

It is possible to contribute to the development of the test by submitting blood samples with pedigree details of your dog to the research project in France. You will have to bear the cost of the blood sample at your vet and he will have to submit the sample on your behalf for verification purposes. There will be no further cost but you will receive no feedback of result and nothing individual will ever be published.

Alternatively if you are thinking of breeding with your Bernese then **surely now it is the responsible thing to test all prospective breeding stock** and ensure that any C graded dogs are only mated to A grade or possibly B but NOT C. The test is available commercially and on top of the cost of your vet, as outlined above, it is currently €105 (Euros). Together with vet's fees this equates to a little over £100 or so per breeding dog to improve the breed's future in it's experience of this cancer. Is this such a big percentage of the price of a litter's worth of puppies? Should any responsible stud dog owner not know the status of their male?

### **Summary**

It is true that having an Index A dog does not make him or her totally safe from the disease but gives a much lower chance of developing it. Similarly mating your 'A' grade dog to another 'A' or only using a better grade on your 'C' will not ensure you produce no 'C' graded dogs, nor will it guarantee your puppies never develop this awful disease but it will mean you have done what you can to reduce the risk in YOUR litter for YOUR puppies and their owners AND improve the outlook for the breed. Over time though these small gains for individual dogs add up to a significant improvement for the breed. I hope people agree it is time the UK engaged with this initiative and started testing more of our breeding dogs and began to do our bit to tackle this nasty and distressing disease. So far, 12 dogs from the UK have been tested.

Overall progress will be slow but over time the efficacy of the test itself will improve and, with it's use, incidence of 'Histio' will decrease and longevity will increase. The test is still far from perfect and is a work in progress but it is a validated tool that can genuinely help our breed.

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The pre-test for Histiocytic Sarcoma has three possible results expressed as an index. Your dog will be graded A, B or C.

Index	Explanation
<b>A</b>	The individuals tested have four times the chance of NOT developing Histiocytic Sarcoma
<b>B</b>	Neutral index
<b>C</b>	The individuals tested have four times the risk of developing Histiocytic Sarcoma. The risk of the markers associated with the disease being transmitted to offspring is greatly increased

The developers of the test are extremely keen to point out that it is 'only' a selection tool to assist breeders.

The latest updates on the scheme were given at the International BMD Health Seminar in Finland at the end of August (2015) in a presentation by Benoit Hedan.

The updates of ongoing French, American and European studies seeking to validate the test were outlined although I have been asked not to publish these numbers in any more detail yet as they are still felt to be too small to be statistically viable. A broad summary of results to date is as follows.

	Clear Dogs	Affected Dogs
Index A	41%	9%
Index B	45%	47%
Index C	14%	44%

Generally speaking a very low percentage of affected dogs were found to be Index A whereas a small percentage of clear dogs were in Index C. Index B is split fairly evenly and, as it is described, 'neutral'

Summary of tests undertaken by Antagene since 2012

	General Population of BMD	BMD over 10 years and unaffected
<b>Index A</b>	23%	47%
<b>Index B</b>	44%	37%
<b>Index C</b>	33%	16%

As you can see these results clearly demonstrate the research is on the right lines in this difficult task but there is still some way to go. It is very interesting that there is a higher proportion of 'A' grades in the older Bernese population which is another pointer that the test is meaningful. The general population testing result may be skewed by a number of dogs only being tested because they were ill so the figures are not necessarily reliably representative of the whole population.

### Summary of this and latest advice

HS is definitely a multigenic and multifactorial cancer (in dogs and humans)

There is a high variability of the index results in any litter or bloodline

Exceptionally A X A can produce C dogs and C X C can produce A dogs

This has led to the development of a tool referred to as HSIMS (Histiocytic Sarcoma Index Mate Selection), this tool was shown briefly to the seminar and will be available soon on the Antagene web site. The test itself will continue to improve with the support of breeders.

The '**Take Home Message**' to the breed from the seminar presentation was

- Keep genetic diversity
- The HS index should just be one of many selection criteria
- Not all dogs with C index will develop the cancer
- Not all dogs with A index will not develop the cancer
- We will have to work with C dogs but should only mate them to the most compatible A or B dogs.

## **The "Histio Test"**

### **Background**

Firstly, we ought to clarify our subject matter. In most people's eyes Histiocytic Sarcoma (HS) previously more commonly known as Malignant Histiocytosis, (hence "Histio" or sometimes MH), has been the most serious health threat to our breed and in countries where good records are kept this is the most common form of cancer causing death in our breed and has been for many years.

By definition this can never be substantiated, but in my opinion it goes undiagnosed on many occasions as without proper investigation it can be written off as other sorts of cancer or other diseases. I'm sure mostly it has been mistakenly diagnosed as lung cancer or leukemia type diseases. This is because it can affect any part of the dog's functionality but perhaps the most typical symptoms would include shadows on radiographs of the lungs, severe anemia, appetite/energy loss. Sometimes death comes less than two weeks from first noticing anything amiss although some dogs last for a few months. Treatment is usually only temporarily helpful, if at all, before becoming ineffective.

In terms of age it can affect any age of Bernese but the typical sort of age is middle age, 5-7 years, but there have been a few extremely young deaths. Generally speaking, but again not exclusively, once dogs get to older age say 10 plus they do not tend to develop Histio. This disease is well implicated in the general lack of longevity that affects our breed.

As no one has been able to develop a cure or effective treatment, all realistic help for the breed is in the area of prevention by means of breeding selection as there has always seemed to be a somewhat indistinct but definite inherited element to it's occurrence. However, as well as the difficulty of proper diagnosis, the fact that most dogs will have been used for breeding by the time they succumb to the disease means that only a predictive test can be of real value.

Over the past decade or more the focus has been on DNA research and identification of the genes involved in a predisposition to the disease. There is not a simple recessive gene to find and the feeling has always been that the condition is multi factorial in it's incidence but there has always been the feeling there was some kind of familial link. The search has been to find pre-disposing genes that are present in affected dogs but not in unaffected dogs. Multiple implicated locations within Bernese DNA have been identified. Which of course confirms, there is no simple solution.

### **The Test**

Massive research into the disease has been carried out almost inevitably in America but also by a determined and dedicated team at the University of Rennes in France headed originally by Catherine Andre, latterly assisted by Benoit Hedan, and it is in France that the test has been developed. The French and American Bernese communities have been very supportive not only raising funds but giving support with blood and data about the dogs. Three years ago the test was launched by the French company Antagene and many breeders in other countries have begun to take advantage of this test to assess their Bernese and incorporate the results into breeding choices.

Incidentally, at the recent Kennel Club Breed Health Co-ordinators seminar (September 2015) this Bernese HS test was mentioned as the only 'test for cancer' available in the whole canine world. This puts into perspective the real difficulties involved and the gratitude our breed should have to Catherine and Benoit and everyone else involved in developing this test, including the fundraisers and those supplying the blood samples from their dogs.

### **What does it do?**

There are a few things to perhaps clarify about with this test; namely what it is and what it is not. Work continues to develop and validate the test but it is absolutely not a definitive predictive guide as to whether your dog will develop the disease, but does indicate if there is a potential genetic predisposition to the disease.

It will not dictate to you, or anyone else, whether or not to breed with your dog, as a responsible breeder the choice will always be yours weighing up all the facts of any proposed mating.