# HAILEY

## Veterinary Report by Embark

embarkvet.com

Test Date: March 23rd, 2026

## Customer-supplied information

Owner Name: Melvin Lapp
Dog Name: Hailey
Sex: Female
Date of birth: 01/15/22

Breed type: N/A
Breed: Cavalier King Charles Spaniel
Breed registration: N/A
Microchip: N/A

## Genetic summary

Genetic breed identification:
**Cavalier King Charles Spaniel**

Breed ancestry:

**Cavalier King Charles Spaniel: 100.0%**

Predicted adult weight: **17 lbs**
Calculated from 17 size genes.

Life stage: **Young adult**
Based on date of birth provided.

# Health Report

**How to interpret Hailey's genetic health results:**

If Hailey 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 Hailey 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**

Of the 270 genetic health risks we analyzed, we found 4 results that you should learn about.

**Increased risk results** (2)

**Degenerative Myelopathy, DM**

**Intervertebral Disc Disease (Type I)**

**Notable results** (2)

**ALT Activity**

**Copper Toxicosis (Accumulating)**

**Clear results**

**Breed-relevant** (4)

**Other** (262)

# Health Report

## BREED-RELEVANT RESULTS

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

| | |
|---|---|
| Degenerative Myelopathy, DM (SOD1A) | Increased risk |
| Intervertebral Disc Disease (Type I) (FGF4 retrogene - CFA12) | Increased risk |
| Dry Eye Curly Coat Syndrome (FAM83H Exon 5) | Clear |
| Episodic Falling Syndrome (BCAN) | Clear |
| Medium-Chain Acyl-CoA Dehydrogenase Deficiency, MCADD (ACADM, Cavalier King Charles Spaniel Variant) | Clear |
| Muscular Dystrophy (DMD, Cavalier King Charles Spaniel Variant 1) | Clear |

# Health Report

## OTHER RESULTS

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

| | |
|---|---|
| ALT Activity (GPT) | Notable |
| Copper Toxicosis (Accumulating) (ATP7B) | Notable |
| 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 |
| Anhidrotic Ectodermal Dysplasia (EDA Intron 8) | 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 Leukocyte Adhesion Deficiency Type III, CLAD III (FERMT3, German Shepherd Variant) | Clear |
| Canine Multifocal Retinopathy, cmr1 (BEST1 Exon 2) | Clear |
| Canine Multifocal Retinopathy, cmr2 (BEST1 Exon 5, Coton de Tulear Variant) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| 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 |
| Cardiomyopathy and Juvenile Mortality (YARS2) | Clear |
| Centronuclear Myopathy, CNM (PTPLA) | Clear |
| Cerebellar Hypoplasia (VLDLR, Eurasier Variant) | Clear |
| Chondrodysplasia (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 Dyserythropoietic Anemia and Polymyopathy (EHPB1L1, Labrador Retriever 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 |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Congenital Hypothyroidism with Goiter (SLC5A5, Shih Tzu Variant) | Clear |
| Congenital Macrothrombocytopenia (TUBB1 Exon 1, Cairn and Norfolk Terrier Variant) | Clear |
| Congenital Muscular Dystrophy (LAMA2, Italian Greyhound) | Clear |
| Congenital Myasthenic Syndrome, CMS (COLQ, Labrador Retriever Variant) | Clear |
| Congenital Myasthenic Syndrome, CMS (COLQ, Golden Retriever Variant) | Clear |
| 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 |
| Copper Toxicosis (Attenuating) (ATP7A, Labrador Retriever) | Clear |
| Copper Toxicosis (Attenuating) (RETN, Labrador Retriever) | 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 |
| Darier Disease (ATP2A2, Irish Terrier Variant) | Clear |
| Day Blindness (CNGB3 Deletion, Alaskan Malamute Variant) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Day Blindness (CNGA3 Exon 7, German Shepherd 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 |
| Dilated Cardiomyopathy, DCM2 (TTN, Doberman Pinscher Variant 2) | Clear |
| Disproportionate Dwarfism (PRKG2, Dogo Argentino Variant) | 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 |
| Ehlers-Danlos Syndrome (EDS) (COL5A1, Labrador Retriever Variant) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Enamel Hypoplasia (ENAM Deletion, Italian Greyhound Variant) | Clear |
| Enamel Hypoplasia (ENAM SNP, Parson Russell Terrier Variant) | 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 |
| 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 (G6PC1, German Pinscher 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 |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| 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 2, GR-PRA2 (TTC8) | Clear |
| Goniodysgenesis and Glaucoma, Pectinate Ligament Dysplasia, PLD (OLFM3) | Clear |
| Hemophilia A (F8 Exon 11, German Shepherd Variant 1) | Clear |
| Hemophilia A (F8 Exon 1, German Shepherd Variant 2) | Clear |
| Hemophilia A (F8 Exon 10, Boxer Variant) | Clear |
| Hemophilia B (F9 Exon 7, Terrier Variant) | Clear |
| Hemophilia B (F9 Exon 7, Rhodesian Ridgeback Variant) | Clear |
| Hereditary Ataxia (PNPLA8, Australian Shepherd Variant) | Clear |
| Hereditary Ataxia, Cerebellar Degeneration (RAB24, Old English Sheepdog and Gordon Setter Variant) | Clear |
| Hereditary Cataracts (FYCO1, Wirehaired Pointing Griffon Variant) | Clear |
| Hereditary Cerebellar Ataxia (SELENOP, Belgian 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 |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| 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 |
| Ichthyosis, ICH2 (ABHD5, Golden Retriever Variant) | Clear |
| Inflammatory Myopathy (SLC25A12) | Clear |
| Inherited Myopathy of Great Danes (BIN1) | Clear |
| Inherited Selected Cobalamin Malabsorption with Proteinuria (CUBN, Komondor Variant) | 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 |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| 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 |
| Laryngeal Paralysis and Polyneuropathy (CNTNAP1, Leonberger, Saint Bernard, and Labrador Retriever 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 |
| 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 |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Malignant Hyperthermia (RYR1) | Clear |
| May-Hegglin Anomaly (MYH9) | Clear |
| MDR1 Drug Sensitivity (ABCB1) | 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 3, German Shepherd Variant) | Clear |
| Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 5, Terrier Brasileiro Variant) | Clear |
| Muscular Dystrophy (DMD, Golden Retriever Variant) | Clear |
| Muscular Dystrophy-Dystroglycanopathy (LARGE1, Labrador Retriever Variant) | Clear |
| Musladin-Lueke Syndrome, MLS (ADAMTSL2) | Clear |
| Myasthenia Gravis-Like Syndrome (CHRNE, Heideterrier Variant) | Clear |
| Myotonia Congenita (CLCN1 Exon 23, Australian Cattle Dog Variant) | Clear |
| Myotonia Congenita (CLCN1 Exon 19, Labrador Retriever Variant) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| 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 |
| Neuronal Ceroid Lipofuscinosis 7, NCL 7 (MFSD8, Chihuahua and Chinese Crested Variant) | Clear |
| Neuronal Ceroid Lipofuscinosis 8, NCL 8 (CLN8, Australian Shepherd Variant) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| 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 |
| Platelet Factor X Receptor Deficiency, Scott Syndrome (TMEM16F) | Clear |
| Polycystic Kidney Disease, PKD (PKD1) | Clear |
| Pompe's Disease (GAA, Finnish and Swedish Lapphund, Lapponian Herder Variant) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Prekallikrein Deficiency (KLKB1 Exon 8) | Clear |
| Primary Ciliary Dyskinesia, PCD (NME5, Alaskan Malamute Variant) | Clear |
| Primary Ciliary Dyskinesia, PCD (STK36, Australian Shepherd 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 5, PRA5 (NECAP1 Exon 6, Giant Schnauzer 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, PRA1 (CNGB1) | Clear |
| Progressive Retinal Atrophy, PRA3 (FAM161A) | Clear |

# Health Report

## 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 |
| Renal Cystadenocarcinoma and Nodular Dermatofibrosis (FLCN Exon 7) | 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 |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Shaking Puppy Syndrome (PLP1, English Springer Spaniel Variant) | Clear |
| 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 |
| Urate Kidney & Bladder Stones (SLC2A9) | Clear |

# Health Report

## OTHER RESULTS

| | |
|---|---|
| Von Willebrand Disease Type I, Type I vWD (VWF) | Clear |
| Von Willebrand Disease Type II, Type II vWD (VWF, Pointer Variant) | Clear |
| 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 |

# HEALTH REPORT

**Increased risk result**

**Degenerative Myelopathy, DM**

Hailey inherited both copies of the variant we tested for Degenerative Myelopathy, DM
Hailey is at increased risk for DM

**How to interpret this result**
Hailey has two copies of a variant in SOD1 and is at risk for developing DM. As previously stated, this variant is incompletely penetrant, so while it predisposes Hailey to developing DM, other genetic and environmental factors will determine whether Hailey ultimately develops the disease. Please consult your veterinarian to discuss further diagnostic, monitoring, and supportive care options for Hailey.'

**What is Degenerative Myelopathy, DM?**
This condition affects the spinal cord nerves involved in movement, most noticeably in the hind limbs. It is progressive, meaning symptoms worsen over time, including weakness, muscle loss, and changes in walking.

**When signs & symptoms develop in affected dogs**
Affected dogs do not usually show signs of DM until they are at least 8 years old.

**Signs & symptoms**
You may notice your dog scuffing the tops of his or her hind paws, or walking with a hesitant, exaggerated gait. In advanced cases, it can lead to weakness or near-paralysis of all four legs and widespread muscle wasting.

**How vets diagnose this condition**
Definitive diagnosis requires microscopic analysis of the spinal cord after death. However, veterinarians use clues such as genetic testing, breed, age, and other diagnostics to determine if DM is the most likely cause of your dog's clinical signs.

**How this condition is treated**
As dogs are seniors at the time of onset, the treatment for DM is aimed towards increasing their comfort through a combination of lifestyle changes, medication, and physical therapy.

**Actions to take if your dog is affected**

- Talk to your vet about your dog's degenerative myelopathy result, as it may influence how they monitor your dog's mobility and overall health, especially in their senior years.
- Keep your dog active with regular, low-impact exercise to help them maintain a healthy weight and support their mobility.
- Watch for changes in movement, such as wobbling, reluctance to jump, or dragging their back paws, and consult your vet if you notice any of these signs.
- Provide good traction in your home with rugs or mats to help prevent slipping as your dog ages. If mobility becomes difficult, ask your vet about supportive devices such as harnesses or wheelchairs.

# HEALTH REPORT

**Increased risk result**

**Intervertebral Disc Disease (Type I)**

Hailey inherited both copies of the variant we tested for Chondrodystrophy and Intervertebral Disc Disease, CDDY/IVDD, Type I IVDD
Hailey is at increased risk for Type I IVDD

**How to interpret this result**
Hailey has two copies of an FGF4 retrogene on chromosome 12. In some breeds such as Beagles, Cocker Spaniels, and Dachshunds (among others) this variant is found in nearly all dogs. While those breeds are known to have an elevated risk of IVDD, many dogs in those breeds never develop IVDD. For mixed breed dogs and purebreds of other breeds where this variant is not as common, risk for Type I IVDD is greater for individuals with this variant than for similar dogs.

**What is Chondrodystrophy and Intervertebral Disc Disease, CDDY/IVDD, Type I IVDD?**
This condition is associated with differences in body proportions, such as a longer back and shorter legs, and may increase the risk of spinal disc problems. Disc disease can vary in severity, from mild discomfort to more serious movement changes.

**When signs & symptoms develop in affected dogs**
Signs of CDDY are recognized in puppies as it affects body shape. IVDD is usually first recognized in adult dogs, with breed specific differences in age of onset.

**Signs & symptoms**
Research indicates that dogs with one or two copies of this variant have a similar risk of developing IVDD. However, there are some breeds (e.g. Beagles and Cocker Spaniels, among others) where this variant has been passed down to nearly all dogs of the breed and most do not show overt clinical signs of the disorder. This suggests that there are other genetic and environmental factors (such as weight, mobility, and family history) that contribute to an individual dog's risk of developing clinical IVDD. Signs of IVDD include neck or back pain, a change in your dog's walking pattern (including dragging of the hind limbs), and paralysis. These signs can be mild to severe, and if your dog starts exhibiting these signs, you should schedule an appointment with your veterinarian for a diagnosis.

**How vets diagnose this condition**
For CDDY, dogs with one copy of this variant may have mild proportional differences in their leg length. Dogs with two copies of this variant will often have visually longer bodies and shorter legs. For IVDD, a neurological exam will be performed on any dog showing suspicious signs. Based on the result of this exam, radiographs to detect the presence of calcified discs or advanced imaging (MRI/CT) to detect a disc rupture may be recommended.

**How this condition is treated**
IVDD is treated differently based on the severity of the disease. Mild cases often respond to medical management which includes cage rest and pain management, while severe cases are often treated with surgical intervention. Both conservative and surgical treatment should be followed up with rehabilitation and physical therapy.

**Actions to take if your dog is affected**
- Talk to your vet about your dog's chondrodystrophy and intervertebral disc disease result so you can discuss how it may influence their daily activities and lifestyle.
- This variant is very common in certain breeds, and many dogs with this result will not need any special accommodations because they are unlikely to develop symptoms. However, some breeds are at greater risk, and precautions may help reduce strain on the back and neck.
- Keep your dog fit with regular, low-impact exercise and maintain a healthy weight to support spinal health.
- Consider using ramps to access furniture, avoiding long flights of stairs, and choosing a harness instead of a collar to minimize stress on the spine.

# HEALTH REPORT

**Notable result**

**ALT Activity**

Hailey inherited both copies of the variant we tested for Alanine Aminotransferase Activity

**Why is this important to your vet?**
Hailey has two copies of a variant in the GPT gene and is likely to have a lower than average baseline ALT activity. ALT is a commonly used measure of liver health on routine veterinary blood chemistry panels. As such, your veterinarian may want to watch for changes in Hailey's ALT activity above their current, healthy, ALT activity. As an increase above Hailey's baseline ALT activity could be evidence of liver damage, even if it is within normal limits by standard ALT reference ranges.

**What is Alanine Aminotransferase Activity?**
ALT is a liver enzyme that vets measure to monitor liver health. With this result, your dog may naturally have a lower ALT baseline. Knowing this helps your veterinarian interpret future bloodwork results more accurately.

**How vets diagnose this condition**
Genetic testing is the only way to provide your veterinarian with this clinical tool.

**How this condition is treated**
Veterinarians may recommend blood work to establish a baseline ALT value for healthy dogs with one or two copies of this variant.

**Actions to take if your dog is affected**

- Talk to your vet about your dog's ALT result, as it may help them better interpret your dog's blood work.
- Dogs with this result do not exhibit symptoms or develop health issues associated with this variant.

# HEALTH REPORT

**Notable result**

**Copper Toxicosis (Accumulating)**

Hailey inherited both copies of the variant we tested for Copper Toxicosis (Accumulating)
Hailey is not known to be at increased risk for Copper Toxicosis (Accumulating)

**What does this result mean?**
We do not know whether this increases the risk that Hailey will develop Copper Toxicosis (Accumulating).

**Scientific Basis**
Research studies for this variant have been based on dogs of other breeds. Not enough dogs with Hailey's breed have been studied to know whether or not this variant will increase Hailey's risk of developing this disease.

**Impact on Breeding**
Research into the clinical impact of this variant is ongoing. We recommend tracking this genetic result and incidence of Copper Toxicosis (Accumulating) in your breeding program and related dogs.

**What is Copper Toxicosis (Accumulating)?**
This condition affects the liver's ability to remove excess copper. Over time, copper can build up in the liver and damage liver cells. Both genetic and environmental factors play a role in how the condition develops.

**When signs & symptoms develop in affected dogs**
Signs typically develop in adults.

**How vets diagnose this condition**
Genetic testing, blood work, abdominal ultrasound, and surgical biopsy are all used to diagnose this condition.

**How this condition is treated**
Treatment includes a low copper diet and medical management to help bind excess copper. Antioxidant supplements may also be considered.

**Actions to take if your dog is affected**

- Talk to your vet about your dog's copper toxicosis result so you can discuss if dietary management or monitoring is indicated.
- Copper is an essential nutrient, but amounts can vary widely among commercial diets, so your vet may recommend a specific food or periodic testing to maintain safe levels.
- Many dogs with this result never develop clinical disease. Watch for signs that may indicate high copper levels, such as decreased appetite, vomiting, lethargy, or jaundice.
- Learn more about how the three variants for Copper Toxicosis are inherited and, if applicable, how results can be used in a breeding program here (https://embarkvet.com/resources/embark-adds-copper-toxicosis-dna-test/).

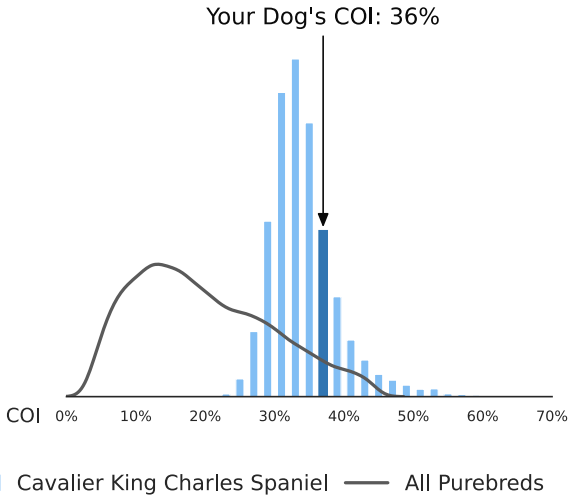
# Genetic Diversity and Inbreeding

## Coefficient of Inbreeding (COI)

**Genetic Result: 36%**

Our genetic COI measures the proportion of your dog's genome (her genes) where the genes on the mother's side are identical by descent to those on the father's side. The higher your dog's coefficient of inbreeding (the percentage), the more inbred your dog is.

## Your Dog's COI




This graph represents where your dog's inbreeding levels fall on a scale compared to both dogs with a similar breed makeup to her (the blue bars) and all purebred dogs (the grey line).

# Genetic Diversity and Inbreeding

## More on the Science

Embark scientists, along with our research partners at Cornell University, have shown the impact of inbreeding on longevity and fertility and developed a state-of-the-art, peer-reviewed method for accurately measuring COI and predicting average COI in litters.

**Citations**

Sams & Boyko 2019 "Fine-Scale Resolution of Runs of Homozygosity Reveal Patterns of Inbreeding and Substantial Overlap with Recessive Disease Genotypes in Domestic Dogs" (https://www.ncbi.nlm.nih.gov/pubmed/30429214)

Chu et al 2019 "Inbreeding depression causes reduced fecundity in Golden Retrievers" (https://link.springer.com/article/10.1007/s00335-019-09805-4)

Yordy et al 2019 "Body size, inbreeding, and lifespan in domestic dogs" (https://www.semanticscholar.org/paper/Body-size%2C-inbreeding%2C-and-lifespan-in-domestic-Yordy-Kraus/61d0fa7a71afb26f547f0fb7ff71e23a14d19d2c)

# About Embark

Embark Veterinary is a canine genetics company offering research-grade genetic tests to pet owners and breeders. Every Embark test examines thousands of genetic markers, and provides results for over NaN genetic health conditions, breed identification, clinical tools, and more.

Embark is a research partner of the Cornell University College of Veterinary Medicine and collaborates with scientists and registries to accelerate genetic research in canine health. We make it easy for customers and vets to understand, share and make use of their dog's unique genetic profile to improve canine health and happiness.

Learn more at embarkvet.com

Veterinarians and hospitals can send inquiries to veterinarians@embarkvet.com.