The Merle (Dapple) Gene

The merle DNA test can detect the following alleles:

M (merle), Mc (cryptic merle), Ma (atypical merle), Mh (harlequin merle) and m (non-merle).

Merle (M)

The merle allele (M) is known to dilute random parts of the coat colour to a lighter shade such as black to gray or blue, brown to lighter patches. The merled patches have irregular edges and can be anywhere on the head, the body and the legs resulting in the familiar merle coat pattern. Merle can also affect the eyes, the nose and the paw pads.

The Merle (M) allele is dominant to the normal non-merle allele (m) and so a dog with one copy of the merle gene will express the merle pattern and a dog with two copies of the merle is called double merle (double dapple). Double merle is associated with health problems such as deafness and blindness, and also sun sensitivity and skin cancer, and therefore breeders should avoid breeding merle to merle.

Harlequin Merle (Mh)

The Mh allele is similar to the Merle allele but it causes the expression of the harlequin pattern in some Collie type breeds. It is also dominant to the non-merle.

Hidden Merle:

Merle can be hidden which means that you cannot see if the dog is merle or not and therefore you may breed merle to merle and produce double merle puppies without realising. There are two types of hidden merle Invisible merle and Cryptic merle:

Invisible Merle

Invisible merle occurs when the dog actually carries the merle allele (M) but you cannot see it because it is hidden. This happens when the dog's coat colour is yellow, red, sable, fawn, gold or cream, in this case merle is almost invisible because merle is expressed on eumelanin pigment (black, brown, blue, lilac) but not on pheomelanin pigment, and so if your dog's coat colour is yellow, red, sable, fawn, gold or cream, it is often very difficult to tell if the dog has merle by looking at it and the only way to find out if your dog has merle is by testing.

Cryptic Merle (Mc)

Cryptic merle (Mc) is a short version of the merle allele with very little merling effect if any. Cryptic merle is not associated with health problems but it is a mutable allele and when the dog is bred it may well expand to regular merle in the puppies and so it should be treated same as regular merle and dogs with cryptic merle should only be bred to dogs with no merle. The Ma allele (Atypical Merle) can also be cryptic hidden (see next paragraph)

Atypical Merle (Ma)

The test can now detect the Atypical Merle (Ma) allele which is a mutable allele that causes the expression of different non-typical and typical merle patterns ranging from dilution to normal merle and even piebald-like patterns. Atypical merle can also be cryptic, in this case it is hidden and not visible but like the cryptic merle, when bred it can expand to full merle and therefore it should be treated as if the dog carries the merle allele and should only be bred to dogs with no merle.

Summary

The test detects : **M** (merle), **Mc** (cryptic merle), **Ma** (atypical merle), **Mh** (harlequin merle) and **m** (non-merle). The m allele (non-merle) is recessive to all the other alleles. Double merle is associated with health problems and should be avoided. To avoid having double merle puppies, dogs carrying at least one copy of the M (merle), Mc (cryptic merle), Ma (atypical merle) or Mh (harlequin merle) allele should only be bred to dogs that do not carry any of these alleles ie dogs with two copies of the non-merle (m/m).

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For genetic testing we require a DNA sample, this can be either 0.5-1 ml of whole blood in EDTA blood tube, or buccal swabs.

Blood must be collected by a veterinary surgeon whereas buccal swabs maybe used by owners.

There is no minimum age for using blood. Buccal swabs can be used about a week after the animal is weaned from the mother, this is to avoid DNA cross contamination.

Before using swabs the animal must be separated from other animals and must not be fed for few hours, best time maybe in the morning before the animal is fed.

We supply both EDTA blood tubes and buccal swabs free of charge, you can order sample collection materials from the following link:

http://www.laboklin.co.uk/laboklin/dispatcher.jsp?section=Downloads&subID=RequestMaterials

You will receive a testing kit with instructions on how to use buccal swabs to collect DNA sample from the mouth.

Samples should be sent to the following address:
LABOKLIN UK, 125 Northenden Road, Sale, Manchester M33 3HF