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

Coat Color and Trait Certificate

Call Name:	Legend	**Laboratory #:**	131881
Registered Name:	Fullerton Legendary Lover	**Registration #:**	ASDT-NE-2201006
Breed:	Toy Australian Shepherd	**Microchip #:**	990000004565265
Sex:	Male	**Certificate Date:**	Jan. 31, 2022
DOB:	Nov. 2021		

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

Coat Color/Trait Test	Gene	Genotype	Interpretation
A Locus (Agouti)	*ASIP*	a^t/a^t	Tricolor, black and tan
B Locus (Brown)	*TYRP1*	B/b	Black coat, nose and foot pads (carries one copy of brown)
Chondrodysplasia (CDPA)	*CFA18 FGF4*	cd/cd	No Leg Shortening Associated with CDPA
D Locus (Dilute)	*MLPH*	D/D	Non-dilute (does not carry dilute)
E Locus (Apricot/Yellow/Red) - e (Common Variant Found in Many Breeds)	*MC1R*	E/E	Black
E^m Locus (Melanistic Mask)	*MC1R*	E^m/E^m	Melanistic mask
K Locus (Dominant Black)	*CBD103*	k^y/k^y	Agouti expression allowed
M Locus (Merle)	*PMEL*	m/m	Non merle
S Locus (White Spotting, Parti, or Piebald)	*MITF*	S/S	No white spotting, flash, parti, or piebald

Interpretation:

This dog carries two copies of **a^t** 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 100% of its offspring.

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.

Two genetic mutations are associated with shortened legs in dogs. Both mutations consist of copied sections (duplication) of the canine *FGF4* gene (called an *FGF4*-retrogene) that have been inserted into two aberrant locations in the genome; one in chromosome 12 (*CFA12 FGF4*; associated with CDDY and IVDD risk) and one in chromosome 18 (*CFA18 FGF4*; associated with chondrodysplasia [CDPA], but not associated with IVDD). Appropriate breeding decisions regarding dogs which have inherited the *CFA12 FGF4* mutation (WT/M or M/M) need to address both the potential loss of genetic diversity in a population which would occur if dogs with this mutation were prohibited from breeding as well as the loss of the short-legged appearance that is a defining physical characteristic for some breeds. In breeds which inherit both mutations, breeders may use genetic testing