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# LUCKY

## Veterinary Report by **embark**

embarkvet.com

Test Date: February 25th, 2020

## Customer-supplied information

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Owner Name: Melissa S Miller

Dog Name: Lucky

Sex: Male (intact)

Date of birth: 12/31/19

Breed type: n/a

Breed: Labradoodle

Breed registration: n/a

Microchip: n/a

## Genetic summary

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Genetic breed identification:

**Mixed Breed**

Predicted adult weight: **40 lbs**

Calculated from 17 size genes.

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Genetic age: **6 human years**

Human equivalent age based on size, date of birth provided, and other factors

# Clinical Tools

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These clinical genetic tools can inform clinical decisions and diagnoses. These tools do not predict increased risk for disease.

## **Alanine Aminotransferase Activity (GPT)**

Lucky's baseline ALT level is Low Normal

### **Why is this important to your vet?**

Lucky has one copy of a variant associated with reduced ALT activity as measured on veterinary blood chemistry panels. Please inform your veterinarian that Lucky has this genotype, as ALT is often used as an indicator of liver health and Lucky is likely to have a lower than average resting ALT activity. As such, an increase in Lucky's 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?**

The liver enzyme alanine aminotransferase, or ALT, is one of several values your veterinarian measures on routine blood work to gauge liver health.

### **How vets diagnose this condition**

Genetic testing is the only way to know if your dog has this clinical condition.

### **How this condition is treated**

No treatment is necessary! Your veterinarian may recommend blood work to establish an individualized baseline ALT value during an annual wellness exam or before starting certain medications. You and your veterinarian would then be able to monitor your dog for any deviation from this established baseline.

# Health Report

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## **How to interpret Lucky's genetic health results:**

If Lucky 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 Lucky 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.



**Lucky inherited one variant that you should learn more about.**

# Health Report

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## **Progressive Retinal Atrophy - crd4/cord1 (RPGRIP1)**

### **What does this result mean?**

This result should not impact Lucky's health but it could have consequences for siblings or other related dogs if they inherited two copies of the variant. We recommend discussing this result with their owners or breeders if you are in contact.

### **Impact on Breeding**

This result should be taken into account as part of your breeding program. Lucky will pass this variant to ~50% of his offspring.

### **What is Progressive Retinal Atrophy - crd4/cord1?**

PRA-CRD4/cord1 is a retinal disease that causes progressive, non-painful vision loss over a 1-2 year period. The retina contains cells, called photoreceptors, that collect information about light and send signals to the brain. There are two types of photoreceptors: rods, for night vision and movement, and cones, for day vision and color. This type of PRA leads to early loss of cone cells, causing day blindness before night blindness.

### **When signs & symptoms develop in affected dogs**

The earliest ophthalmic signs are typically present by 6 months of age. There is a wide range in the age of when dogs become clinically affected, although the average age is approximately 5 years. Dogs as young as 6 months may be blind, while dogs as old as 10 may still have vision.

### **How vets diagnose this condition**

Veterinarians use a focused light to examine the pupils. In affected dogs, the pupils will appear more dilated and slower to contract. Your vet may also use a lens to visualize the retina at the back of the eye to look for changes in the optic nerve or blood vessels. You may be referred to a veterinary ophthalmologist for a definitive diagnosis.

### **How this condition is treated**

Currently, there is no definitive treatment for PRA. Supplements, including antioxidants, have been proposed for management of the disease, but have not been scientifically proven effective.

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

Careful monitoring by your veterinarian will be required for the rest of your affected dog's life as secondary complications, including cataracts, can develop. With blind dogs, keeping furniture in the same location, making sure they are on a leash in unfamiliar territory, and training them to understand verbal commands are some of the ways to help them at home.

# Breed-Relevant Conditions Tested

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Lucky did not have the variants that we tested for, that are relevant to his breeds:

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

# Breed-Relevant Conditions Tested

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- ✔ **Skeletal Dysplasia 2, SD2 (COL11A2)**
- ✔ **Chondrodystrophy and Intervertebral Disc Disease, CDDY/IVDD, Type I IVDD (FGF4 retrogene - CFA12)**

# Additional Conditions Tested

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Lucky did not have the variants that we tested for, in the following conditions that the potential effect on dogs with Lucky's breeds may not yet be known.

- ✓ MDR1 Drug Sensitivity (MDR1)
- ✓ P2Y12 Receptor Platelet Disorder (P2RY12)
- ✓ Factor IX Deficiency, Hemophilia B (F9 Exon 7, Terrier Variant)
- ✓ Factor IX Deficiency, Hemophilia B (F9 Exon 7, Rhodesian Ridgeback Variant)
- ✓ Factor VII Deficiency (F7 Exon 5)
- ✓ Factor VIII Deficiency, Hemophilia A (F8 Exon 10, Boxer Variant)
- ✓ Factor VIII Deficiency, Hemophilia A (F8 Exon 11, Shepherd Variant 1)
- ✓ Factor VIII Deficiency, Hemophilia A (F8 Exon 1, Shepherd Variant 2)
- ✓ Thrombopathia (RASGRP2 Exon 5, Basset Hound Variant)
- ✓ Thrombopathia (RASGRP2 Exon 8)
- ✓ Thrombopathia (RASGRP2 Exon 5, American Eskimo Dog Variant)
- ✓ Von Willebrand Disease Type III, Type III vWD (VWF Exon 4)
- ✓ Von Willebrand Disease Type II, Type II vWD (VWF)
- ✓ Canine Leukocyte Adhesion Deficiency Type III, CLAD3 (FERMT3)
- ✓ Glanzmann's Thrombasthenia Type I (ITGA2B Exon 12)
- ✓ May-Hegglin Anomaly (MYH9)
- ✓ Prekallikrein Deficiency (KLKB1 Exon 8)
- ✓ Pyruvate Kinase Deficiency (PKLR Exon 5)
- ✓ Pyruvate Kinase Deficiency (PKLR Exon 7 Pug Variant)
- ✓ Pyruvate Kinase Deficiency (PKLR Exon 7 Beagle Variant)
- ✓ Pyruvate Kinase Deficiency (PKLR Exon 10)
- ✓ Trapped Neutrophil Syndrome (VPS13B)
- ✓ Ligneous Membranitis, LM (PLG)
- ✓ Platelet factor X receptor deficiency, Scott Syndrome (TMEM16F)

# Additional Conditions Tested

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- ✔ Methemoglobinemia CYB5R3
- ✔ Congenital Hypothyroidism (TPO, Tenterfield Terrier Variant)
- ✔ Complement 3 Deficiency, C3 Deficiency (C3)
- ✔ Severe Combined Immunodeficiency (PRKDC)
- ✔ Severe Combined Immunodeficiency (RAG1)
- ✔ X-linked Severe Combined Immunodeficiency (IL2RG Variant 1)
- ✔ X-linked Severe Combined Immunodeficiency (IL2RG Variant 2)
- ✔ Progressive Retinal Atrophy, rcd1 (PDE6B Exon 21 Irish Setter Variant)
- ✔ Progressive Retinal Atrophy, rcd3 (PDE6A)
- ✔ Progressive Retinal Atrophy, CNGA (CNGA1 Exon 9)
- ✔ Progressive Retinal Atrophy (CNGB1)
- ✔ Progressive Retinal Atrophy (SAG)
- ✔ Golden Retriever Progressive Retinal Atrophy 1, GR-PRA1 (SLC4A3)
- ✔ Progressive Retinal Atrophy, crd1 (PDE6B)
- ✔ Progressive Retinal Atrophy, crd2 (IQCB1)
- ✔ Collie Eye Anomaly, Choroidal Hypoplasia, CEA (NHEJ1)
- ✔ Achromatopsia (CNGA3 Exon 7 German Shepherd Variant)
- ✔ Autosomal Dominant Progressive Retinal Atrophy (RHO)
- ✔ Canine Multifocal Retinopathy (BEST1 Exon 2)
- ✔ Canine Multifocal Retinopathy (BEST1 Exon 5)
- ✔ Canine Multifocal Retinopathy (BEST1 Exon 10 Deletion)
- ✔ Canine Multifocal Retinopathy (BEST1 Exon 10 SNP)
- ✔ Glaucoma (ADAMTS10 Exon 9)
- ✔ Glaucoma (ADAMTS10 Exon 17)

# Additional Conditions Tested

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- ✓ Glaucoma (ADAMTS17 Exon 11)
- ✓ Glaucoma (ADAMTS17 Exon 2)
- ✓ Hereditary Cataracts, Early-Onset Cataracts, Juvenile Cataracts (HSF4 Exon 9 Shepherd Variant)
- ✓ Primary Lens Luxation (ADAMTS17)
- ✓ Congenital Stationary Night Blindness (RPE65)
- ✓ 2,8-Dihydroxyadenine Urolithiasis, 2,8-DHA Urolithiasis (APRT)
- ✓ Cystinuria Type I-A (SLC3A1)
- ✓ Cystinuria Type II-A (SLC3A1)
- ✓ Cystinuria Type II-B (SLC7A9)
- ✓ Polycystic Kidney Disease, PKD (PKD1)
- ✓ Primary Hyperoxaluria (AGXT)
- ✓ Protein Losing Nephropathy, PLN (NPHS1)
- ✓ X-Linked Hereditary Nephropathy, XLHN (COL4A5 Exon 35, Samoyed Variant 2)
- ✓ Primary Ciliary Dyskinesia, PCD (CCDC39 Exon 3)
- ✓ Congenital Keratoconjunctivitis Sicca and Ichthyosiform Dermatitis, Dry Eye Curly Coat Syndrome, CKCSID (FAM83H Exon 5)
- ✓ X-linked Ectodermal Dysplasia, Anhidrotic Ectodermal Dysplasia (EDA Intron 8)
- ✓ Renal Cystadenocarcinoma and Nodular Dermatofibrosis, RCND (FLCN Exon 7)
- ✓ Canine Fucosidosis (FUCA1)
- ✓ Glycogen Storage Disease Type II, Pompe's Disease, GSD II (GAA)
- ✓ Glycogen Storage Disease Type IA, Von Gierke Disease, GSD IA (G6PC)
- ✓ Glycogen Storage Disease Type IIIA, GSD IIIA (AGL)
- ✓ Mucopolysaccharidosis Type I, MPS I (IDUA)
- ✓ Mucopolysaccharidosis Type IIIA, Sanfilippo Syndrome Type A, MPS IIIA (SGSH Exon 6 Variant 1)
- ✓ Mucopolysaccharidosis Type IIIA, Sanfilippo Syndrome Type A, MPS IIIA (SGSH Exon 6 Variant 2)

# Additional Conditions Tested

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- ✔ Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 5)
- ✔ Mucopolysaccharidosis Type VII, Sly Syndrome, MPS VII (GUSB Exon 3)
- ✔ Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM Wachtelhund Variant)
- ✔ Lagotto Storage Disease (ATG4D)
- ✔ Neuronal Ceroid Lipofuscinosis 1, NCL 1 (PPT1 Exon 8)
- ✔ Neuronal Ceroid Lipofuscinosis 2, NCL 2 (TPP1 Exon 4)
- ✔ Neuronal Ceroid Lipofuscinosis 1, Cerebellar Ataxia, NCL4A (ARSG Exon 2)
- ✔ Neuronal Ceroid Lipofuscinosis 1, NCL 5 (CLN5 Border Collie Variant)
- ✔ Neuronal Ceroid Lipofuscinosis 6, NCL 6 (CLN6 Exon 7)
- ✔ Neuronal Ceroid Lipofuscinosis 8, NCL 8 (CLN8 English Setter Variant)
- ✔ Neuronal Ceroid Lipofuscinosis (MFSD8)
- ✔ Neuronal Ceroid Lipofuscinosis (CLN8 Australian Shepherd Variant)
- ✔ Neuronal Ceroid Lipofuscinosis 10, NCL 10 (CTSD Exon 5)
- ✔ Neuronal Ceroid Lipofuscinosis (CLN5 Golden Retriever Variant)
- ✔ Adult-Onset Neuronal Ceroid Lipofuscinosis (ATP13A2, Tibetan Terrier Variant)
- ✔ Late-Onset Neuronal Ceroid Lipofuscinosis (ATP13A2, Australian Cattle Dog Variant)
- ✔ GM1 Gangliosidosis (GLB1 Exon 15 Shiba Inu Variant)
- ✔ GM1 Gangliosidosis (GLB1 Exon 15 Alaskan Husky Variant)
- ✔ GM1 Gangliosidosis (GLB1 Exon 2)
- ✔ GM2 Gangliosidosis (HEXA)
- ✔ Globoid Cell Leukodystrophy, Krabbe disease (GALC Exon 5)
- ✔ Autosomal Recessive Amelogenesis Imperfecta, Familial Enamel Hypoplasia (Italian Greyhound Variant)
- ✔ Autosomal Recessive Amelogenesis Imperfecta, Familial Enamel Hypoplasia (Parson Russell Terrier Variant)
- ✔ Persistent Mullerian Duct Syndrome, PMDS (AMHR2)

# Additional Conditions Tested

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- ✔ Deafness and Vestibular Syndrome of Dobermans, DVDob, DINGS (MYO7A)
- ✔ Shar-Pei Autoinflammatory Disease, SPAID, Shar-Pei Fever (MTBP)
- ✔ Alaskan Husky Encephalopathy, Subacute Necrotizing Encephalomyelopathy (SLC19A3)
- ✔ Cerebellar Abiotrophy, Neonatal Cerebellar Cortical Degeneration, NCCD (SPTBN2)
- ✔ Cerebellar Ataxia, Progressive Early-Onset Cerebellar Ataxia (SEL1L)
- ✔ Cerebellar Hypoplasia (VLDLR)
- ✔ Spinocerebellar Ataxia, Late-Onset Ataxia, LoSCA (CAPN1)
- ✔ Spinocerebellar Ataxia with Myokymia and/or Seizures (KCNJ10)
- ✔ Benign Familial Juvenile Epilepsy, Remitting Focal Epilepsy (LGI2)
- ✔ Fetal-Onset Neonatal Neuroaxonal Dystrophy (MFN2)
- ✔ Hypomyelination and Tremors (FNIP2)
- ✔ Shaking Puppy Syndrome, X-linked Generalized Tremor Syndrome (PLP)
- ✔ Neuroaxonal Dystrophy, NAD (Spanish Water Dog Variant)
- ✔ Neuroaxonal Dystrophy, NAD (Rottweiler Variant)
- ✔ L-2-Hydroxyglutaricaciduria, L2HGA (L2HGDH)
- ✔ Polyneuropathy, NDRG1 Greyhound Variant (NDRG1 Exon 15)
- ✔ Polyneuropathy, NDRG1 Malamute Variant (NDRG1 Exon 4)
- ✔ Progressive Neuronal Abiotrophy, Canine Multiple System Degeneration, CMSD (SERAC1 Exon 15)
- ✔ Progressive Neuronal Abiotrophy, Canine Multiple System Degeneration, CMSD (SERAC1 Exon 4)
- ✔ Juvenile Laryngeal Paralysis and Polyneuropathy, Polyneuropathy with Ocular Abnormalities and Neuronal Vacuolation, POANV (RAB3GAP1, Rottweiler Variant)
- ✔ Juvenile-Onset Polyneuropathy, Leonberger Polyneuropathy 1, LPN1 (LPN1, ARHGEF10)
- ✔ Spongy Degeneration with Cerebellar Ataxia 1, SDCA1, SeSAME/EAST Syndrome (KCNJ10)
- ✔ Spongy Degeneration with Cerebellar Ataxia 2, SDCA2 (ATP1B2)
- ✔ Dilated Cardiomyopathy, DCM1 (PDK4)

# Additional Conditions Tested

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- ✔ Dilated Cardiomyopathy, DCM2 (TTN)
- ✔ Long QT Syndrome (KCNQ1)
- ✔ Muscular Dystrophy (DMD, Cavalier King Charles Spaniel Variant 1)
- ✔ Muscular Dystrophy (DMD Pembroke Welsh Corgi Variant )
- ✔ Muscular Dystrophy (DMD Golden Retriever Variant)
- ✔ Inherited Myopathy of Great Danes (BIN1)
- ✔ Myostatin Deficiency, Bully Whippet Syndrome (MSTN)
- ✔ Myotonia Congenita (CLCN1 Exon 7)
- ✔ Myotonia Congenita (CLCN1 Exon 23)
- ✔ Hypocatalasia, Acatlasemia (CAT)
- ✔ Pyruvate Dehydrogenase Deficiency (PDP1)
- ✔ Malignant Hyperthermia (RYR1)
- ✔ Imlerslund-Grasbeck Syndrome, Selective Cobalamin Malabsorption (CUBN Exon 53)
- ✔ Imlerslund-Grasbeck Syndrome, Selective Cobalamin Malabsorption (CUBN Exon 8)
- ✔ Lundehund Syndrome (LEPREL1)
- ✔ Congenital Myasthenic Syndrome (CHAT)
- ✔ Episodic Falling Syndrome (BCAN)
- ✔ Dystrophic Epidermolysis Bullosa (COL7A1)
- ✔ Ectodermal Dysplasia, Skin Fragility Syndrome (PKP1)
- ✔ Ichthyosis, Epidermolytic Hyperkeratosis (KRT10)
- ✔ Ichthyosis (PNPLA1)
- ✔ Ichthyosis (SLC27A4)
- ✔ Ichthyosis (NIPAL4)
- ✔ Focal Non-Epidermolytic Palmoplantar Keratoderma, Pachyonychia Congenita (KRT16)

# Additional Conditions Tested

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- ✓ Hereditary Footpad Hyperkeratosis (FAM83G)
- ✓ Musladin-Lueke Syndrome (ADAMTSL2)
- ✓ Bald Thigh Syndrome (IGFBP5)
- ✓ Cleft Lip and/or Cleft Palate (ADAMTS20)
- ✓ Hereditary Vitamin D-Resistant Rickets (VDR)
- ✓ Osteogenesis Imperfecta, Brittle Bone Disease (COL1A2)
- ✓ Osteogenesis Imperfecta, Brittle Bone Disease (SERPINH1)
- ✓ Osteogenesis Imperfecta, Brittle Bone Disease (COL1A1)
- ✓ Craniomandibular Osteopathy, CMO (SLC37A2)
- ✓ Chondrodystrophy, Norwegian Elkhound and Karelian Bear Dog Variant (ITGA10)

# About Embark

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Embark Veterinary is a canine genetics company offering research-grade genetic tests to pet owners and breeders. Every Embark test examines over 200,000 genetic markers, and provides results for over 170 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](https://embarkvet.com)

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