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

Coat Color and Trait Certificate

Call Name:	Tootsie	**Laboratory #:**	132119
Registered Name:	-	**Registration #:**	-
Breed:	French Bulldog	**Certificate Date:**	May 22, 2019
Sex:	Female		
DOB:	July 2016		

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

Coat Color/Trait Test	Gene	Genotype	Interpretation
A Locus (Agouti)	*ASIP*	A^y/A^y	Sable/fawn
D Locus (Dilute)	*MLPH*	D/D	Non dilute
E^m Locus (Melanistic Mask)	*MC1R*	N/N	No melanistic mask
K Locus (Dominant Black)	*CBD103*	K^B/k^y	No agouti expression allowed (carrier)
S Locus (White Spotting, Parti, or Piebald)	*MITF*	S/s^p	Limited white spotting, flash, parti, or piebald (carrier)

Interpretation:

This dog carries two copies of **A^y** which results in a sable/fawn coat color. However, this dog's coat color is also dependent on the E, K, and B genes. The sable/fawn coat color is only expressed if the dog is also E/E or E/e at the E locus and k^y/k^y at the K locus which allows for agouti gene expression. This dog will pass on **A^y** 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 **N** which does not result in a melanistic mask on the muzzle of the dog. This dog will pass on **N** to 100% of its offspring.

This dog carries one copy of **K^B** and one copy of **k^y** 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 genes. This dog will pass on **K^B** to 50% of its offspring and **k^y** to 50% of its offspring.

This dog carries one copy of **S** and one copy of **s^p** which results in limited white spotting, flash, parti, or piebald coat color due to the co-dominance of **S** and **s^p**. This dog will pass on one copy of **S** to 50% of its offspring and one copy of **s^p** to 50% 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.

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Canine Genetic Health Certificate™

Call Name:	Tootsie	**Laboratory #:**	132119
Registered Name:	-	**Registration #:**	-
Breed:	French Bulldog	**Certificate Date:**	May 22, 2019
Sex:	Female		
DOB:	July 2016		

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

Disease	Gene	Genotype	Interpretation
Degenerative Myelopathy	*SOD1*	WT/M	Carrier
Hereditary Cataracts	*HSF4*	WT/WT	Normal (clear)
Hyperuricosuria	*SLC2A9*	WT/WT	Normal (clear)
Multifocal Retinopathy 1	*BEST1*	WT/WT	Normal (clear)
Progressive Retinal Atrophy, Cone-Rod Dystrophy 4	*RPGRIP1*	WT/M	Carrier

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

Christina J Ramirez, PhD, DVM, DACVP
Medical Director

Casey R Carl, DVM
Associate Medical Director

Paw Print Genetics® performed the tests listed on this dog. See the Laboratory Report for interpretation and recommendations based on these findings. 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. 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. Genetic counseling is available at Paw Print Genetics.

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

Laboratory Report

Laboratory #:	132119	**Call Name:**	Tootsie
Order #:	58132	**Registered Name:**	-
Ordered By:	Mary Miller	**Breed:**	French Bulldog
Ordered:	April 9, 2019	**Sex:**	Female
Received:	May 16, 2019	**DOB:**	July 2016
Reported:	May 22, 2019	**Registration #:**	-

Results:

Disease	Gene	Genotype	Interpretation
Degenerative Myelopathy	*SOD1*	WT/M	Carrier
Hereditary Cataracts	*HSF4*	WT/WT	Normal (clear)
Hyperuricosuria	*SLC2A9*	WT/WT	Normal (clear)
Multifocal Retinopathy 1	*BEST1*	WT/WT	Normal (clear)
Progressive Retinal Atrophy, Cone-Rod Dystrophy 4	*RPGRIP1*	WT/M	Carrier

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

Interpretation:

Molecular genetic analysis was performed for five specific mutations reported to be associated with disease in dogs. We identified two normal copies of the DNA sequences in three of the mutations tested. Thus, this dog is not at an increased risk for the diseases associated with these three mutations. However, we identified one normal copy and one mutant copy of the DNA sequences for *SOD1*. Thus, this dog is a carrier of Degenerative Myelopathy. In addition, we identified one normal copy and one mutant copy of the DNA sequences for *RPGRIP1*. Thus, this dog is a carrier of Progressive Retinal Atrophy, Cone-Rod Dystrophy 4.

Recommendations:

Degenerative Myelopathy is inherited in an autosomal recessive fashion. Based on this, and the fact that this dog showed a mutation in one copy of the *SOD1* gene, this dog is a carrier of this disease. Although dogs that carry only one copy of this mutation will not be clinically affected, 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 gene. Additional testing for this mutation is indicated for related dogs.

Progressive Retinal Atrophy, Cone-Rod Dystrophy 4 is inherited in an autosomal recessive fashion. Based on this, and the fact that this dog showed a mutation in one copy of the *RPGRIP1* gene, this dog is a carrier of this disease. Although dogs that carry only one copy of this mutation will not be clinically affected, 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 gene. Additional testing for this mutation is indicated for related dogs.

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