

# REX

## Veterinary Report by Embark

embarkvet.com

Test Date: November 2nd, 2022

### Customer-supplied information

Owner Name: Ryan Spiess

Dog Name: Rex

Sex: Male (intact)

Date of birth: 08/16/22

Breed type: purebred

Breed: Poodle (Toy)

Breed registration: American Kennel Club (AKC) PR26008504


Microchip: N/A

### Genetic summary

Genetic breed identification:

**Poodle (Small)**

Breed mix:

 **Poodle (Small): 100.0%**

Predicted adult weight: **13 lbs**

Calculated from 17 size genes.

Life stage: **Young adult**

Based on date of birth provided.

# Health Report

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## How to interpret Rex's genetic health results:

If Rex 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 Rex 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 240 genetic health risks we analyzed, we found 2 results that you should learn about.

### Increased risk results (1)

**Intervertebral Disc Disease (Type I)**

### Notable results (1)

**ALT Activity**

### Clear results







**Breed-relevant (5)**

**Other (233)**

# Health Report

## BREED-RELEVANT RESULTS



















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

	Intervertebral Disc Disease (Type I) (FGF4 retrogene - CFA12)	Increased risk
	GM2 Gangliosidosis (HEXB, Poodle Variant)	Clear
	Neonatal Encephalopathy with Seizures, NEWS (ATF2)	Clear
	Osteochondrodysplasia (SLC13A1, Poodle Variant)	Clear
	Progressive Retinal Atrophy, prcd (PRCD Exon 1)	Clear
	Von Willebrand Disease Type I, Type I vWD (VWF)	Clear

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## OTHER RESULTS

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

	ALT Activity (GPT)	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
	Canine Multifocal Retinopathy, cmr3 (BEST1 Exon 10 Deletion, Finnish and Swedish Lapphund, Lapponian Herder Variant)	Clear

# Health Report

## OTHER RESULTS

	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
	Chondrodystrophy (ITGA10, Norwegian Elkhound and Karelian Bear Dog Variant)	Clear
	Cleft Lip and/or Cleft Palate (ADAMTS20, 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 Hypothyroidism (TPO, Rat, Toy, Hairless Terrier Variant)	Clear
	Congenital Hypothyroidism (TPO, Tenterfield Terrier Variant)	Clear
	Congenital Hypothyroidism with Goiter (SLC5A5, Shih Tzu Variant)	Clear
	Congenital Macrothrombocytopenia (TUBB1 Exon 1, Cairn and Norfolk Terrier Variant)	Clear
	Congenital Myasthenic Syndrome, CMS (COLQ, Labrador Retriever Variant)	Clear
	Congenital Myasthenic Syndrome, CMS (COLQ, Golden Retriever Variant)	Clear
	Congenital Myasthenic Syndrome, CMS (CHAT, Old Danish Pointing Dog Variant)	Clear



















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## OTHER RESULTS

✓ Congenital Myasthenic Syndrome, CMS (CHRNE, Jack Russell Terrier Variant)	Clear
✓ Congenital Stationary Night Blindness (LRIT3, Beagle Variant)	Clear
✓ Congenital Stationary Night Blindness (RPE65, Briard Variant)	Clear
✓ Craniomandibular Osteopathy, CMO (SLC37A2)	Clear
✓ Cystinuria Type I-A (SLC3A1, Newfoundland Variant)	Clear
✓ Cystinuria Type II-A (SLC3A1, Australian Cattle Dog Variant)	Clear
✓ Cystinuria Type II-B (SLC7A9, Miniature Pinscher Variant)	Clear
✓ Day Blindness (CNGB3 Deletion, Alaskan Malamute Variant)	Clear
✓ Day Blindness (CNGA3 Exon 7, 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
✓ Degenerative Myelopathy, DM (SOD1A)	Clear
✓ Demyelinating Polyneuropathy (SBF2/MTRM13)	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
✓ Dry Eye Curly Coat Syndrome (FAM83H Exon 5)	Clear



















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## OTHER RESULTS

	Dystrophic Epidermolysis Bullosa (COL7A1, Central Asian Shepherd Dog Variant)	Clear
	Dystrophic Epidermolysis Bullosa (COL7A1, Golden Retriever Variant)	Clear
	Early Bilateral Deafness (LOXHD1 Exon 38, Rottweiler Variant)	Clear
	Early Onset Adult Deafness, EOAD (EPS8L2 Deletion, Rhodesian Ridgeback Variant)	Clear
	Early Onset Cerebellar Ataxia (SEL1L, Finnish Hound Variant)	Clear
	Ehlers Danlos (ADAMTS2, Doberman Pinscher Variant)	Clear
	Enamel Hypoplasia (ENAM Deletion, Italian Greyhound Variant)	Clear
	Enamel Hypoplasia (ENAM SNP, Parson Russell Terrier Variant)	Clear
	Episodic Falling Syndrome (BCAN)	Clear
	Exercise-Induced Collapse, EIC (DNM1)	Clear
	Factor VII Deficiency (F7 Exon 5)	Clear
	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

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





## OTHER RESULTS

	Glycogen Storage Disease Type IA, Von Gierke Disease, GSD IA (G6PC, Maltese Variant)	Clear
	Glycogen Storage Disease Type IIIA, GSD IIIA (AGL, Curly Coated Retriever Variant)	Clear
	Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM, Whippet and English Springer Spaniel Variant)	Clear
	Glycogen storage disease Type VII, Phosphofructokinase Deficiency, PFK Deficiency (PFKM, Wachtelhund Variant)	Clear
	GM1 Gangliosidosis (GLB1 Exon 2, Portuguese Water Dog Variant)	Clear
	GM1 Gangliosidosis (GLB1 Exon 15, Shiba Inu Variant)	Clear
	GM1 Gangliosidosis (GLB1 Exon 15, Alaskan Husky Variant)	Clear
	GM2 Gangliosidosis (HEXA, Japanese Chin Variant)	Clear
	Golden Retriever Progressive Retinal Atrophy 1, GR-PRA1 (SLC4A3)	Clear
	Golden Retriever Progressive Retinal Atrophy 2, GR-PRA2 (TTC8)	Clear
	Goniodysgenesis and Glaucoma, Pectinate Ligament Dysplasia, PLD (OLFM3)	Clear
	Hemophilia A (F8 Exon 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, Cerebellar Degeneration (RAB24, Old English Sheepdog and Gordon Setter Variant)	Clear
	Hereditary Cataracts (HSF4 Exon 9, Australian Shepherd Variant)	Clear



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## OTHER RESULTS

	Hereditary Footpad Hyperkeratosis (FAM83G, Terrier and Kromfohrlander Variant)	Clear
	Hereditary Footpad Hyperkeratosis (DSG1, Rottweiler Variant)	Clear
	Hereditary Nasal Parakeratosis (SUV39H2 Intron 4, Greyhound Variant)	Clear
	Hereditary Nasal Parakeratosis, HNPk (SUV39H2)	Clear
	Hereditary Vitamin D-Resistant Rickets (VDR)	Clear
	Hypocatalasia, Acatalasemia (CAT)	Clear
	Hypomyelination and Tremors (FNIP2, Weimaraner Variant)	Clear
	Hypophosphatasia (ALPL Exon 9, Karelian Bear Dog Variant)	Clear
	Ichthyosis (NIPAL4, American Bulldog Variant)	Clear
	Ichthyosis (SLC27A4, Great Dane Variant)	Clear
	Ichthyosis, Epidermolytic Hyperkeratosis (KRT10, Terrier Variant)	Clear
	Ichthyosis, ICH1 (PNPLA1, Golden Retriever Variant)	Clear
	Inflammatory Myopathy (SLC25A12)	Clear
	Inherited Myopathy of Great Danes (BIN1)	Clear
	Inherited Selected Cobalamin Malabsorption with Proteinuria (CUBN, Komondor Variant)	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

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## 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
✓ 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
✓ Malignant Hyperthermia (RYR1)	Clear

# Health Report

## OTHER RESULTS

✓ May-Hegglin Anomaly (MYH9)	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
✓ Multiple Drug Sensitivity (ABCB1)	Clear
✓ Muscular Dystrophy (DMD, Cavalier King Charles Spaniel Variant 1)	Clear
✓ Muscular Dystrophy (DMD, Golden 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 7, Miniature Schnauzer Variant)	Clear
✓ Narcolepsy (HCRTR2 Exon 1, Dachshund Variant)	Clear
✓ Narcolepsy (HCRTR2 Intron 4, Doberman Pinscher Variant)	Clear



















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## OTHER RESULTS

✓	Narcolepsy (HCRT2 Intron 6, Labrador Retriever Variant)	Clear
✓	Nemaline Myopathy (NEB, American Bulldog Variant)	Clear
✓	Neonatal Cerebellar Cortical Degeneration (SPTBN2, Beagle Variant)	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
✓	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, Small Breed Variant)	Clear



















# Health Report

## OTHER RESULTS

 Oculoskeletal Dysplasia 2 (COL9A2, Samoyed 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
 Prekallikrein Deficiency (KLKB1 Exon 8)	Clear
 Primary Ciliary Dyskinesia, PCD (NME5, Alaskan Malamute Variant)	Clear
 Primary Ciliary Dyskinesia, PCD (CCDC39 Exon 3, Old English Sheepdog Variant)	Clear
 Primary Hyperoxaluria (AGXT)	Clear
 Primary Lens Luxation (ADAMTS17)	Clear
 Primary Open Angle Glaucoma (ADAMTS17 Exon 11, Basset Fauve de Bretagne Variant)	Clear



















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## OTHER RESULTS

	Primary Open Angle Glaucoma (ADAMTS10 Exon 17, Beagle Variant)	Clear
	Primary Open Angle Glaucoma (ADAMTS10 Exon 9, Norwegian Elkhound Variant)	Clear
	Primary Open Angle Glaucoma and Primary Lens Luxation (ADAMTS17 Exon 2, Chinese Shar-Pei Variant)	Clear
	Progressive Retinal Atrophy (SAG)	Clear
	Progressive Retinal Atrophy (IFT122 Exon 26, Lapponian Herder Variant)	Clear
	Progressive Retinal Atrophy, Bardet-Biedl Syndrome (BBS2 Exon 11, Shetland Sheepdog Variant)	Clear
	Progressive Retinal Atrophy, CNGA (CNGA1 Exon 9)	Clear
	Progressive Retinal Atrophy, crd1 (PDE6B, American Staffordshire Terrier Variant)	Clear
	Progressive Retinal Atrophy, crd4/cord1 (RPGRIP1)	Clear
	Progressive Retinal Atrophy, PRA1 (CNGB1)	Clear
	Progressive Retinal Atrophy, PRA3 (FAM161A)	Clear
	Progressive Retinal Atrophy, rcd1 (PDE6B Exon 21, Irish Setter Variant)	Clear
	Progressive Retinal Atrophy, rcd3 (PDE6A)	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



















# Health Report

## OTHER RESULTS

 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
 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

# Health Report

## OTHER RESULTS

	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
	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



# Health Report

## HEALTH REPORT

### Increased risk result

#### Intervertebral Disc Disease (Type I)

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

#### How to interpret this result

Rex 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?

Type I Intervertebral Disc Disease (IVDD) is a back/spine issue that refers to a health condition affecting the discs that act as cushions between vertebrae. With Type I IVDD, affected dogs can have a disc event where it ruptures or herniates towards the spinal cord. This pressure on the spinal cord causes neurologic signs which can range from a wobbly gait to impairment of movement. Chondrodystrophy (CDDY) refers to the relative proportion between a dog's legs and body, wherein the legs are shorter and the body longer. There are multiple different variants that can cause a markedly chondrodystrophic appearance as observed in Dachshunds and Corgis. However, this particular variant is the only one known to also increase the risk for IVDD.

#### 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

- Follow veterinary advice for diet, weight management, and daily exercise. Overweight dogs and those with insufficient exercise are thought to be at higher risk of developing clinical disease.
- Ramps up to furniture, avoiding flights of stairs, and using a harness on walks will also help minimize some of the risk of an IVDD event by reducing stress on the back.

- In breeds where this variant is extremely common, this genetic health result should not be a deciding factor when evaluating a dog for breeding or adoption purposes.

# Health Report

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## HEALTH REPORT

### Notable result

#### ALT Activity

Rex inherited one copy of the variant we tested for Alanine Aminotransferase Activity

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

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

Alanine aminotransferase (ALT) is a clinical tool that can be used by veterinarians to better monitor liver health. This result is not associated with liver disease. ALT is one of several values veterinarians measure on routine blood work to evaluate the liver. It is a naturally occurring enzyme located in liver cells that helps break down protein. When the liver is damaged or inflamed, ALT is released into the bloodstream.

#### 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.

# Genetic Diversity and Inbreeding

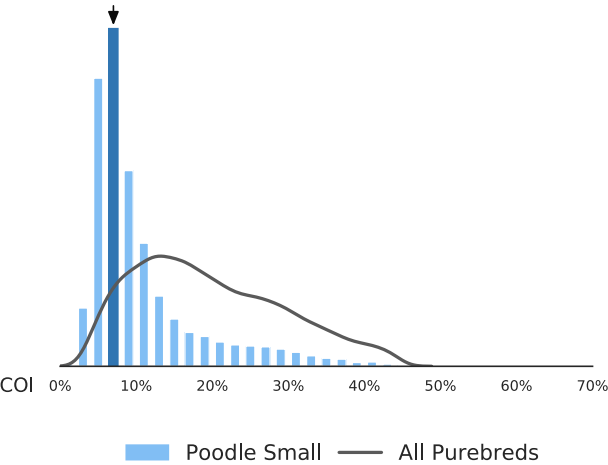
## Coefficient of Inbreeding (COI)

Genetic Result: 7%

Our genetic COI measures the proportion of your dog’s genome (his 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

Your Dog's COI: 7%



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

# Genetic Diversity and Inbreeding

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## 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

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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 230 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)

Veterinarians and hospitals can send inquiries to [veterinarians@embarkvet.com](mailto:veterinarians@embarkvet.com).