

## Laboratory Report

### \*\* Amended Report \*\*

<b>Laboratory #:</b>	321590	<b>Call Name:</b>	Flicker
<b>Order #:</b>	147746	<b>Registered Name:</b>	Empress Flicker of Hope
<b>Ordered By:</b>	Dawn Nacey	<b>Breed:</b>	Labrador Retriever
<b>Ordered:</b>	Sept. 23, 2022	<b>Sex:</b>	Male
<b>Received:</b>	Oct. 11, 2022	<b>DOB:</b>	May 2022
<b>Reported:</b>	Oct. 19, 2022	<b>Registration #:</b>	ss34238601
<b>Amended:</b>	Jan. 5, 2023	<b>Microchip #:</b>	992000000963532

### Results:

Disease	Gene	Genotype	Interpretation
Centronuclear Myopathy	<i>PTPLA</i>	WT/WT	Normal (clear)
Congenital Myasthenic Syndrome (Labrador Retriever Type)	<i>COLQ</i>	WT/WT	Normal (clear)
Copper Toxicosis (Labrador Retriever Type) ATP7A	<i>ATP7A</i>	M/Y	Carrier Male
Copper Toxicosis (Labrador Retriever Type) ATP7B	<i>ATP7B</i>	WT/WT	Normal (clear)
Exercise-Induced Collapse	<i>DNM1</i>	WT/WT	Normal (clear)
Hereditary Nasal Parakeratosis (Labrador Retriever Type)	<i>SUV39H2</i>	WT/WT	Normal (clear)
Macular Corneal Dystrophy (Labrador Retriever Type)	<i>CHST6</i>	WT/WT	Normal (clear)
Progressive Retinal Atrophy, Golden Retriever 2	<i>TTC8</i>	WT/WT	Normal (clear)
Progressive Retinal Atrophy, Progressive Rod-Cone Degeneration	<i>PRCD</i>	WT/WT	Normal (clear)
Retinal Dysplasia/Oculoskeletal Dysplasia 1	<i>COL9A3</i>	WT/WT	Normal (clear)
Skeletal Dysplasia 2	<i>COL11A2</i>	WT/WT	Normal (clear)
Stargardt Disease	<i>ABCA4</i>	WT/WT	Normal (clear)

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

### Interpretation:

Molecular genetic analysis was performed for 12 specific mutations reported to be associated with disease in dogs (11 deleterious mutations and one protective mutation). We identified two normal copies of the DNA sequences in the 11 deleterious mutations tested. Thus, this dog is not at an increased risk for the diseases associated with these 11 mutations. 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 deleterious mutations were identified. Thus, this dog is not at an increased risk for the diseases caused by or associated with the mutations tested. This dog was also tested for a genetic mutation of the canine *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 Jan 05, 2023: Name, Registered Name*



**Blake C Ballif, PhD**  
Laboratory & Scientific Director



**Christina J Ramirez, PhD, DVM, DACVP**  
Medical Director

Paw Print Genetics® performed the tests listed on this dog. The genes/diseases reported here were selected by the client. 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. The results included in this report relate only to the items tested using the sample provided. These tests were developed and their performance determined by Paw Print Genetics. This laboratory has established and verified the test(s)' accuracy and precision with >99.9% sensitivity and specificity. The presence of mosaicism may not be detected by this test. Non-paternity may lead to unexpected results. This is not a breed identification test. Because all tests performed are DNA-based, rare genomic variations may interfere with the performance of some tests producing false results. If you think any 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.

## Coat Color and Trait Certificate

<b>Call Name:</b>	Flicker	<b>Laboratory #:</b>	321590
<b>Registered Name:</b>	Empress Flicker of Hope	<b>Registration #:</b>	ss34238601
<b>Breed:</b>	Labrador Retriever	<b>Microchip #:</b>	992000000963532
<b>Sex:</b>	Male	<b>Certificate Date:</b>	Jan. 5, 2023
<b>DOB:</b>	May 2022		

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

Coat Color/Trait Test	Gene	Genotype	Interpretation
B Locus (Brown)	<i>TYRP1</i>	B/b	Black coat, nose and foot pads (carries one copy of brown)
D Locus (Dilute)	<i>MLPH</i>	D/D	Non-dilute (does not carry dilute)
E Locus - e (Apricot/Cream/Red/Yellow, Common Variant Found in Many Breeds)	<i>MC1R</i>	E/e	Black (carries yellow/red)

### Interpretation:

This dog carries one copy of one of the b mutations and has a B locus genotype of **B/b**. Thus, this dog typically will have a black coat, nose, and foot pads. However, this dog's coat color is dependent on the genotypes of many other genes. This dog will pass one copy of **B** to 50% of its offspring and one copy of **b** to 50% of its offspring. This dog can produce b/b offspring if bred to a dog that is also a carrier of a b mutation (B/b or b/b). Depending on the breed, b/b dogs may be referred to as brown, chocolate, liver or red.

This dog does not carry any copies of the d<sup>1</sup> or d<sup>2</sup> mutations and has a D locus genotype of **D/D** which does not result in the "dilution" or lightening of the pigments that produce the dog's coat color. This dog will pass one copy of **D** to 100% of its offspring and cannot produce d/d dogs.

This dog carries one copy of **E** and one copy 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 **E** on to 50% of its offspring and **e** to 50% of its offspring, which can produce a yellow/red coat (including shades of white, cream, yellow, apricot or red) if inherited with another copy of **e**.

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