Paw Print Genetics
A division of Genetic Veterinary Sciences, Inc.

220 E. Rowan, Suite 220
Spokane, Washington 99207
www.pawprintgenetics.com
(509) 483-5950

Laboratory Report

**** Amended Report ****

Laboratory #:	25987	**Call Name:**	Junior
Order #:	10300	**Registered Name:**	Empress Silver Lining Jr.
Ordered By:	Dawn Nacey	**Breed:**	Labrador Retriever
Ordered:	April 1, 2016	**Sex:**	Male
Received:	April 15, 2016	**DOB:**	March 2016
Reported:	April 27, 2016	**Registration #:**	SR92442301
Amended:	Nov. 29, 2016	**Microchip #:**	941000018766565
Amended:	Oct. 30, 2023		

Results:

Disease	Gene	Genotype	Interpretation
Centronuclear Myopathy	*PTPLA*	WT/WT	Normal (Clear)
Degenerative Myelopathy (Common Variant)	*SOD1*	WT/WT	Normal (Clear)
Exercise-Induced Collapse	*DNM1*	WT/M	Carrier
Hereditary Nasal Parakeratosis (Labrador Retriever Type)	*SUV39H2*	WT/WT	Normal (Clear)
Progressive Retinal Atrophy, Progressive Rod-Cone Degeneration	*PRCD*	WT/M	Carrier
Retinal Dysplasia/Oculoskeletal Dysplasia 1	*COL9A3*	WT/WT	Normal (Clear)
Skeletal Dysplasia 2	*COL11A2*	WT/WT	Normal (Clear)

WT, wild type (normal); M, mutant; Y, Y chromosome (male)

Interpretation:

Molecular genetic analysis was performed for seven specific mutations reported to be associated with disease in dogs. We identified two normal copies of the DNA sequences in five of the mutations tested. Thus, this dog is not at an increased risk for any of the diseases associated with these five mutations. However, we identified one normal copy and one mutant copy of the DNA sequences for *DNM1*. Thus, this dog is a carrier of exercise-induced collapse. In addition, we identified one normal copy and one mutant copy of the DNA sequences for *PRCD*. Thus, this dog is also a carrier of progressive retinal atrophy, progressive rod-cone degeneration.

Recommendations:

Exercise-induced collapse is inherited in an autosomal recessive fashion. Based on this, and the fact that this dog showed a mutation in one copy of the *DNM1* gene, this dog is a carrier of this disease. Although this dog is not clinically affected by this mutation, if bred with another carrier, the pairing could produce affected offspring. To avoid producing affected offspring, this dog should be bred with dogs that are normal (WT/WT) for this gene.

Progressive retinal atrophy, progressive rod-cone degeneration is also inherited in an autosomal recessive fashion. Based on this, and the fact that this dog showed a mutation in one copy of the *PRCD* gene, this dog is a carrier of this disease. Although this dog is not clinically affected by this mutation, if bred with another carrier, the pairing could produce affected offspring. To avoid producing affected offspring, this dog should be bred with

dogs that are normal (WT/WT) for this gene.

Dogs related to this dog have an increased risk to be affected by or carry the mutated genes. Additional testing for these mutations is indicated for related dogs. Paw Print Genetics™ has genetic counseling available to you at no additional charge to answer any questions about these test results, their implications and potential outcomes in breeding this dog.

**Note: At the client's request, this laboratory report and the accompanying Canine Genetic Health Certificate™ were amended on Nov. 29, 2016 to update the call name for this dog.*

Progressive retinal atrophy, Progressive rod-cone degeneration and Retinal dysplasia/Oculoskeletal dysplasia 1 were performed under an exclusive sublicense from OptiGen®, LLC

NOTE: The following fields were adjusted at the client's request on Oct 30, 2023: Registration ID, Registered Name

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Laboratory Report

**** Amended Report ****

Laboratory #:	25987	**Call Name:**	Junior
Order #:	33795	**Registered Name:**	Empress Silver Lining Jr.
Ordered By:	Dawn Nacey	**Breed:**	Labrador Retriever
Ordered:	Jan. 7, 2018	**Sex:**	Male
Received:	Jan. 17, 2018	**DOB:**	March 2016
Reported:	Jan. 31, 2018	**Registration #:**	SR92442301
Amended:	Oct. 30, 2023	**Microchip #:**	941000018766565

Results:

Disease	Gene	Genotype	Interpretation
Copper Toxicosis (Labrador Retriever Type) ATP7A	*ATP7A*	M/Y	Carrier Male
Copper Toxicosis (Labrador Retriever Type) ATP7B	*ATP7B*	WT/WT	Normal (Clear)

WT, wild type (normal); M, mutant; Y, Y chromosome (male)

Interpretation:

Molecular genetic analysis was performed for two specific mutations reported to be associated with copper toxicosis in dogs. We identified two normal copies of the DNA sequences in the *ATP7B* gene tested. Thus, this dog is not at an increased risk for Copper Toxicosis (Labrador Retriever Type) ATP7B. In addition, we identified one mutant copy of the DNA sequence for *ATP7A* on the X chromosome. Thus, this dog carries one copy of the protective mutation for Copper Toxicosis (Labrador Retriever Type) ATP7A.

Recommendations:

No mutations were identified in the *ATP7B* gene. Thus, this dog is not at an increased risk for copper toxicosis. This dog was also tested for a genetic mutation of the *ATP7A* gene which partially protects against copper toxicosis in dogs that have inherited the *ATP7B* mutation described above. This dog carries one copy of the *ATP7A* gene mutation. The *ATP7A* gene mutation is more effective at decreasing the risk of copper toxicosis in male dogs than females. However, since multiple factors (both genetic and environmental) play a role in causing copper toxicosis, the *ATP7A* mutation is not completely protective in either sex. Note: The *ATP7A* mutation is located on the X-chromosome. Since males only have a single X chromosome they can only inherit a single copy of this mutation.

Paw Print Genetics® has genetic counseling available to you at no additional charge to answer any questions about these test results, their implications and potential outcomes in breeding this dog.

NOTE: The following fields were adjusted at the client's request on Oct 30, 2023: Registration ID, Registered Name

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Laboratory Report

**** Amended Report ****

Laboratory #:	25987	**Call Name:**	Junior
Order #:	112758	**Registered Name:**	Empress Silver Lining Jr.
Ordered By:	Dawn Nacey	**Breed:**	Labrador Retriever
Ordered:	July 7, 2021	**Sex:**	Male
Received:	Aug. 3, 2021	**DOB:**	March 2016
Reported:	Aug. 9, 2021	**Registration #:**	SR92442301
Amended:	Oct. 30, 2023	**Microchip #:**	941000018766565

Results:

Disease	Gene	Genotype	Interpretation
Stargardt Disease	*ABCA4*	WT/WT	Normal (Clear)

WT, wild type (normal); M, mutant; Y, Y chromosome (male)

Interpretation:

Molecular genetic analysis was performed for a specific mutation reported to be associated with Stargardt Disease in dogs. We identified two normal copies of the DNA sequences in the *ABCA4* gene tested. Thus, this dog is not at an increased risk for Stargardt Disease.

Recommendations:

No mutations were identified. Thus, this dog is not at an increased risk for the disease caused by or associated with the mutation tested. Because this dog is "clear" of this mutation, this dog will only pass the normal gene on to its offspring. Normal results do not exclude inherited mutations not tested in this gene or other genes that may cause medical problems or may be passed on to offspring. Paw Print Genetics® has genetic counseling available to you at no additional charge to answer any questions about these test results, their implications and potential outcomes in breeding this dog.

NOTE: The following fields were adjusted at the client's request on Oct 30, 2023: Registration ID, Registered Name

Coat Color and Trait Certificate

Call Name:	Junior	**Laboratory #:**	25987
Registered Name:	Empress Silver Lining Jr.	**Registration #:**	SR92442301
Breed:	Labrador Retriever	**Microchip #:**	941000018766565
Sex:	Male	**Certificate Date:**	Oct. 30, 2023
DOB:	March 2016		

This canine's DNA showed the following genotype(s):

Coat Color/Trait Test	Gene	Genotype	Interpretation
B Locus (Brown) - b^a, b^c, b^d, b^s	*TYRP1*	B/B	Black coat, nose and foot pads
D Locus (Dilute) - d^1, d^2	*MLPH*	WT/WT	Non dilute
E Locus - e (Apricot/Cream/Red/Yellow, Common Variant Found in Many Breeds)	*MC1R*	E/E	Black
K Locus (Dominant Black)	*CBD103*	K^B/K^B	No agouti expression allowed
L Locus (Long Hair/Fluffy) - Lh^1 (Common Variant Found in Many Breeds)	*FGF5*	Sh/Sh	Shorthaired (does not carry long hair)

Interpretation:

This dog carries two copies of **B** at all three of the b^c, b^d and b^s loci making the overall B locus genotype of this dog **B/B**. The overall B locus genotype for a dog is determined by the combination of the genotypes at the b^c, b^d, and b^s loci. The b^c, b^d, and b^s variants confer brown coat, nose, and foot pads when at least one of these DNA changes is present on both genes of the dog at the B locus. If the dog has one or no copies of **b** then the dog will have a black coat, nose, and foot pads. However, this dog's coat color is also dependent on the E, K, and A genes. This dog will pass on **B** to 100% of its offspring.

This dog carries two copies of **D** which does not result in the "dilution" or lightening of the black and yellow/red pigments that produce the dog's coat color. The base coat color of this dog will be primarily determined by the E, K, A, and B genes. This dog will pass on **D** to 100% of its offspring.

This dog carries two copies of **E** which allows for the production of black pigment. However, this dog's coat color is also dependent on the K, A, and B genes. This dog will pass on **E** to 100% of its offspring.

The K locus genotype for this dog is $\mathbf{K^B/K^B}$ which prevents expression of the agouti gene (A locus) and allows for solid eumelanin (black pigment) production in pigmented areas of the dog. However, this dog's coat color is also dependent on its genotypes at the E and B loci. This dog will pass on $\mathbf{K^B}$ to 100% of its offspring.

This dog carries two copies of **Sh** which results in short hair. However, the overall coat type of this dog is dependent on the combination of this dog's genotypes at the L, Cu, and IC loci. This dog will pass **Sh** on to 100% of its offspring.

Paw Print Genetics® has genetic counseling available to you at no additional charge to answer any questions about these test results, their implications and potential outcomes in breeding this dog.

NOTE: The following fields were adjusted at the client's request on Oct 30, 2023: Registration ID, Registered Name

Normal results do not exclude inherited mutations not tested in these or other genes that may cause medical problems or may be passed on to offspring. These tests were developed and their performance determined by Paw Print Genetics®. This laboratory has established and verified the tests' accuracy and precision. Because all tests performed are DNA-based, rare genomic variations may interfere with the performance of some tests producing false results. If you think these results are in error, please contact the laboratory immediately for further evaluation. In the event of a valid dispute of results claim, Paw Print Genetics will do its best to resolve such a claim to the customer's satisfaction. If no resolution is possible after investigation by Paw Print Genetics with the cooperation of the customer, the extent of the customer's sole remedy is a refund of the fee paid. In no event shall Paw Print Genetics be liable for indirect, consequential or incidental damages of any kind. Any claim must be asserted within 60 days of the report of the test results.

Orivet
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Single Report

Animal Name: Junior

Owner:
Dawn Nacey
Membership Number : Not assigned
Member Body/Breed Club: Not assigned

Approved Collection Method: No

Orivet
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Single Report

Scan to authenticate this Report online

Owner's details

Name:	Dawn Nacey

Animal's Details

Registered Name :	Empress Silver Lining Jr.
Pet Name :	Junior
Registration Number :	SR924423/01
Breed: :	Labrador Retriever
Microchip Number :	941000019095427
Sex: :	Intact Male
Date of Birth :	17th Mar 2016
Colour :	black

Sample Collection Details

Case Number :	19221400
Collected By :	
Approved Collection :	No
Sample Type :	SWAB

Test Details

Test Requested :	Macular Corneal Dystrophy (Labrador Type)
Pet Name :	Junior
Date of Test :	24th Dec 2019

Authorisation

Sample with Lab ID Number 19221400 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

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Orivet Genetic Analyst

Orivet
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Single Report

Scan to authenticate this Report online

Animal's Details

Registered Name :	**Empress Silver Lining Jr.**
Pet Name :	**Junior**
Registration Number :	**SR924423/01**
Breed: :	**Labrador Retriever**
Microchip Number :	**941000019095427**
Sex: :	**Intact Male**
Date of Birth :	**17th Mar 2016**
Colour :	**black**

Sample with Lab ID Number 19221400 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported

Test Reported : MACULAR CORNEAL DYSTROPHY (LABRADOR TYPE)

Result : NORMAL (N/N) - [NO VARIANT DETECTED] [1]

Gene : CHST6

Variant Detected : chr5:75279762 (canFam3): C>A

Interpretation: DNA analysis indicates that this animal is Normal (Clear) at the tested locus. No copies of the disease-associated variant (mutation) were detected. The genotype result is described as Negative, NN, –/–, "wild type (WT/WT)", or homozygous negative. Implications: This dog does not have the genetic mutation associated with the condition. It will not develop the associated disease due to this mutation. It cannot pass on the disease-causing variant to its offspring. Summary: The animal is genetically clear for the tested condition.

Clarification of Genetic Testing

Genetic inheritance is not a simple process, and may be complicated by several factors. Below is some information to help clarify these factors.

1) Some diseases may demonstrate signs of what Geneticists call "genetic heterogeneity". This is a term to describe an apparently single condition that may be caused by more than one mutation and/or gene

2) It is possible that there exists more than one disease that presents in a similar fashion and segregates in a single breed. These conditions - although phenotypically similar - may be caused by separate mutations and/or genes.

3) It is possible that the disease affecting your breed may be what Geneticists call an "oligogenic disease". This is a term to describe the existence of additional genes that may modify the action of a dominant gene associated with a disease. These modifier genes may for example give rise to a variable age of onset for a particular condition, or affect the penetrance of a particular mutation such that some animals may never develop the condition.

The range of hereditary diseases continues to increase and we see some that are relatively benign and others that can cause severe and/or fatal disease. Diagnosis of any disease should be based on pedigree history, clinical signs, history (incidence) of the disease and the specific genetic test for the disease. Penetrance of a disease will always vary not only from breed to breed but within a breed, and will vary with different diseases. Factors that influence penetrance are genetics, nutrition and environment. Although genetic testing should be a priority for breeders, we strongly recommend that temperament and phenotype also be considered when breeding.