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

Canine Genetic Health Certificate™

Call Name:	Atari	**Laboratory #:**	291203
Registered Name:	-	**Registration #:**	-
Breed:	French Bulldog	**Certificate Date:**	Feb. 24, 2022
Sex:	Female		
DOB:	Feb. 2021		

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

Disease	Gene	Genotype	Interpretation
Degenerative Myelopathy	*SOD1*	WT/WT	Normal (clear)
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/WT	Normal (clear)

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

Blake C Ballif, PhD
Laboratory & Scientific Director

Casey R Carl, DVM
Associate Medical Director

Paw Print Genetics® performed the testing on the dog listed on this certificate. 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. 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 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.

Lewis and Clark Veterinary Clinic
504 East 2nd Street
Yankton, SD 57078
605-260-5650

To whom it may concern,

I examined Nadika (aka Rueben), a female French Bulldog (Isabella and Tan), on 6/18/22. Date of birth is 4/25/22. The patient weighed 4.3#. At the time of exam, she was apparently healthy (no heart murmur was detected, no hernias were noted, palpation of patellas was within normal limits and no cleft palate was noted).

Sincerely,

Mary Green, DVM

SD #1976

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Canine Genetic Health Certificate™

Call Name:	Eternity	**Laboratory #:**	280572
Registered Name:	-	**Registration #:**	-
Breed:	French Bulldog	**Certificate Date:**	Jan. 10, 2022
Sex:	Male		
DOB:	Nov. 2020		

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

Disease	Gene	Genotype	Interpretation
Degenerative Myelopathy	*SOD1*	WT/WT	Normal (clear)
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/WT	Normal (clear)

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

Blake C Ballif, PhD
Laboratory & Scientific Director

Christina J Ramirez, PhD, DVM, DACVP
Medical Director

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on the genotypes of many other genes. The B locus genotype for this dog can be inferred without the need for parental testing by evaluating the color of this dog's nose. If this dog's nose is brown, the B locus genotype of this dog must be **b/b** and this dog will pass one copy of **b** to 100% of its offspring. If this dog's nose is black, the final B locus genotype of this dog must be **B/b** and this dog will pass one copy of **B** to 50% of its offspring and one copy of **b** to 50% of its offspring. In either case, this dog carries at least one copy of **b** and can produce b/b offspring if bred to a dog that is also a carrier of a b mutation (B/b or b/b).

This dog carries one copy of the co (cocoa) mutation and has a Co Locus genotype of **CO/co**. 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 including the B Locus (Brown). This dog will pass one copy of **CO** to 50% of its offspring and one copy of **co** (cocoa) to 50% of its offspring. This dog can produce co/co (cocoa) offspring if bred to a dog that is also a carrier of co (cocoa) (CO/co or co/co).

This dog carries two copies of the same d mutation and has a D locus genotype of **d/d** which results 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. This dog can produce d/d offspring if bred to a dog that is also a carrier of a d mutation (D/d or d/d).

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**.

This dog carries two copies of $\mathbf{k^y}$ which allows for the expression of the agouti gene (A locus) which can result in a variety of coat colors including sable/fawn, tricolor, tan points, black or brown. However, this dog's coat color is dependent on its genotypes at the E, A and B genes. This dog will pass on $\mathbf{k^y}$ to 100% of its offspring.

This dog carries two copies of $\mathbf{Lh^4}$ which results in long hair. This dog will pass one copy of $\mathbf{Lh^4}$ to 100% of its offspring.

This dog carries two copies of **S** which results in a solid coat with no white spotting, flash, parti, or piebald coat color. This dog will pass on one copy of **S** 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.

Blake C Ballif, PhD
Laboratory & Scientific Director

Casey R Carl, DVM
Associate Medical Director

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Nadika

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Coat Color and Trait Certificate

Call Name:	Orange Female	**Laboratory #:**	305624
Registered Name:	-	**Registration #:**	-
Breed:	French Bulldog	**Certificate Date:**	May 9, 2022
Sex:	Female		
DOB:	April 2022		

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

Coat Color/Trait Test	Gene	Genotype	Interpretation
A Locus (Agouti)	*ASIP*	a^t/a	Tricolor, black and tan (carries bicolor/solid)
B Locus (Brown)	*TYRP1*	B/b or b/b	Black or brown coat, nose and foot pads (carries at least one copy of brown)
Co Locus (Cocoa, French Bulldog Type)	*HPS3*	CO/co	Black coat, nose and foot pads (carries one copy of cocoa)
D Locus (Dilute)	*MLPH*	d/d	Dilute (carries two copies of dilute)
E Locus - e (Apricot/Cream/Red/Yellow, Common Variant Found in Many Breeds)	*MC1R*	E/e	Black (carries yellow/red)
K Locus (Dominant Black)	*CBD103*	k^y/k^y	Agouti expression allowed
L Locus (Long Hair/Fluffy) - Lh^4 (Afghan Hound, Eurasier, French Bulldog Type)	*FGF5*	Lh/Lh	Longhaired (carries two copies of long hair)
S Locus (White Spotting, Parti, or Piebald)	*MITF*	S/S	No white spotting, flash, parti, or piebald

Interpretation:

This dog carries one copy of **a^t** and one copy of **a** which results in tan points and can also present as a black and tan or tricolor coat color. However, this dog's coat color is also dependent on the E, K, and B genes. The tan point 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. This dog will pass on **a^t** to 50% of its offspring and **a** to 50% of its offspring.

This dog carries one or more copies of the four possible b mutations and has a B locus genotype of **B/b** or **b/b** that cannot be distinguished without additional testing of parental samples or by examining the coat, nose and footpad color of the dog. Dogs inherit two copies of the B locus, one from each parent. Because there are four different B locus mutations that can potentially be identified, as well as some limitations inherent to genetic testing methodologies currently available, a result of "B/b or b/b" means that it cannot be determined if the b mutations identified in this dog are present on the same copy of the B locus inherited from one parent or if they occur on separate copies of the B locus inherited from each of the parents. If the mutations identified are all present on the same copy of the B locus, this dog will have a **B/b** genotype and typically will have a black coat, nose and footpads. If the mutations identified are present on different copies of the B locus, this dog will have a **b/b** genotype and may have a brown coat, and will typically have a brown nose and footpads. Depending on the breed, b/b dogs may be referred to as brown, chocolate, liver or red. However, this dog's coat color is dependent