GENETIC ANALYSIS DNA PROFILE REPORT

OWNER'S DETAILS

Kathryn Winton
PO Box 69
Rosewood Queensland 4340 AU

ANIMAL'S DETAILS

Registered Name:	Mirribandi Merveilleux	**Pet Name:**	Marvel
Registration Number:	4100242773	**Breed:**	Belgian Tervueren Shepherd
Microchip Number:	953010000185840	**Sex:**	Intact Male
Date of Birth:	11th May 2014	**Colour:**	Fawn

COLLECTION DETAILS

Case Number:	18162214	**Date of Test:**	15th Jun 2018
Approved Collection Method:	NO	**Collected By:**	

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

DNA PROFILE The DNA Profile below represents the genetic identification of Mirribandi Merveilleux

P1_2 **A A** P3_2 **A A** P3_3 **G G** P11_3 **C C** P12_1 **G G** P24_2 **A A** P12_3 **G G** P30_3 **A A**
P13_1 **C C** P24_3 **C C** P31_1 **A A** P28_3 **A T** P31_3 **G G** P25_1 **G G** P32_2 **C G** P13_2 **A T**
P13_3 **A A** P25_2 **G G** P25_3 **C C** P32_3 **A G** P33_1 **G G** P14_1 **T T** P10_1 **G G** P26_1 **A G**
P33_3 **A G** P26_2 **A A** P14_2 **C G** P26_3 **A G** P14_3 **C C** P15_1 **A G** P34_1 **C C** P34_2 **A A**
P34_3 **A A** P10_3 **C C** P15_2 **G G** P15_3 **C C** P16_3 **C C** P35_1 **G G** P35_2 **G G** P36_1 **C C**
P17_1 **A G** P36_2 **C C** P37_2 **G G** P17_2 **A C** P29_1 **G G** P37_3 **G G** P38_1 **C C** P38_2 **A G**
P27_1 **G G** P17_3 **G G** P27_2 **C C** P4_3 **A G** P18_2 **C C** P18_3 **A A** P5_1 **G G** P11_1 **G G**
P19_1 **T T** P19_2 **G G** P5_2 **G G** P19_3 **A G** P2_1 **G G** P2_3 **C C** P27_3 **A T** P20_1 **A A**
P20_3 **A A** P5_3 **G G** P11_2 **C G** P6_2 **A A** P6_3 **C C** P21_1 **G G** P21_3 **A G** P22_2 **C C**
P28_1 **G G** P7_1 **C C** P7_2 **G G** P28_2 **G G** P7_3 **A A** P29_2 **G G** P8_1 **A G** P22_3 **C G**
P8_2 **A G** P8_3 **G G** P23_1 **C C** P9_3 **A A** P23_2 **C C** P23_3 **G G** P24_1 **G G** P3_1 **A G**

RESULTS REVIEWED AND CONFIRMED BY:

Dr. Noam Pik BVSc, BMVS, MBA, MACVS

George Sofronidis BSc (Hons)

GENETIC ANALYSIS

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	Degenerative Myelopathy
Result:	**NEGATIVE / CLEAR [NO VARIANT DETECTED][1]**
Gene :	**Superoxide dismutase 1 (SOD1) on chromosome 31**
Variant Detected :	**Base Substitution c.118G>A p.Glu40Lys**

[1] We have scanned the DNA and the genotype of this animal is NORMAL - no presence of the disease associated variant (mutation) has been detected. This result may also be referred to as NORMAL, "-/-" or "wild type (WT)" or "homozygous negative". The animal is clear of the disease and will not pass on the disease-causing variant. Can be mated with an untested animal and WILL NOT produce any positive/affected offspring.

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	Ivermectin Sensitivity MDR1 (Multi Drug Resistance)
Result:	**NEGATIVE / CLEAR [NO VARIANT DETECTED][1]**
Gene :	**MDR1 on Chromosome 14**
Variant Detected :	**Deletion 4bp AGAT**

[1] We have scanned the DNA and the genotype of this animal is NORMAL - no presence of the disease associated variant (mutation) has been detected. This result may also be referred to as NORMAL, "-/-" or "wild type (WT)" or "homozygous negative". The animal is clear of the disease and will not pass on the disease-causing variant. Can be mated with an untested animal and WILL NOT produce any positive/affected offspring.

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	Spongy Degeneration with Cerebellar Ataxia (KCNJ10)
Result:	**NEGATIVE / CLEAR [NO VARIANT DETECTED][1]**
Gene :	**Potassium voltage-gated channel subfamily J member 10 (KCNJ10) on Chromosome 38**
Variant Detected :	**Base Substitution c.986T>C p.Leu329Pro**

[1] We have scanned the DNA and the genotype of this animal is NORMAL - no presence of the disease associated variant (mutation) has been detected. This result may also be referred to as NORMAL, "-/-" or "wild type (WT)" or "homozygous negative". The animal is clear of the disease and will not pass on the disease-causing variant. Can be mated with an untested animal and WILL NOT produce any positive/affected offspring.

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	EM (MC1R) Locus - Melanistic Mask
Result:	**E^m/E^m - TWO MASK ALLELES DEPENDS ON A and K SERIES [1]**
Gene :	**MC1R**
Variant Detected :	**Base Substitution G>A**

[1] 2 copies of mask – dog has mask. Masks are not visible on black, brown or blue dogs. Some other coat patterns such as Merle, Harlequin and Spotting may also "hide" the mask. Some breeds are "fixed" for the mask and the genetic result will never vary.

SAMPLE COLLECTION DETAILS

Case Number: 18162214

Date of Test: 15th Jun 2018

Approved Collection Method: NO

Collected By:

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	A Locus (Fawn/Sable;Tri/Tan Points)
Result:	**a^y/a^y - PURE FAWN/RED or SABLE only PRODUCE ay OFFSPRING [1]**
Gene :	**ASIP**
Variant Detected :	**Base Substitution 246 G>T(A82S); G>A (R83H): C>T (p.R96C)**

[1] Homozygous for fawn/sable (no hidden colour). Also referred to as "clear red". Pure factoring/no white factoring. Please note that the colour will be dependent on the breed and other colour genes. The colour shown is dependent on the E, K and B Locus.

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	K Locus (Dominant Black)
Result:	**kk - RECESSIVE NON- BLACK [COLOUR PATTERN DETERMINED BY A LOCUS][1]**
Gene :	**CBD103**
Variant Detected :	**Deletion of GGG**

[1] Dog does not have the dominant black mutation. Dog's coat colour will be determined by the agouti gene – may be brindled or not brindled. Any phaeomelanin (red/tan) will be brindled. Can be sable/fawn, tricolour, tan points, black or brown. Will (may) have black pigment and black markings.

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	Black Hair Follicular Dysplasia
Result:	**NEGATIVE - NOT SHOWING THE PHENOTYPE[1]**
Gene :	**RAB27**
Variant Detected :	**Base Substitution G>A**

[1]

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	Long Hair Gene (Canine)
Result:	**POSITIVE - SHOWING THE PHENOTYPE[1]**
Gene :	**FGF5**
Variant Detected :	**Base Substitution L > I (Point Mutation)**

[1] The phenotype/trait tested is present. Please Note this can vary from breed to breed and within breed.

SAMPLE COLLECTION DETAILS

Case Number: 18162214 **Date of Test:** 15th Jun 2018

Approved Collection Method: NO **Collected By:**

Sample with Lab ID Number 18162214 was received at Orivet Genetics, DNA was extracted and analysed with the following result reported:

Test Reported:	Mucopolysaccharidosis VII - Type II (German Shepherd/Belgian Shepherd Type)
Result:	**NEGATIVE / CLEAR [NO VARIANT DETECTED][1]**
Gene :	**Glucuronidase beta (GUSB) on Chromosome 6**
Variant Detected :	**Base Substitution c.498G>A p.Arg166His**

[1] We have scanned the DNA and the genotype of this animal is NORMAL - no presence of the disease associated variant (mutation) has been detected. This result may also be referred to as NORMAL, "-/-" or "wild type (WT)" or "homozygous negative". The animal is clear of the disease and will not pass on the disease-causing variant. Can be mated with an untested animal and WILL NOT produce any positive/affected offspring.

SAMPLE COLLECTION DETAILS

Case Number: 18162214

Date of Test: 15th Jun 2018

Approved Collection Method: NO

Collected By:

EXPLANATION of RESULT TERMINOLOGY

The terms below are provided to help clarify certain results phrases on your genetic report. The phrases below are those as reported by Orivet and may vary from one laboratory to the other.

NEGATIVE / CLEAR [NO VARIANT DETECTED]
No presence of the variant (mutation) has been detected. The animal is clear of the disease and will not pass on any disease-causing mutation.

CARRIER [ONE COPY OF THE VARIANT DETECTED]
This is also referred to as HETEROZYGOUS. One copy of the normal gene and copy of the affected (mutant) gene has been detected. The animal will not exhibit disease symptoms or develop the disease. Consideration needs to be taken if breeding this animal - if breeding with another carrier or affected or unknown then it may produce an affected offspring.

POSITIVE / AT RISK [TWO COPIES OF THE VARIANT DETECTED]
Two copies of the disease gene variant (mutation) have been detected also referred to as HOMOZYGOUS for the variant. The animal may show symptoms (affected) associated with the disease. Appropriate treatment should be pursued by consulting a Veterinarian.

POSITIVE HETEROZYGOUS [ONE COPY OF THE DOMINANT VARIANT DETECTED]
Also referred to as POSITIVE ONE COPY or POSITIVE HETEROZYGOUS. This result is associated with a disease that has a dominant mode of inheritance. One copy of the normal gene (wild type) and affected (mutant) gene is present. Appropriate treatment should be pursued by consulting a Veterinarian. This result can still be used to produce a clear offspring.

POSITIVE HOMOZYGOUS [TWO COPIES OF THE DOMINANT VARIANT DETECTED]
Also referred to as POSITIVE HOMOZYGOUS. Two copies of the disease gene variant (mutant) have been detected and the animal may show symptoms associated with the disease. Please Note: This disease has dominant mode of inheritance so if mated to a clear animal ALL offspring with be AFFECTED – HETEROZYGOUS ONE COPY.

NORMAL BY PARENTAGE HISTORY
The sample submitted has had its parentage verified by DNA. By interrogating the DNA profiles of the Dam, Sire and Offspring this information together with the history submitted for the parents excludes this animal from having this disease. The controls run confirm that the dog is NORMAL for the disease requested.

NORMAL BY PEDIGREE
The sample submitted has had its parentage verified by Pedigree. The pedigree has been provided and details (genetic testing reports) of the parents have been included. Parentage could not be determined via DNA profile as no sample was submitted.

NO RESULTS AVAILABLE
Insufficient information has been provided to provide a result for this test. Sire and Dam information and/or sample may be required. This result is mostly associated with tests that have a patent/license and therefore certain restrictions apply. Please contact the laboratory to discuss.

INDETERMINABLE
The sample submitted has failed to give a conclusive result. This result is mainly due to the sample failing to “cluster” or result in the current grouping. A recollection is required at no charge.

DNA PROFILE
Also known as a DNA fingerprint. This is unique for the animal. No animal shares the same DNA profile. An individual’s DNA profile is inherited from both parents and can be used for verifying parentage (pedigrees). This profile contains no disease or trait information and is simply a unique DNA signature for that animal.

PARENTAGE VERIFICATION
QUALIFIES/CONFIRMED or DOES NOT QUALIFY/EXCLUDED
Parentage is determined by examining the markers on the DNA profile. A result is generated and stated for all DNA parentage requests. Parentage confirmation reports can only be generated if a DNA profile has been carried out for Dam, Offspring and possible Sire/s.

PENDING
Results for this test are still being processed. Some tests are run independently and are reported at a later date. When completed, the result will be emailed.

SAMPLE COLLECTION DETAILS

Case Number: 18162214 **Date of Test:** 15th Jun 2018

Approved Collection Method: NO **Collected By:**

APPROVED COLLECTION METHOD (NO)
The sample submitted for testing HAS NOT met the requirements recommended by member bodies for the DNA collection process.

TRAIT (PHENOTYPE)
A feature that an animal is born with (a genetically determined characteristic). Traits are a visual phenotype that range from colour to hair length, and also includes certain features such as tail length. If an individual is AFFECTED for a trait then it will show that characteristic eg. AFFECTED for the B (Brown) Locus or bb will be brown/chocolate.

POSITIVE – SHOWING THE PHENOTYPE
The animal is showing the trait or phenotype tested.

SAMPLE COLLECTION DETAILS

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Approved Collection Method: NO **Collected By:**

CLARIFICATION OF GENETIC TESTING

The goal of genetic testing is to provide breeders with relevant information to improve breeding practices in the interest of animal health. However, 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.

Orivet Genetic Pet Care aims to frequently update breeders with the latest research from the scientific literature. If breeders have any questions regarding a particular condition, please contact us on **(03) 9534 1544** or **admin@orivet.com** and we will be happy to work with you to answer any relevant questions.

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Collected By:

This report has been generated by Orivet Genetic Pet Care (Case Number : 18162214)