Supplementary Table S1

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Affenpinscher	☑	☐	Toy
Afghan Hound	☑	☑	Hound
Airedale Terrier	☑	☑	Terrier
Akita	☑	☑	Working
Alaskan Malamute	☑	☑	Working
American English Coonhound	☑	☐	Hound
American Eskimo Dog	☑	☐	Non-sporting
American Foxhound	☑	☐	Hound
American Hairless Terrier	☑	☐	Terrier
American Leopard Hound	☑	☐	Hound
American Pitbull Terrier	☑	☑	Terrier
American Staffordshire Terrier	☑	☐	Terrier
American Water Spaniel	☑	☐	Sporting
Anatolian Shepherd Dog	☑	☐	Working
Appenzeller Sennenhund	☑	☐	FSS
Australian Cattle Dog	☑	☑	Herding
Australian Kelpie	☑	☐	FSS
Australian Shepherd	☑	☑	Herding
Australian Stumpy Tail Cattle Dog	☑	☐	FSS
Australian Terrier	☑	☐	Terrier
Azawakh	☑	☐	Hound
Barbet	☑	☐	Sporting
Basenji	☑	☑	Hound
Basset Fauve de Bretagne	☑	☐	Misc
Basset Hound	☑	☑	Hound
Bavarian Mountain Scent Hound	☑	☐	Hound
Beagle	☑	☑	Hound
Bearded Collie	☑	☑	Herding
Beauceron	☑	☐	Herding
Bedlington Terrier	☑	☐	Terrier

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Belgian Laekenois	☑	☐	Herding
Belgian Malinois	☑	☑	Herding
Belgian Sheepdog (Groenendael)	☑	☑	Herding
Belgian Tervuren	☑	☑	Herding
Bergamasco	☑	☐	Herding
Berger Picard	☑	☑	Herding
Bernese Mountain Dog	☑	☑	Working
Bichon Frise	☑	☑	Non-sporting
Biewer Terrier	☑	☐	Toy
Black and Tan Coonhound	☑	☐	Hound
Black Mouth Cur	☑	☐	FSS
Black Russian Terrier	☑	☐	Working
Bloodhound	☑	☑	Hound
Blue Lacey	☑	☐	NA
Bluetick Coonhound	☑	☐	Hound
Boerboel	☑	☐	Working
Bolognese	☑	☐	FSS
Border Collie	☑	☑	Herding
Border Terrier	☑	☑	Terrier
Borzoi	☑	☑	Hound
Boston Terrier	☑	☑	Terrier
Bouvier des Flandres	☑	☑	Herding
Boxer	☑	☑	Working
Boykin Spaniel	☑	☐	Sporting
Bracco Italiano	☑	☐	Sporting
Braque de Bourbonnais	☑	☐	FSS
Braque Francais Pyrenean	☑	☐	FSS
Briard	☑	☐	Herding
Brittany	☑	☑	Sporting
Broholmer	☑	☐	FSS

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Brussels Griffon	☑	☐	Toy
Bull Terrier	☑	☑	Terrier
Bulldog (English)	☑	☑	Non-sporting
Bullmastiff	☑	☑	Working
Cairn Terrier	☑	☑	Terrier
Canaan Dog	☑	☐	Herding
Cane Corso	☑	☐	Working
Cardigan Welsh Corgi	☑	☐	Herding
Carolina Dog	☑	☐	FSS
Catahoula Leopard Dog	☑	☐	FSS
Caucasian Shepherd Dog	☑	☐	FSS
Cavalier King Charles Spaniel	☑	☑	Toy
Central Asian Shepherd Dog	☑	☐	FSS
Cesky Terrier	☑	☐	Terrier
Chesapeake Bay Retriever	☑	☑	Sporting
Chihuahua	☑	☑	Toy
Chinese Crested	☑	☑	Toy
Chinese Shar-Pei	☑	☑	Non-sporting
Chinook	☑	☑	Working
Chow Chow	☑	☑	Non-sporting
Cirneco Dell'Etna	☑	☐	Hound
Clumber Spaniel	☑	☐	Sporting
Cocker Spaniel	☑	☑	Sporting
Collie	☑	☑	Herding
Coton De Tulear	☑	☐	Non-sporting
Croatian Sheepdog	☑	☐	FSS
Curly-Coated Retriever	☑	☐	Sporting
Czechoslovakian Vlack	☑	☐	FSS
Dachshund	☑	☑	Hound
Dalmatian	☑	☑	Non-sporting

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Dandie Dinmont Terrier	☑	☐	Terrier
Danish-Swedish Farmdog	☑	☐	Misc
Deutscher Wachtelhund	☑	☐	FSS
Doberman Pinscher	☑	☑	Working
Dogo Argentino	☑	☐	Working
Dogue de Bordeaux	☑	☐	Working
Drentsche Patrijshond	☑	☐	FSS
Drever	☑	☐	FSS
Dutch Shepherd	☑	☐	Misc
English Cocker Spaniel	☑	☑	Sporting
English Foxhound	☑	☐	Hound
English Setter	☑	☑	Sporting
English Shepherd	☑	☑	Herding
English Springer Spaniel	☑	☑	Sporting
English Toy Spaniel	☑	☐	Toy
Entlebucher Mountain Dog	☑	☑	Herding
Estrela Mountain Dog	☑	☐	FSS
Eurasier	☑	☐	FSS
Field Spaniel	☑	☐	Sporting
Finish Spitz	☑	☑	Non-sporting
Finnish Lapphund	☑	☐	Herding
Flat-Coated Retriever	☑	☐	Sporting
French Bulldog	☑	☑	Non-sporting
French Spaniel	☑	☐	FSS
German Longhaired Pointer	☑	☐	FSS
German Pinscher	☑	☐	Working
German Shepherd Dog	☑	☑	Herding
German Shorthaired Pointer	☑	☑	Sporting
German Spitz	☑	☐	FSS
German Wirehaired Pointer	☑	☐	Sporting

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Giant Schnauzer	☑	☐	Working
Glen of Imaal Terrier	☑	☐	Terrier
Golden Retriever	☑	☑	Sporting
Gordon Setter	☑	☑	Sporting
Grand Basset Griffon Vendeen	☑	☐	Hound
Great Dane	☑	☑	Working
Great Pyrenees	☑	☑	Working
Greater Swiss Mountain Dog	☑	☑	Working
Greyhound	☑	☑	Hound
Hamiltonstovare	☑	☐	FSS
Hanoverian Scenthound	☑	☐	FSS
Harrier	☑	☐	Hound
Havanese	☑	☑	Toy
Hokkaido	☑	☐	FSS
Hovawart	☑	☐	FSS
Ibizan Hound	☑	☐	Hound
Icelandic Sheepdog	☑	☐	Herding
Irish Red and White Setter	☑	☐	Sporting
Irish Setter	☑	☑	Sporting
Irish Terrier	☑	☐	Terrier
Irish Water Spaniel	☑	☐	Sporting
Irish Wolfhound	☑	☑	Hound
Italian Greyhound	☑	☑	Toy
Jack Russell Terrier	☑	☑	Terrier
Jagdterrier	☑	☐	FSS
Japanese Chin	☑	☐	FSS
Jindo	☑	☐	FSS
Kai Ken	☑	☐	Misc
Karelian Bear Dog	☑	☐	FSS
Keeshond	☑	☐	Non-sporting

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Kerry Blue Terrier	☑	☐	Terrier
Kishu Ken	☑	☐	FSS
Komondor	☑	☐	Working
Kromfohrlander	☑	☐	FSS
Kuvasz	☑	☐	Working
Labrador Retriever	☑	☑	Sporting
Lagotto Romagnolo	☑	☑	Sporting
Lakeland Terrier	☑	☐	Terrier
Lancashire Heeler	☑	☐	Herding
Lapponian Herder	☑	☐	FSS
Leonberger	☑	☑	Working
Lhasa Apso	☑	☑	Non-sporting
Lowchen	☑	☐	Non-sporting
Maltese	☑	☑	Toy
Manchester Terrier	☑	☐	Toy
Mastiff	☑	☑	Working
Miniature American Shepherd	☑	☐	Herding
Miniature Bull Terrier	☑	☐	Terrier
Miniature Pinscher	☑	☑	Toy
Miniature Schnauzer	☑	☑	Terrier
Mountain Cur	☑	☐	FSS
Mudi	☑	☐	Herding
Neapolitan Mastiff	☑	☐	Working
Nederlandse Kooikerhondje	☑	☐	Sporting
Newfoundland	☑	☑	Working
Norfolk Terrier	☑	☑	Terrier
Norrbottenspets	☑	☐	Misc
Norwegian Buhund	☑	☐	Herding
Norwegian Elkhound	☑	☑	Hound
Norwegian Lundhund	☑	☐	Non-sporting

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Norwich Terrier	☑	☑	Terrier
Nova Scotia Duck Tolling Retriever	☑	☑	Sporting
Old English Sheepdog	☑	☑	Herding
Otterhound	☑	☐	Hound
Papillon	☑	☑	Toy
Parson Russell Terrier	☑	☐	Terrier
Pekingese	☑	☑	Toy
Pembroke Welsh Corgi	☑	☑	Herding
Perro de Presa Canario	☑	☐	FSS
Peruvian Inca Orchid	☑	☐	Misc
Petit Basset Griffon Vendeen	☑	☐	Hound
Pharaoh Hound	☑	☐	Hound
Plott	☑	☐	Hound
Pointer	☑	☐	Sporting
Polish Lowland Sheepdog	☑	☐	Herding
Pomeranian	☑	☑	Toy
Poodle	☑	☑	Non-sporting
Poodle (Toy)	☑	☑	Toy
Porcelaine	☑	☐	FSS
Portuguese Podengo	☑	☐	Hound
Portuguese Podengo Pequeno	☑	☐	Hound
Portuguese Pointer	☑	☐	FSS
Portuguese Sheepdog	☑	☐	FSS
Portuguese Water Dog	☑	☑	Working
Pudelpointer	☑	☐	FSS
Pug	☑	☑	Toy
Puli	☑	☐	Herding
Pumi	☑	☐	Herding
Pyrenean Mastiff	☑	☐	FSS
Pyrenean Shepherd	☑	☐	Herding

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Rafeiro de Alentejo	☑	☐	FSS
Rat Terrier	☑	☐	Terrier
Redbone Coonhound	☑	☐	Hound
Rhodesian Ridgeback	☑	☑	Hound
Romanian Mioritic Shepherd Dog	☑	☐	FSS
Rottweiler	☑	☑	Working
Russell Terrier	☑	☐	Terrier
Russian Toy	☑	☐	Toy
Russian Tsvetnaya Bolonka	☑	☐	Misc
Saluki	☑	☑	Hound
Samoyed	☑	☑	Working
Schapendoes	☑	☐	FSS
Schipperke	☑	☑	Non-sporting
Scottish Deerhound	☑	☐	Hound
Scottish Terrier	☑	☑	Terrier
Sealyham Terrier	☑	☐	Terrier
Segugio Italiano	☑	☐	FSS
Shetland Sheepdog	☑	☑	Herding
Shiba Inu	☑	☑	Non-sporting
Shih Tzu	☑	☑	Toy
Shikoku	☑	☐	FSS
Siberian Husky	☑	☑	Working
Silken Windhound	☑	☐	NA
Silky Terrier	☑	☐	Toy
Skye Terrier	☑	☐	Terrier
Sloughi	☑	☑	Hound
Slovakian Wirehaired Pointer	☑	☐	FSS
Slovensky Cuvac	☑	☐	FSS
Slovensky Kopov	☑	☐	FSS
Small Musterlander Pointer	☑	☐	Misc

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Smooth Fox Terrier	☑	☐	Terrier
Soft Coated Wheaten Terrier	☑	☑	Terrier
Spanish Mastiff	☑	☐	FSS
Spanish Water Dog	☑	☐	Herding
Spinone Italiano	☑	☐	Sporting
St. Bernard	☑	☑	Working
Stabyhoun	☑	☐	FSS
Staffordshire Bull Terrier	☑	☑	Terrier
Standard Schnauzer	☑	☑	Working
Sussex Spaniel	☑	☐	Sporting
Swedish Lapphund	☑	☐	FSS
Swedish Vallhund	☑	☐	Herding
Taiwan Dog	☑	☐	FSS
Teddy Roosevelt Terrier	☑	☐	Misc
Thai Ridgeback	☑	☐	FSS
Tibetan Mastiff	☑	☑	Working
Tibetan Spaniel	☑	☑	Non-sporting
Tibetan Terrier	☑	☑	Non-sporting
Tornjak	☑	☐	FSS
Tosa	☑	☐	FSS
Toy Fox Terrier	☑	☐	Toy
Transylvanian Hound	☑	☐	FSS
Treeing Tennessee Brindle	☑	☐	FSS
Treeing Walker Coonhound	☑	☐	Hound
Vizsla	☑	☑	Sporting
Village dog - China	☐	☑	NA
Village dog - Nigeria	☐	☑	NA
Village dog - Vietnam	☐	☑	NA
Weimaraner	☑	☑	Sporting
Welsh Springer Spaniel	☑	☐	Sporting

Dog breed name	Option for owner to select in HLES	Included in DAP genetic library	AKC breed group designation
Welsh Terrier	☑	☐	Terrier
West Highland White Terrier	☑	☑	Terrier
Whippet	☑	☑	Hound
Wire Fox Terrier	☑	☑	Terrier
Wirehaired Pointing Griffon	☑	☑	Sporting
Wirehaired Vizsla	☑	☐	Sporting
Wolf - Eurasian	☐	☑	NA
Wolf - North American	☐	☑	NA
Working Kelpie	☑	☐	FSS
Xoloitzcuintli	☑	☐	Non-sporting
Yakutian Laika	☑	☐	FSS
Yorkshire Terrier	☑	☑	Toy

Dog Aging Project
Longer, healthier lives. Together.

VERIFY DNA KIT - COLLECT DNA - SHIP DNA SAMPLE

Please Complete the Following Steps

1. Log in to your personal portal at portal.dogagingproject.org to *Verify the DNA Kit*. This links the unique verification code on the kit to your dog.
2. *Collect a DNA Sample* from your dog by following the instructions below. If you would like to **watch a short video** that demonstrates the proper use of the DNA Kit, please visit dogagingproject.org/dnakit or scan the QR code.
3. Place the prepaid shipping label on the box and *Ship the Sample* back to our lab.

Contents of the DNA Kit

- A sealed packet containing one cheek swab attached to a collection tube, which contains a liquid used to preserve genetic material in your dog's saliva sample during transit.
- A bubble sleeve used to hold the collection tube after you have taken a sample of your dog's saliva.
- A biospecimen bag used to protect the sample during shipping.
- A prepaid shipping label.

Instructions for Saliva Collection

IMPORTANT: To obtain a usable genetic sample, it is important to swab your dog's cheek at least 30 minutes after your dog has eaten and at least 10 minutes since your dog has had anything to drink.

- Open the sealed packet where indicated and remove the cheek swab and collection tube. **Please DO NOT touch the spongy tip of the swab. Do not open the tube.**
- Place the spongy tip of the swab in your dog's cheek. Try to keep your dog from biting the swab. You may need to hold your dog's head or have someone help you during the collection procedure. Collect saliva for 30 seconds by moving the swab and mopping up saliva where it naturally pools in the cheek pouch.
- Hold the tube upright and unscrew the cap from the tube. **Please DO NOT spill the liquid in the collection tube.** (Rinse with water if the liquid comes into contact with skin or eyes.)
- Turn the cap with the attached cheek swab upside down and place the cheek swab into the collection tube. Screw the cap on tightly to prevent leakage during transport.
- Invert the collection tube vigorously 10 times to thoroughly mix the sample.
- Use a permanent marker to write your dog's name on the tube label.
- Place the well-sealed collection tube into the bubble sleeve, place the bubble sleeve into the biospecimen bag, and return it to the box that it originally came in.
- Place the prepaid shipping label on the box, seal the box, and drop into any mailbox. **Please remember to ship the sample back to us within 1-2 days of collection.**

After we have had a chance to sequence your dog's genetic material, we will provide you with a report that details your dog's genetic ancestry. Thank you so much for your contribution to our research at the Dog Aging Project. If you have any questions, please contact our team at team@dogagingproject.org.

Dog Aging Project

Longer, healthier lives. Together.

Thank you, Jackie, for being part of the Dog Aging Project! We are thrilled to be partnering with you and Hagar to expand our knowledge of healthy aging in dogs. Both of you are valuable members of our team. We couldn't do this work without you!

Here's what you told us about Hagar

Sex: Male

Spayed/Neutered: Neutered

You reported Hagar to be:

Spanish Wa...

Genomic Report For Hagar

We've had the opportunity to analyze the saliva sample you submitted. We are excited to share the results of our analysis as well as more information about our methods and the goals of our research.

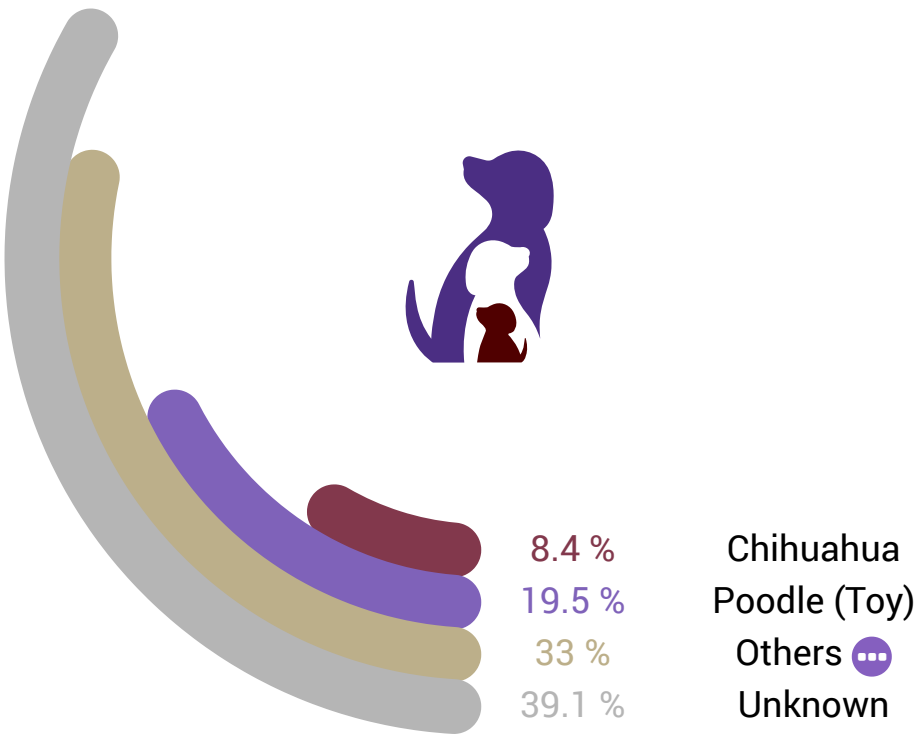
To analyze your dog's saliva, we extracted DNA from the sample and sequenced most of the 2.4 billion base pairs that make up the canine genome. After sequencing, we compared your dog's DNA sequence to a database consisting of the genetic material from over one hundred purebred dog lineages as well as genetic material from multiple populations of village dogs around the world.

By comparing the similarities and differences between your dog's unique genetic composition and this database, we determined the percentage of shared ancestry with each of these groups. In addition, we analyzed your dog's genetic code at regions of the genome known to be involved in the determination of size, coat color, coat pattern, prevalence of white spotting, coat type, and other special features.

Below, you can click through to each of these physical attributes and see what we would predict about your dog's appearance based solely on examining their genes. If you want to give us feedback about the accuracy of these predictions, please return to your personal portal and complete the Genomic Report Feedback Survey.

Genomic Ancestry

The figure above displays an image of the top breed of your dog's ancestry. We detected 19.5% ancestry from Poodle (Toy) in Hagar.



Genetic Variation Report

The Coefficient of Inbreeding is a measure of genetic variation. It quantifies the reduction in genetic variation of your dog's genome compared to the population of dogs in general. The value for the Coefficient of Inbreeding ranges from 0% (which indicates high genetic variation) to 100% (which indicates low genetic variation). Modern purebred lines were derived by selective breeding from ancestral lineages.

The goal was to produce canine lineages that have consistent physical and behavioral characteristics. As a result, purebred dogs tend to have a higher Coefficient of Inbreeding when compared to mixed breed dogs. However, even some mixed breed dogs can have low genetic variation. This result would occur if the dog came from a relatively isolated population of dogs. The Coefficient of Inbreeding is neither good nor bad nor does it indicate anything about the health of your dog.

The figure above displays your dog's genetic ancestry. Even purebred dogs may show some proportion of DNA as unknown. This is because many breeds share at least some identical sequences of DNA, and thus, those sections of genetic material are not uniquely traceable to a single breed. In mixed-breed dogs, the unknown genomic proportion can be quite high due to either the large number of purpose-bred ancestors in their lineage or because they are descended from ancestral dogs, so-called "village dogs," who may not have any purebred ancestors in their genealogy at all.

Body Size

Based on Hagar's genetic variants, we predict their body size to be:

Tiny
Chihuahua, Pomeranian, Shih Tzu, Papillon

Small
Pembroke Welsh Corgi, Jack Russell Terrier, Toy Poodle

Medium
Border Collie, Australian Cattle Dog, Whippet

Large
Golden Retriever, Labrador Retriever, Standard Poodle

Giant
Leonberger, Irish Wolfhound, Great Dane, Newfoundland

Hagar's DNA Results

Top Contributing Variants	Gene	Possible Alleles	First Copy	Second Copy	Effect
Chromosome #3 Position: 91085576	near LCORL	A & G	A	A	▲
Chromosome #4 Position: 67040898	GHR	C & T	T	T	▲
Chromosome #6 Position: 22864474	HS3ST2	A & G	A	G	●
Chromosome #10 Position: 8356059	HMGA2	G & T	G	T	●
Chromosome #12 Position: 33792879	near OGFRL1	G & A	G	A	●
Chromosome #15 Position: 41219654	IGF1	T & C	C	T	●
Chromosome #17 Position: 36295546	ANAPC1	C & T	C	C	▲
Chromosome #18 Position: 20428564	FGF4 retrogene	G & GC	G	G	▲
Chromosome #26 Position: 12761780	near MED13L	G & A	G	G	▼
Chromosome #32 Position: 5421641	non-coding	A & T	A	A	▼

Body size in dogs, especially height which this model predicts, is determined by the cumulative effects of genetic variants (alleles) in multiple genes. For each gene, dogs can carry two alleles that are the same or two that are different. Each variant has a separate effect on the dog's size, making the dog larger or smaller. The table depicted here shows genes that contribute to your dog's size, the two alleles that your dog has, and whether those variants increase or decrease size. We put these variants into a predictive, machine learning model (based on a reference panel of over a thousand dogs) and used this model to predict your dog's body size.

Colors

Based on Hagar's genetic variants, we predict they will have the following pigment colors:

Brown (nose and paws)

Yellow

Dogs can express two types of pigment in their fur and skin: red (pheomelanin), and black (eumelanin). The red coat pigment can vary in shade, from light cream to deep red. Dark pigment comes in black or brown varieties, and may show up on a dog's nose and paw pads, even if absent in the coat.

Multiple genes influence the expression of these pigments, and color is determined by which genetic variants (alleles) are present.

Hagar's DNA Results

Genetic Variant	Gene	Possible Alleles	First Copy	Second Copy
Liver - variant p.(C41S)	TYRP1	T & A	T	A
Liver - variant p.(P345del)	TYRP1	ACCT & A	ACCT	ACCT
Liver - variant p.(Gln331*)	TYRP1	C & T	C	T
Cocoa - variant p.(T807*)	HPS3	G & A	G	G
Dilution - splice variant	MLPH	G & A	G	G
Dilution - variant p.(Q235H)	MLPH	G & C	G	G
Red intensity - marker 1	lincRNA	T & A	A	A
Red intensity - marker 2	intergenic	T & C	C	C
Red intensity - marker 3	SLC264A	T & C	T	T
Red intensity - marker 4	intergenic	T & C	T	T
Red intensity - marker 5	TYR	G & A	A	A

The results depicted here show your dog's genetic variation and predict their dominant coat color. Keep in mind that some coat color traits may be masked by other coat traits.

Eumelanin: The dark pigment expressed in a dog's fur and skin, which can be black or brown.

Liver: A dog with two copies of the Liver alleles will express brown pigmentation, also known as liver or chocolate.

Cocoa: A dog with two copies of the Cocoa allele, discovered in French bulldogs, will express dark brown pigmentation, also known as cocoa.

Dilution: A dog with two copies of the Dilute allele will express a diluted, or lighter, pigmentation of eumelanin. Diluted black is also known as slate, grey or blue, and diluted brown is also called lilac or isabella.

Pheomelanin: The light pigment expressed in a dog's fur and skin, which ranges in intensity from cream to yellow to tan to red.

Red intensity: A collection of genes control the shade of pheomelanin pigment expressed, and can result in a range of values from very light cream to very deep red.

Coat Pattern

Based on Hagar's genetic variants, we predict their coat patterns to include:

SABLE (HIDDEN)

Several genes affect the patterning of pigment in a dog's coat from banding of hairs to facial masks and even stripe-like brindle patterns. Some of these genes influence the presence or absence of key features like a melanistic facial mask or an overall brindle pattern.

Hagar's DNA Results

Genetic Variant	Gene	Possible Alleles	First Copy	Second Copy
Sable - variant p. (A82S)	ASIP	G & T	T	G
Sable - variant p. (R83H)	ASIP	G & A	A	G
Tan points - marker	ASIP	C & T	C	T
Recessive black - variant p.(R96C)	ASIP	C & T	C	C
Saddle - marker 1	RALY	CAGAGTTTCCCCAGGT & C	C	C
Saddle - marker 2	RALY	GTCCCCAGGTCAGAGTT & G	G	G
Facial mask - variant p. (M264V)	MC1R	T & C	T	T
Sighthound grizzle - variant p. (G78V)	MC1R	C & A	C	C
Northern domino - variant p. (R301C)	MC1R	G & A	G	G
Recessive red - variant p.(R306*)	MC1R	G & A	A	A
Recessive red - regulatory variant	MC1R	C & G	C	C
Dominant black - variant p.(G23del)	CBD103	TCCC & T	TCCC	T
Brindle - marker 1	intergenic	A & AGG	A	A

The results depicted here show your dog's genetic variants (alleles) and predict their overall patterning. Keep in mind that the genetic variants for coat pattern genes can also interact with or mask coat color genes.

Agouti Series

Sable: A dog with any copies of these alleles will have their coat shaded with dark-pigmented hairs, especially along the top of a dog's body.

Agouti: A dog that carries neither alleles for sable nor both alleles for tan points will express an ancient coat pattern consisting of light- and dark-banded hairs.

Tan points: A dog with two copies of these alleles will have mostly dark pigment across their body except for a few light-pigmented patches in various parts of a dog's coat, including the eyebrows, chest, muzzle, and legs.

Recessive black: A dog with two copies of this allele, rarely found in herding breeds like the German Shepherd Dog, will produce only eumelanin solidly throughout their coat.

Saddle: A dog that is genetically predicted to have tan points may carry copies of these alleles, which causes dark pigmentation to withdraw into a saddle pattern along the back as the dog grows up.

Extension Series

Facial mask: A dog with any copies of this allele will express a melanistic mask on their face, which sometimes extends further to the chest, toes, and tail tip.

Northern domino: A dog with no facial mask and any copies of this allele will have a strong, crisply shaded coat, especially in the facial markings, iconic to the Siberian Husky and other Northern breeds.

Recessive red: A dog with two copies of these alleles will not produce any eumelanin in their fur, only a pheomelanin coat, though will leave pigmentation in the paw pads and nose unaffected.

Sighthound grizzle: A dog with no facial mask and any copies of this allele will have a shaded coat similar to sable or agouti but featuring a distinctive widow's peak, iconic in breeds like the Saluki.

Defensin Series

Brindle: A dog without dominant black and any copies of these alleles will express distinctive striping and bands of eumelanin and pheomelanin across any non-white fur.

Genetic Variant	Gene	Possible Alleles	First Copy	Second Copy
Brindle - marker 2	intergenic	GCTTCCCTAAAA & G	GCTTCCCTAAAA	GCTTCCCTAAAA
Ticking - marker	USH2A	G & A	G	G
Harlequin - variant p.(V49I)	PSMB7	T & G	T	T

Dominant black: A dog with at least one copy of this allele will produce only eumelanin solidly throughout their coat.

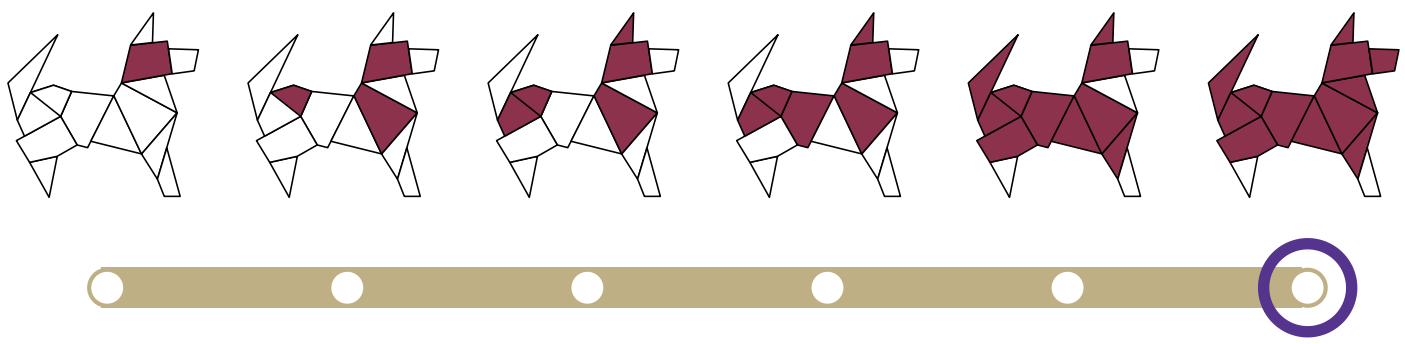
Other Patterns

Harlequin: A dog with one copy of this allele, in combination with other alleles, may express large, dappled “cow” patches, as seen in some dogs of the Great Dane breed.

Ticking: A dog with two copies of this allele will express flecks of color among otherwise white fur, sometimes in a dense, mottled manner, known as roaning, commonly seen in the Australian Cattle Dog breed.

White Spotting

Based on Hagar's genetic variants, we predict their amount of white spotting to be:



In dogs, white coat color results from the absence of pigment. White spotting describes the pattern of white color (lack of pigment) in a dog's coat. A dog can range from a solid color with no white to pure white or any amount of white in between.

Hagar's DNA Results

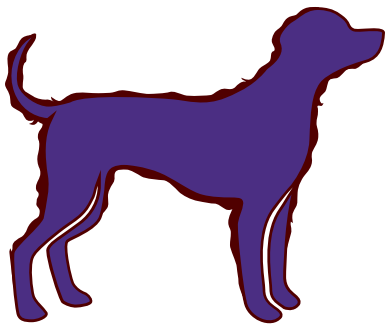
Top Contributing Variants	Gene	Possible Alleles	First Copy	Second Copy	Effect
Chromosome #4 Position: 4882111	non-coding	G & T	T	T	▼
Chromosome #5 Position: 63694334	MC1R	G & A	A	A	▼
Chromosome #14 Position: 29948181	AGMO	G & A	G	G	▲
Chromosome #20 Position: 21792546	MITF	G & A	G	A	•
Chromosome #20 Position: 21797796	MITF	A & C	C	A	•
Chromosome #20 Position: 21825467	MITF	A & C	A	A	▲
Chromosome #20 Position: 21827584	MITF	TTTTTTC & TTTTTTCTTTTTC	TTTTTTC	TTTTTTC	▼
Chromosome #20 Position: 21827657	MITF	T & TTTCTTTTC	T	TTTCTTTTC	•
Chromosome #20 Position: 21829531	MITF	T & TA	TA	T	•
Chromosome #20 Position: 21834982	MITF	T & A	T	A	•

There are specific genes that determine where on the body pigment, or the lack of pigment, is expressed. We used a predictive, machine learning model (based on a reference panel of over a thousand dogs) to predict the amount of white in your dog's coat based on their unique genetic variants (alleles), each of which has some effect on white spotting.

Coat Type

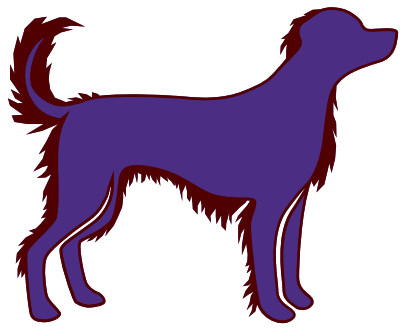
Based on Hagar’s genetic variants, we expect the following coat type features:

Coat Texture



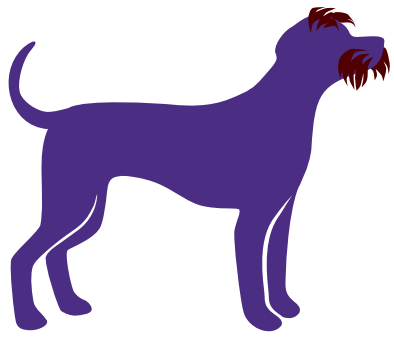
Prediction: Wavy coat

Coat Length



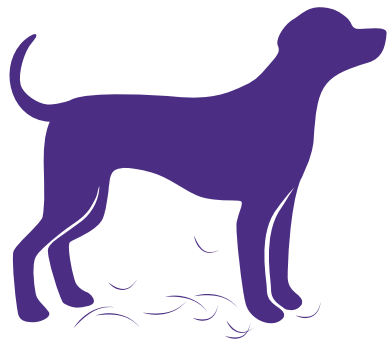
Prediction: Long coat

Coat Furnishings



Prediction: Eyebrow and muzzle furnishings

Shedding Propensity



Prediction: Low shedding

Hagar's DNA Results

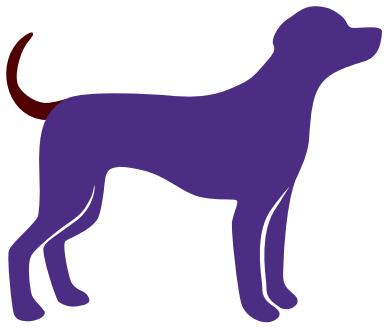
Genetic Variant	Gene	Possible Alleles	First Copy	Second Copy
Curly coat - variant p.(R151W)	KRT71	C & T	C	T
Curly coat - variant p.(S422Rfs)	KRT71	CTG & C	CTG	CTG
Long coat - variant p.(C95F)	FGF5	G & T	T	T
Furnishings - marker	RSPO2	A & C	C	C
Shedding propensity - variant p.(A237T)	MC5R	T & C	C	C
Single-layer coat - marker 1	ADRB1-AU1	C & T	T	T
Single-layer coat - marker 2	ADRB1-AU1	G & A	A	A

Dogs display huge variation in coat type. Specific genes are associated with these differences, determining features like curly coats or fringed fur on the muzzle and whether or not a dog is prone to shedding. We examined your dog’s specific genetic variants (alleles) at these genes. Here, we report which alleles your dog possesses and what effect we predict these variants to have on your dog’s coat type.

Special Features

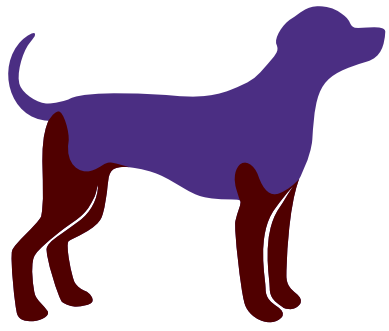
Based on Hagar’s genetic variants, they may express the following special features:

Skeletal - Tail Length



Prediction: **Normal length tail**

Skeletal - Leg Length



Prediction: **Normal leg length**

High Altitude Adaptation

Prediction: **No adaptation to high altitudes**

Hagar's DNA Results

Genetic Variant	Gene	Possible Alleles	First Copy	Second Copy
High altitude hypoxia tolerance - marker 1	EPAS1	G & A	G	G
High altitude hypoxia tolerance - marker 2	EPAS1	G & T	T	T
High altitude hypoxia tolerance - marker 3	EPAS1	G & A	G	G
High altitude hypoxia tolerance - marker 4	EPAS1	C & T	C	C
Blue eyes - marker	ALX4	C & T	C	C
Shortened legs - marker	FGF4 retrogene on chromosome 18	A & G	A	A
Long legs - marker 1	ESR1	C & T	T	T
Long legs - marker 2	ESR1	A & G	G	G
Long legs - marker 3	ESR1	T & G	G	G
Natural bob tail - variant p.(I63M)	T	G & C	G	G

Based on your dog’s genome, we can also make predictions about other interesting physical traits such as tail length and skeletal proportions as well as physiological traits like adaptation to altitude. The results presented here provide a snapshot of some of these traits in your dog. One of the goals of the Dog Aging Project is to expand our knowledge of how a dog’s genes influence important aspects of healthy aging.

Dog Aging Project | Genomic Feedback Survey

The Genomic Report for **[baseline_arm_1][st_dog_name]** is the result of a two-step process. First, our lab extracted DNA from the saliva sample you submitted and sequenced most of the 2.4 billion base pairs that make up the canine genome. Second, we used a variety of analytical and statistical approaches to draw conclusions about your dog's breed ancestry and to make predictions about various physical and behavioral characteristics that your dog might display.

With respect to breed ancestry, we compared your dog's genetic sequence to a database consisting of the genetic material from over one hundred purebred dog lineages. This represents about one-third of the known dog breeds in the world. The rest of these lineages have not been thoroughly sequenced. Thus, if your dog has ancestry from any of these less well-studied breeds, that genetic contribution would show up as unknown in our analyses.

Additionally, your dog may be descended from so-called village dogs, ancestral canine lineages which came before the familiar, modern lines created through selective breeding. In genetic analyses, this ancient DNA is not associated with any single breed. Some cherished companion dogs may not have any purebred ancestors in their genealogy at all.

In the Health and Life Experience Survey you told us what you know about your dog's breed ancestry. It's interesting how the information we obtain from DNA sequencing can differ from the physical interpretations made by dog professionals like veterinarians or dog rescue staff. In the following pages, you will be able to comment on the differences (if any) between what you know and what we interpret from genetic data.

To make predictions about your dog's physical appearance, we analyzed your dog's genetic code at regions of the genome known to be involved in the determination of size, pigmentation, coat pattern, prevalence of white spotting, coat type, and other special features. In many cases, these are complex traits influenced by variation in multiple genes. We used models that try to predict the cumulative effect of your dog's unique genetic variation.

We don't always get it right. This survey gives you an opportunity to provide feedback on the accuracy of our predictions. Your input will help us to enhance our statistical models and improve our ability to predict a dog's characteristics based on genetic information.

Do you think we got your dog's breed ancestry right?

- ○ Yes
- ○ No → Can you explain how we got it wrong?
  - ○ My dog isn't a purebred dog.
  - ○ My dog is a purebred dog, but you got the breed wrong.
  - ○ My dog is a mixed breed dog, but you got the breeds wrong.
  - ○ This just doesn't seem right.

  What breed(s) do you believe or know your dog to be?

  _____
- ○ I'm not sure

Where did you original get your information about your dog's breed? Please select all that apply.

- ☐ Animal shelter
- ☐ Breeder
- ☐ Met father
- ☐ Met mother
- ☐ Previous owner
- ☐ A genetic test
- ☐ Other: _____

Using the descriptions provided, please select the option that best matches your dog.

	Totally correct	Mostly correct	Mostly wrong	Totally wrong	I don't know
Did we correctly predict your dog's body size?	○	○	○	○	○

Please explain the mismatch between your dog's body size and our predictions:

_____

Did we correctly predict your dog's colors?	○	○	○	○	○

Please explain the mismatch between your dog's colors and our predictions:

_____

Did we correctly predict your dog's coat pattern?	○	○	○	○	○

Please explain the mismatch between your dog's coat patterns and our predictions:

_____

Did we correctly predict your dog's white spotting?	○	○	○	○	○

Please explain the mismatch between your dog's white spotting and our predictions:

_____

Did we correctly predict your dog's coat type?	○	○	○	○	○

Please explain the mismatch between your dog's coat type and our predictions:

_____

Did we correctly predict your dog's special features?	○	○	○	○	○

Please explain the mismatch between your dog's special features and our predictions:

_____

Is there anything else you would like to share with us?

Woof! Thank you for providing feedback. Your input will help us refine our analyses so that we can make better, more accurate conclusions based on genetic data. Give [baseline_arm_1][st_dog_name] some extra belly scritches from all of us at the Dog Aging Project! Please click Submit below to finalize your answers and close this task.

Consent

Response was added on 04/28/2023 5:42pm.

Dog Aging Project PACK

Informed Consent Form: Health and Life Experience Survey

Introduction

You have nominated your dog for participation in the Dog Aging Project (DAP), a longitudinal research study that brings together dogs, dog owners, veterinarians, and scientists to identify factors critical to improving a dog's healthy lifespan. Participation in the Dog Aging Project is voluntary. The first part of the DAP involves answering a fairly long questionnaire called the Health and Life Experience Survey. We will ask for detailed information about your dog, including information about your dog's lifestyle and living environment.

Before you start filling out the Health and Life Experience Survey, we want you to read the following informed consent form. This will take five minutes. The following screens will provide you with more information about the purpose of the survey, what we will do with the data we collect, what will happen after you fill out the survey, how we will store the data and keep your identity private, and your rights as a research participant. It is our hope that this informed consent form will help you decide whether or not the DAP is right for you and your dog.

As you review the informed consent form on the following screens, you may have questions. We would be happy to answer your questions before you make your decision about whether to proceed to the survey. There is a link at the bottom of each screen through which you can contact the DAP. However, we suggest that you read through the whole informed consent form before asking a question because your questions may be answered on subsequent screens. If, at the end of the informed consent form, you still have questions, please email us, and a team member will get back to you within two business days.

After you have read the informed consent form and have received answers to any questions you may have, and if you are ready to proceed to the survey, you will be asked to provide your electronic signature.

Who is conducting this study and how is it funded?

The Dog Aging Project is composed of a collaborative team of over forty researchers from more than twenty different universities and other nonprofit institutions, led by Dr. Daniel Promislow at Tufts University and Dr. Kate Creevy at Texas A&M University.

The Dog Aging Project is supported by grants from the National Institute on Aging and the Dog Aging Institute. We also receive philanthropic donations from organizations and individuals.

Have a question? Contact the team at the Dog Aging Project by phone at (979) 845-2844 or email us.

What is the purpose of the Health and Life Experience Survey?

We have several goals in asking you to fill out the Health and Life Experience Survey.

One goal is to establish a large group of dogs from whom we will be able to collect data and information over time. We seek a broad, diverse group of dogs, including young and old, purebred and mixed breed, male and female, as well as those living in both urban and rural environments from all regions of the United States. This group is known as the "DAP Pack."

By collecting medical data on the dogs in the DAP Pack over time, we hope to make correlations between lifestyle and health. The information that you provide about your dog in the Health and Life Experience Survey, and possibly other surveys as part of the DAP Pack, will be of great value in identifying demographic and environmental influences on a dog's lifespan.

Another goal of the survey is to assess your dog's eligibility for participation in further studies conducted by the DAP and/or our trusted research partners. If your dog is invited to participate in further studies, you will be asked to read and sign additional informed consent forms for those studies. You can, of course, decline to participate.

Have a question? Email us.

What is involved in answering the Health and Life Experience Survey?

The online Health and Life Experience Survey contains approximately 200 questions about your dog's health, lifestyle, behavior, and environment, divided into ten sections.

Although most questions in the Health and Life Experience Survey are about your dog, there are several questions about you and about your living environment. For example, we will ask for your approximate household income and the number of people who live in your home. We will ask about the source of your and your dog's drinking water and about materials in your home.

We estimate that it will take 1-2 hours to complete all ten sections. All of the sections do not need to be completed in one sitting. The survey will automatically save all of your answers. Your answers will be saved in our encrypted database under a unique identification number (UIN) that will be assigned to your dog.

Have a question? Email us.

What happens after I finish the survey?

Once you have completed the Health and Life Experience Survey, your dog will be an official member of the DAP Pack. We will ask you to share your dog's veterinary medical records with us. We will provide full instructions on how to obtain them and provide them to us.

You will have the opportunity to update the Health and Life Experience Survey every year and tell us about changes in your dog's health and lifestyle. In addition, we will invite you to participate in other studies and surveys, all of which are completely voluntary.

We will keep you updated about the Dog Aging Project through regular emails, so please make sure to keep your contact information current in your personal profile. When you have a new research task, we will notify you by email, and the task will appear on the To-Do List within your portal.

Have a question? Email us.

What will you do with the information from the Health and Life Experience Survey?

The information from the Health and Life Experience Survey will be used by us and other researchers to evaluate correlations between dogs' living environment, lifestyle, and health. We may share the data that we collect (coded, without revealing your identity) and publish the data in research and popular media (again, without revealing your identity).

Research conducted under the DAP may result in discoveries that may even lead to the creation of products with commercial value. You will not receive any compensation should this occur. The discoveries and products will be the property of the researchers and their institutions.

Your data will not be used for any other purposes (such as marketing or promotional material) without your explicit consent.

Have a question? Email us.

How will confidentiality be maintained?

Securing your personal information is important to the Dog Aging Project. Your survey answers will be stored in an encrypted database. We will not sell or share any of your personally identifying information (PII) such as your name, address, or contact information. Please click here to read our privacy policy.

The data we obtain from you will be kept under a code, the unique identifying number (UIN) assigned to your dog. The link between the UIN and your PII will be stored separately. We will maintain the link indefinitely so that staff can contact you if necessary (for example, to ask you if you want to join another study). All data and identifying information will be stored on an encrypted, password-protected server.

On rare occasions, staff members from the granting agency and/or the sponsoring universities review studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at legal risk of harm.

Although the information you provide will be confidential, if we learn that you intend to harm yourself or others, including your dog, we must report that to the authorities.

Under the NIH's Open Data initiative, we will share coded data about your dog with other researchers around the US, and potentially around the world, who want to study dog health. Researchers will be able to analyze the data and publish their findings in scientific journals. Your identity and your dog's identity will not be revealed to these other researchers or in any publications.

Have a question? Email us.

Are there any risks to answering the Health and Life Experience Survey?

Answering the Health and Life Experience Survey poses a small risk of breach of confidentiality. However, we have an encrypted database in which we will store all of the data we collect. Only the study staff members will have access to your identifying information.

You may experience some stress due to the length of the survey. You are encouraged to take breaks. Some questions may be uncomfortable, such as questions about aggressive behaviors and questions about serious illnesses your dog may have experienced.

You may at any point decide you no longer want to participate in the DAP and do not want to answer all of the questions. Participation is voluntary, and you can withdraw even though you had initially nominated your dog.

As you fill out the survey, you do not have to answer all of the questions about yourself. However, for your dog to be eligible to be a DAP Pack member, you do need to answer all of the questions about your dog. We realize that you may not know all of the answers to the questions, such as questions about your dog's early history. This is fine. There are many questions with the option of "I don't know," which is an okay answer.

Have a question? Email us.

What are the benefits to answering the survey and becoming part of the DAP Pack?

You will not benefit directly by answering the survey. However, the information we collect in the Health and Life Experience Survey will help us identify unique factors that are directly related to canine, as well as human, longevity and healthy aging. We hope that this information will help dogs and humans in the future.

Have a question? Email us.

What are my rights as a participant in the DAP?

You have the right to see your responses to the Health and Life Experience Survey. If you find there is an error in any of your responses, you may ask us to fix it.

You may refuse to participate, and you are free to withdraw from the DAP at any time without penalty or loss of benefits to which you are otherwise entitled. However, any data that we have already obtained about you and your dog cannot be withdrawn. This information will remain in our database because removing your data from our database would adversely affect the statistical conclusions of our analyses.

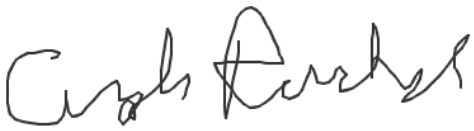
In some cases, we may contact you again for participation in a future study. You are under no obligation to enroll your dog in any future study. We will keep you informed if anything changes in the DAP that might affect your willingness to participate.

Have a question? Email us.

Dog Owner's Agreement to Participate

I have read the informed consent form about the DAP Health and Life Experience Survey. I do not have any questions, or I have had my questions answered by the study team. By clicking "yes" below, I volunteer to take part in this research. If I have questions later about the research, or if I believe I or my dog has been harmed by participating in this study, I can contact the DAP team or one of the Principal Investigators.

⊗ YES, I volunteer to participate

Please type your full name	Cindy Reichel (Full Name)
Please provide signature by clicking the Add signature link and using your mouse or finger (on touch-enabled devices) to sign the form	
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