Canine Thyroid Registry

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Background

Autoimmune thyroiditis is the most common cause of primary hypothyroidism in dogs and is recognized as a heritable condition. Predisposed dogs are born with normal thyroid function and generally grow and develop in a normal manner. Evidence of an immune reaction in the thyroid glands begins to appear sometime in early adulthood in most affected dogs. The initiating factors remain unknown, but part of the response is the appearance of thyroid autoantibodies directed at thyroglobulin and sometimes the thyroid hormones, T4 and/or T3. Eventually the autoimmune response results in irreversible destruction of the thyroid glands, an inability to make thyroid hormones, and finally, development of clinical signs of hypothyroidism. This pathologic process may extend for several years in many affected dogs. Thus detection of positive thyroid autoantibodies early in the course of the disease serves to identify dogs at increased risk of becoming hypothyroid in the future.

Because of the variable onset of the presence of autoantibodies, periodic testing will be necessary. Dogs that are negative at 1 year of age may become positive at 6 years of age. Hence, dogs should be tested every year or two in order to be certain that they have not developed the condition. Since the majority of affected dogs will have autoantibodies by 4 years of age, annual testing for the first 4 years is recommended. After that, testing every other year should suffice. Unfortunately, a negative at any one time will not guarantee that the dog will not develop thyroiditis.

The registry data can by used by breeders in determining which dogs are best for their breeding program. Knowing the status of the dog and the status of the dog's lineage, breeders and genetic counselors can decide which breedings are the most appropriate for reducing the incidence of autoimmune thyroiditis in the offspring.

General Procedures

Purposes - To identify those dogs that are phenotypically normal for breeding programs and to gather data on the genetic disease - autoimmune thyroiditis.

Examination and Classification - Each dog is to be examined by an attending veterinarian and have a serum sample sent to an OFA approved laboratory for testing according to the available application and general information instructions (see website http://www.offa.org) . The laboratory fee will be determined by the approved laboratory. Check with the referral laboratory for special requirements for sample handling and tests for registry purposes. Samples received within 48 hours do not have temperature requirements, but those in shipment for a longer period of time must be received at 60^{o}F or less.

Certification - A breed database number will be issued by OFA on all dogs found to be normal at 12 months of age or older. Ages will be used in the certification process since the classification can change as the dog ages and autoimmune disease progresses. It is recommended that reexamination occur at ages 2,3,4,6, and 8 years.

Preliminary evaluation - Evaluation of dogs under 12 months of age can be performed for private use of the owner since a few dogs are already positive at that age. However, certification will not be possible at that age.

Dogs with autoimmune thyroiditis - All data, whether normal or abnormal, is to be submitted for purposes of completeness. There is no OFA fee for entering an abnormal evaluation of the thyroid in the data bank. Information on results determined to be positive or equivocal will not be made public without the explicit written permission of the owner or agent.

Thyroid abnormalities fall into several categories - Two types will be defined by the registry.

- Autoimmune Thyroiditis
- Idiopathically Reduced Thyroid Function

Autoimmune thyroiditis is known to be heritable.

Those dogs with laboratory results that are questionable - therefore, not definitive, will be considered as equivocal. It is recommended that the test be repeated in 3-6 months.

Classification

The method for classifying the thyroid status will be accomplished using state of the art assay methodology.

Indices of thyroiditis:

A. Free T4 by dialysis (FT4D) - This procedure is considered to be the "gold standard" for assessment of the thyroid's production and cellular availability of thyroxine. FT4D concentration is expected to be decreased in dogs with the thyroid dysfunction due to autoimmune thyroiditis. In 2006 the FT4D assay was no longer available and the Free T4 2 step procedure was substituted for registry purposes. The thyroid committee of OFA will decide whether or not to continue using FT4-2s if a substitute dialysis procedure becomes available.

B. Canine Thyroid Stimulating Hormone (cTSH) - This procedure helps determine the site of the lesion in cases of hypothyroidism. In autoimmune thyroiditis the lesion is at the level of the thyroid and the pituitary gland functions normally. The cTSH concentration is expected to be abnormally elevated in dogs with thyroid atrophy from autoimmune thyroiditis.

C. Thyroglobulin Autoantibodies (TgAA) - This procedure is an indication of the presence of the autoimmune process in the dog's thyroid. When the first screening procedure for TgAA is positive, a second procedure will be performed which corrects for non-specific binding (NSB) in the ELISA procedure. NSB can be increased in dogs when IgG is elevated, such as after a vaccination. The NSB correction will reduce the number of false positive results in the TgAA assay. Some labs are running the NSB correction on all samples for OFA. The

reference range for the screening procedure is <25 = negative, 25 to 35 = inconclusive, and >35 = positive. For the NSB corrected TgAA, <10 = negative, 10 to 25 = inconclusive, and >25 = positive.

Certification

A. Normal

- FT4D Within normal range
- cTSH Within normal range
- TgAA Within normal range

B. Positive autoimmune thyroiditis

- FT4D Less than normal range
- cTSH Greater than normal range
- TgAA Positive

C. Positive compensative autoimmune thyroiditis

- FT4D Within normal range
- cTSH Greater than normal range or equal to normal range
- TgAA Positive

D. Idiopathically reduced thyroid function

- FT4D Less than normal range
- cTSH Greater than normal range
- TgAA Negative

E. All other results are considered equivocal

Further Information

For further information please contact:

Diagnostic Center for Population and Animal Health (DCPAH) Endocrine Diagnostic Section 4125 Beaumont Rd. Lansing, MI 48910 (517) 353-0621.

On the Web: http://www.animalhealth.msu.edu/

Veterinarian Instructions for OFA Testing

1) The veterinarian or owner must obtain the "Application for Thyroid Database form.

2) The veterinarian and owner must complete their respective portions of the form.

3) A check for $15.00 payable to the OFA and the completed OFA form must accompany the specimen.

4) The veterinarian should request the "OFA Thyroid Panel."

5) Two milliliters (2mL) of serum are needed for testing. The serum sample must be from freshly collected blood. Use a plain "red-top" tube for blood collection. Do not use a serum separator tube with clot additives or any other type of plasma collection tube. After collection, place the blood sample in the refrigerator for 60 to 90 minutes to allow clotting. Centrifuge, collect the serum, and transfer to a plain plastic or glass tube suitable for shipping. Clearly label the sample with the owner's name, animal's identification, date of blood collections, and "OFA Thyroid Panel." If the specimen is to be stored for more than 12 hours prior to shipping, frozen storage is recommended.

6) Ship to the lab via an overnight courier service. It is recommended that all specimens be packaged properly and shipped so they are received either chilled or frozen. Serum samples arriving un-chilled or at room temperature within 48 hours of the collection date will be accepted. However, samples arriving after this time must be received either chilled or frozen in order to be accepted for registry testing. Contact the laboratory if you have any questions or further instructions are needed.

7) Please do not submit whole blood, clotted blood, or plasma.

8) Severely lipemic or hemolyzed specimens are also unacceptable.

9) Female dogs should not be tested during an estrus cycle.

10) The date of last routine vaccination should be noted on the OFA application.

11) Test results will be mailed or faxed only to the submitting veterinarian and the OFA. 12) Results will not be available from the laboratory by telephone. The OFA will send a report to the owner.

OFA Thyroid Number Key

Example: ES-TH800/14F-PI

- ES = Breed Code, in this case an English Setter
- TH = OFA Database, in this case Thyroid (TH)
- 800 = Ascending numerical identifier given to each animal with a breed evaluated as normal and given a number, in this case the 800 th English Setter to be given a thyroid number
- 14 = The age in months when the testing was done, in this case 14 months
- F = Sex
- PI = Indicates that the animal has been permanently identified in the form of tattoo or microchip. If the animal lacks permanent identification, a suffix of NOPI is applied

The OFA thyroid registry application may be obtained at the following website:

http://www.offa.org/thyappbw.pdf

Michigan State University Thyroid Statistics

Note: Statistics from tests performed through 2005.

Breed	Rank	Number of Evaluations	Percent Autoimmune Thyroiditis	Percent Equivocal
ENGLISH SETTER	1	1457	31.4	7.9
HAVANESE	2	146	22.6	3.4
OLD ENGLISH SHEEPDOG	3	924	21.9	6.3
GERMAN WIREHAIRED POINTER	4	338	18.6	7.7
AMERICAN PIT BULL TERRIER	5	1305	18.2	6.5
BOXER	6	8910	18.0	4.5
TIBETAN TERRIER	7	294	17.7	9.5
NOVA SCOTIA DUCK TOLLING RETRIEVER	8	188	17.6	9.0
MALTESE	9	1705	16.5	5.6
BEAGLE	10	7237	16.5	5.6
DALMATIAN	11	3194	16.3	6.4
POINTER	12	132	15.9	9.8
COCKER SPANIEL	13	17083	15.7	6.5
GIANT SCHNAUZER	14	748	15.5	6.7
RHODESIAN RIDGEBACK	15	2155	15.4	5.5
WALKER HOUND	16	112	15.2	6.2
KUVASZ	17	225	15.1	8.0
AMERICAN STAFFORDSHIRE TERRIER	18	499	14.6	5.6
WELSH SPRINGER SPANIEL	19	187	13.9	8.0
GOLDEN RETRIEVER	20	40622	13.2	4.6
CHESAPEAKE BAY RETRIEVER	23	1322	12.9	5.4
SHETLAND SHEEPDOG	24	14110	12.7	5.8
IRISH SETTER	25	1791	12.6	7.0
BRITTANY	26	1486	12.0	4.2
SIBERIAN HUSKY	27	1498	11.7	4.5
ENGLISH COCKER SPANIEL	28	562	11.7	4.8
GORDON SETTER	29	644	11.6	8.5
BORZOI	30	729	11.5	5.3
BORDER COLLIE	31	2197	11.2	5.3
LEONBERGER	32	314	11.1	3.8
ALASKAN MALAMUTE	33	1510	11.1	7.3
BASENJI	35	741	10.8	5.5
GREAT DANE	36	2391	10.1	6.7
SCHIPPERKE	37	562	10.0	3.2
COONHOUND	38	254	9.8	5.9
ANATOLIAN SHEPHERD	39	105	9.5	5.7
PETIT BASSET GRIFFON VENDEEN	40	171	9.4	5.8
SAMOYED	41	1808	9.0	6.0
MANCHESTER TERRIER	42	180	8.9	6.7
AIREDALE TERRIER	43	1312	8.8	5.3

MASTIFF	45	2267	8.7	5.5
AKITA	46	2673	8.6	8.2
COCKAPOO	47	977	8.6	3.8
AUSTRALIAN SHEPHERD	48	2515	8.6	4.9
BELGIAN MALINOIS	49	178	8.4	4.5
DOBERMAN PINSCHER	50	9260	8.4	5.5
GERMAN SHORTHAIRED POINTER	51	1339	8.1	5.7
SPINONI ITALIANO	52	100	8.0	3.0
NEAPOLITAN MASTIFF	53	101	7.9	5.9
VIZSLA	54	672	7.9	4.2
SALUKI	55	218	7.8	4.6
AMERICAN ESKIMO	56	848	7.8	3.5
BLOODHOUND	57	338	7.7	7.1
AUSTRALIAN QUEENSLAND HEELER	58	704	7.7	4.5
ROTTWEILER	59	6337	7.7	5.4
CHOW CHOW	60	2296	7.4	6.4
CHINESE CRESTED	61	122	7.4	4.9
AFGHAN HOUND	62	494	7.3	4.7
SAINT BERNARD	63	722	7.2	6.8
ENGLISH SPRINGER SPANIEL	64	1523	7.0	6.4
BULL TERRIER	65	401	7.0	6.5
STANDARD SCHNAUZER	66	187	7.0	8.0
WEIMARANER	67	1750	6.9	5.1
FIELD SPANIEL	69	148	6.8	5.4
SCOTTISH TERRIER	70	1682	6.7	5.2
GREAT PYRENEES	71	971	6.5	3.6
KEESHOND	72	1811	6.4	5.2
GERMAN SHEPHERD DOG	73	7600	6.4	5.5
SPITZ	74	219	6.4	4.6
BULLMASTIFF	75	1169	5.8	6.1
LABRADOR RETRIEVER	76	41447	5.7	4.3
PUG	77	2304	5.6	5.6
RAT TERRIER	78	391	5.1	2.6
WIREHAIRED FOX TERRIER	79	158	5.1	3.2
FLAT-COATED RETRIEVER	80	398	5.0	4.5
AUSTRALIAN TERRIER	81	143	4.9	4.2
BERNESE MOUNTAIN DOG	82	1341	4.8	3.5
PORTUGUESE WATER DOG	83	644	4.8	5.6
CLUMBER SPANIEL	84	154	4.5	13.0
COLLIE	85	3355	4.5	4.1
SHAR-PEI	86	1974	4.5	3.7
PAPILLON	87	335	4.5	1.8
ITALIAN GREYHOUND	88	676	4.4	1.8
BOUVIER DES FLANDRES	89	1492	4.3	4.2
BEARDED COLLIE	90	793	4.3	6.6
POODLE	91	6024	4.2	4.0
ENGLISH BULLDOG	92	3213	4.2	6.7
PARSON RUSSELL TERRIER	93	1428	4.1	3.8

NEWFOUNDLAND	94	2101	4.0	3.7
AMERICAN BULLDOG	95	229	3.9	5.2
CAIRN TERRIER	96	1512	3.9	3.3
BOYKIN SPANIEL	97	129	3.9	2.3
DOGUE DE BORDEAUX	98	184	3.8	6.5
GREATER SWISS MOUNTAIN DOG	99	135	3.7	4.4
WELSH CORGI	100	1350	3.7	4.7
AMERICAN WATER SPANIEL	101	191	3.7	6.8
MINIATURE PINSCHER	102	1660	3.6	2.7
WIREHAIRED FOX TERRIER	103	227	3.5	3.5
BASSET HOUND	104	1739	3.5	4.5
COTON DE TULEAR	105	150	3.3	4.0
LHASA APSO	106	2110	3.2	4.9
POODLE, TOY	107	731	3.1	4.8
BELGIAN SHEEPDOG	108	289	3.1	4.8
NORWEGIAN ELKHOUND	109	588	3.1	4.8
BELGIAN TERVUREN	110	632	3.0	4.3
SHIH TZU	111	4649	3.0	4.8
TOY FOX TERRIER	112	101	3.0	5.0
SILKY TERRIER	113	202	3.0	6.9
WEST HIGHLAND WHITE TERRIER	114	2206	2.9	3.9
WHIPPET	115	350	2.9	5.4
NORWICH TERRIER	116	142	2.8	2.1
DACHSHUND	117	9126	2.8	3.1
BRIARD	118	254	2.8	1.2
KERRY BLUE TERRIER	119	189	2.6	4.2
CHIHUAHUA	120	2052	2.6	3.4
SCHNAUZER	121	3016	2.6	2.4
POMERANIAN	122	3724	2.5	2.3
IRISH WATER SPANIEL	123	240	2.5	5.0
YORKSHIRE TERRIER	124	3083	2.5	3.2
BORDER TERRIER	125	253	2.4	4.7
IRISH WOLFHOUND	126	469	2.3	4.1
SHIBA INU	127	305	2.3	3.0
WELSH TERRIER	128	263	2.3	5.3
CAVALIER KING CHARLES SPANIEL	129	925	2.2	2.7
WELSH CORGI (PEMBROKE)	130	238	2.1	5.5
PEKINGESE	132	652	2.0	2.3
CHINESE FOO DOG	133	365	1.9	2.7
BOSTON TERRIER	134	1475	1.9	1.6
GREYHOUND	135	3657	1.7	1.8
SOFT COATED WHEATEN TERRIER	136	700	1.7	3.1
BRUSSELS GRIFFON	137	118	1.7	1.7
BICHON FRISE	138	1912	1.7	2.7
MINIATURE SCHNAUZER	139	2109	1.3	2.6
FRENCH BULLDOG	140	357	1.1	1.1