, Dachshund Variant 2) | Clear |
| Neuronal Ceroid Lipofuscinosis 5, NCL 5 (CLN5 Exon 4 SNP, Border Collie Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 5, NCL 5 (CLN5 Exon 4 Deletion, Golden Retriever Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 6, NCL 6 (CLN6 Exon 7, Australian Shepherd Variant) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Neuronal Ceroid Lipofuscinosis 7, NCL 7 (MFSD8, Chihuahua and Chinese Crested Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 8, NCL 8 (CLN8, Australian Shepherd Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 8, NCL 8 (CLN8 Exon 2, English Setter Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 8, NCL 8 (CLN8 Insertion, Saluki Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis, Cerebellar Ataxia, NCL4A (ARSG Exon 2, American Staffordshire Terrier Variant) | Clear |
| Oculocutaneous Albinism, OCA (SLC45A2 Exon 6, Bullmastiff Variant) | Clear |
| Oculocutaneous Albinism, OCA (SLC45A2, Small Breed Variant) | Clear |
| Oculoskeletal Dysplasia 2 (COL9A2, Samoyed Variant) | Clear |
| Osteochondrodysplasia (SLC13A1, Poodle Variant) | Clear |
| Osteogenesis Imperfecta (COL1A2, Beagle Variant) | Clear |
| Osteogenesis Imperfecta (SERPINH1, Dachshund Variant) | Clear |
| Osteogenesis Imperfecta (COL1A1, Golden Retriever Variant) | Clear |
| P2Y12 Receptor Platelet Disorder (P2Y12) | Clear |
| Pachyonychia Congenita (KRT16, Dogue de Bordeaux Variant) | Clear |
| Paroxysmal Dyskinesia, PxD (PIGN) | Clear |
| Persistent Mullerian Duct Syndrome, PMDS (AMHR2) | Clear |
| Pituitary Dwarfism (POU1F1 Intron 4, Karelian Bear Dog Variant) | Clear |
| Polycystic Kidney Disease, PKD (PKD1) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Pompe's Disease (GAA, Finnish and Swedish Lapphund, Lapponian Herder Variant) | Clear |
| Prekallikrein Deficiency (KLKB1 Exon 8) | Clear |
| Primary Ciliary Dyskinesia, PCD (NME5, Alaskan Malamute Variant) | Clear |
| Primary Ciliary Dyskinesia, PCD (CCDC39 Exon 3, Old English Sheepdog Variant) | Clear |
| Primary Hyperoxaluria (AGXT) | Clear |
| Primary Lens Luxation (ADAMTS17) | Clear |
| Primary Open Angle Glaucoma (ADAMTS17 Exon 11, Basset Fauve de Bretagne Variant) | Clear |
| Primary Open Angle Glaucoma (ADAMTS10 Exon 17, Beagle Variant) | Clear |
| Primary Open Angle Glaucoma (ADAMTS10 Exon 9, Norwegian Elkhound Variant) | Clear |
| Primary Open Angle Glaucoma and Primary Lens Luxation (ADAMTS17 Exon 2, Chinese Shar-Pei Variant) | Clear |
| Progressive Retinal Atrophy (SAG) | Clear |
| Progressive Retinal Atrophy (IFT122 Exon 26, Lapponian Herder Variant) | Clear |
| Progressive Retinal Atrophy, Bardet-Biedl Syndrome (BBS2 Exon 11, Shetland Sheepdog Variant) | Clear |
| Progressive Retinal Atrophy, CNGA (CNGA1 Exon 9) | Clear |
| Progressive Retinal Atrophy, crd1 (PDE6B, American Staffordshire Terrier Variant) | Clear |
| Progressive Retinal Atrophy, crd4/cord1 (RPGRIP1) | Clear |
| Progressive Retinal Atrophy, PRA1 (CNGB1) | Clear |
| Progressive Retinal Atrophy, PRA3 (FAM161A) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Progressive Retinal Atrophy, prcd (PRCD Exon 1) | Clear |
| Progressive Retinal Atrophy, rcd1 (PDE6B Exon 21, Irish Setter Variant) | Clear |
| Progressive Retinal Atrophy, rcd3 (PDE6A) | Clear |
| Proportionate Dwarfism (GH1 Exon 5, Chihuahua Variant) | Clear |
| Protein Losing Nephropathy, PLN (NPHS1) | Clear |
| Pyruvate Dehydrogenase Deficiency (PDP1, Spaniel Variant) | Clear |
| Pyruvate Kinase Deficiency (PKLR Exon 5, Basenji Variant) | Clear |
| Pyruvate Kinase Deficiency (PKLR Exon 7, Beagle Variant) | Clear |
| Pyruvate Kinase Deficiency (PKLR Exon 10, Terrier Variant) | Clear |
| Pyruvate Kinase Deficiency (PKLR Exon 7, Labrador Retriever Variant) | Clear |
| Pyruvate Kinase Deficiency (PKLR Exon 7, Pug Variant) | Clear |
| Raine Syndrome (FAM20C) | Clear |
| Recurrent Inflammatory Pulmonary Disease, RIPD (AKNA, Rough Collie Variant) | Clear |
| Retina Dysplasia and/or Optic Nerve Hypoplasia (SIX6 Exon 1, Golden Retriever Variant) | Clear |
| Sensory Neuropathy (FAM134B, Border Collie Variant) | Clear |
| Severe Combined Immunodeficiency, SCID (PRKDC, Terrier Variant) | Clear |
| Severe Combined Immunodeficiency, SCID (RAG1, Wetterhoun Variant) | Clear |
| Shaking Puppy Syndrome (PLP1, English Springer Spaniel Variant) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

| | |
|---|---|
| Shar-Pei Autoinflammatory Disease, SPAID, Shar-Pei Fever (MTBP) | Clear |
| Skeletal Dysplasia 2, SD2 (COL11A2, Labrador Retriever Variant) | Clear |
| Skin Fragility Syndrome (PKP1, Chesapeake Bay Retriever Variant) | Clear |
| Spinocerebellar Ataxia (SCN8A, Alpine Dachsbracke Variant) | Clear |
| Spinocerebellar Ataxia with Myokymia and/or Seizures (KCNJ10) | Clear |
| Spongy Degeneration with Cerebellar Ataxia 1 (KCNJ10) | Clear |
| Spongy Degeneration with Cerebellar Ataxia 2 (ATP1B2) | Clear |
| Stargardt Disease (ABCA4 Exon 28, Labrador Retriever Variant) | Clear |
| Succinic Semialdehyde Dehydrogenase Deficiency (ALDH5A1 Exon 7, Saluki Variant) | Clear |
| Thrombopathia (RASGRP1 Exon 5, American Eskimo Dog Variant) | Clear |
| Thrombopathia (RASGRP1 Exon 5, Basset Hound Variant) | Clear |
| Thrombopathia (RASGRP1 Exon 8, Landseer Variant) | Clear |
| Trapped Neutrophil Syndrome, TNS (VPS13B) | Clear |
| Ullrich-like Congenital Muscular Dystrophy (COL6A3 Exon 10, Labrador Retriever Variant) | Clear |
| Ullrich-like Congenital Muscular Dystrophy (COL6A1 Exon 3, Landseer Variant) | Clear |
| Unilateral Deafness and Vestibular Syndrome (PTPRQ Exon 39, Doberman Pinscher) | Clear |
| Von Willebrand Disease Type I, Type I vWD (VWF) | Clear |
| Von Willebrand Disease Type II, Type II vWD (VWF, Pointer Variant) | Clear |

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## OTHER RESULTS

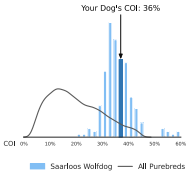
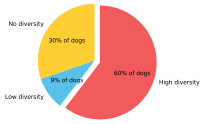
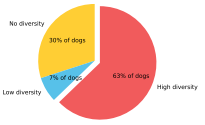
| | |
|---|---|
| Von Willebrand Disease Type III, Type III vWD (VWF Exon 4, Terrier Variant) | Clear |
| Von Willebrand Disease Type III, Type III vWD (VWF Intron 16, Nederlandse Kooikerhondje Variant) | Clear |
| Von Willebrand Disease Type III, Type III vWD (VWF Exon 7, Shetland Sheepdog Variant) | Clear |
| X-Linked Hereditary Nephropathy, XLHN (COL4A5 Exon 35, Samoyed Variant 2) | Clear |
| X-Linked Myotubular Myopathy (MTM1, Labrador Retriever Variant) | Clear |
| X-Linked Progressive Retinal Atrophy 1, XL-PRA1 (RPGR) | Clear |
| X-linked Severe Combined Immunodeficiency, X-SCID (IL2RG Exon 1, Basset Hound Variant) | Clear |
| X-linked Severe Combined Immunodeficiency, X-SCID (IL2RG, Corgi Variant) | Clear |
| Xanthine Urolithiasis (XDH, Mixed Breed Variant) | Clear |
| β-Mannosidosis (MANBA Exon 16, Mixed-Breed Variant) | Clear |

Registration: N/A ROI 21/41256

# ETTA JAMES AYLA

DNA Test Report | Test Date: August 22nd, 2023 | embk.me/ettajamesayla

## INBREEDING AND DIVERSITY

| CATEGORY | RESULT |
|---|---|
| **Coefficient Of Inbreeding**<br>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. | **36%**<br>  |
| **MHC Class II - DLA DRB1**<br>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**<br>How common is this amount of diversity in purebreds:<br>  |
| **MHC Class II - DLA DQA1 and DQB1**<br>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**<br>How common is this amount of diversity in purebreds:<br>  |