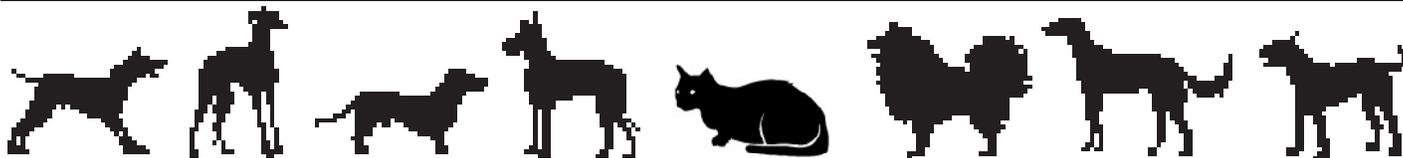

The **ADVOCATE**



News from the Orthopedic Foundation for Animals Inc., a not-for-profit organization

Volume 1, Issue 1

Is Hypothyroidism Really The Leading Canine Genetic Disease?

Testing Can Assess Real Risks and Eliminate Unnecessary Treatments

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The Advocate

Published twice yearly by the Orthopedic Foundation for Animals Inc. to inform and educate veterinarians, veterinary technologists, breeders and owners on advances in animal health and the services of OFA.

Editor

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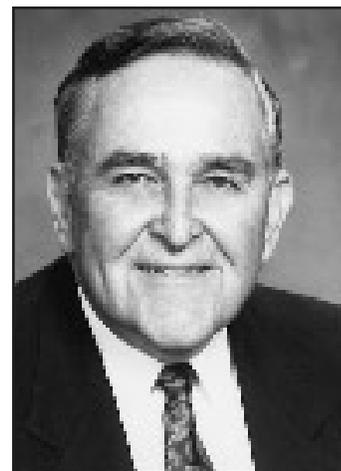
A few years ago two independent polls of purebred dog breeders, handlers and owners listed hypothyroidism as the most common inherited disease in dogs. These surveys accurately reported their perceptions — but how accurate are those perceptions?

Some breeders and handlers estimate that up to 80 percent of dogs shown in some breeds are being treated for hypothyroidism. Unfortunately, the great majority have never been tested to confirm hypothyroidism, making the treatment purely arbitrary.

These dogs are routinely treated due to the ease of obtaining thyroid drugs and their relative low cost. Breeders and handlers have also heard that thyroid drug treatment results in a beautiful full coat, makes a bitch extra-fertile or helps a dog show better.

This treatment is usually not harmful and is the treatment of choice if the dog is truly hypothyroid. But there is no scientific data to suggest there may be any value in using thyroid substitutes in dogs with a normal (euthyroid) thyroid gland. Thyroid treatment is unnecessary in this situation and could even be potentially harmful.

Arbitrary treatment makes it impossible to ascertain the true incidence of hypothyroidism. It is entirely possible the disease is not nearly as common as believed.



Dr. Weitkamp

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Assessing the True Risks of Canine Hypothyroidism

(continued from page 1)

But it would be useless or misleading to test treated animals because significant information cannot be derived if a dog has received thyroid medication in the last three months.

The Physiology of Hypothyroidism

The need for accurate testing of hypothyroidism should become more apparent after an explanation of the physiology of the disease.

The thyroid gland is located in the neck just above the larynx. Its primary function is the production of thyroxin, a hormone that allows the dog to maintain an adequate and consistent level of metabolism.

The thyroid gland is regulated through the interaction of several hormones. If the thyroxin level in the blood circulation drops, the pituitary gland at the base of the brain is stimulated to produce and secrete thyroid stimulating hormone (TSH), which in turn stimulates the thyroid gland to produce and secrete thyroxin.

TSH is secreted through stimulation by another hormone, thyrotropin releasing hormone (TRH), which is released from the hypothalamus.

As thyroxin begins to reach normal levels in the blood stream, TSH secretion is inhibited. Thus, when testing for hypothyroidism in canines or humans, it is necessary to measure the T4 (thyroxin) level

and TSH assay. If the T4 level is low due to hypothyroidism, the TSH assay should be high because the pituitary gland is attempting to stimulate production of thyroxin. If a normal dog is receiving exogenous thyroxin, its own thyroid gland will decrease or stop the secretion of thyroxin. As a result, it becomes impossible to determine whether dogs receiving exogenous thyroxin have a normally functioning thyroid gland.

Hyperthyroidism occurs when there is excess circulating thyroxin. This condition is not common and usually occurs in dogs with tumors of the thyroid gland. The T4 will be above normal and the TSH is below normal in this situation.

The Causes of Hypothyroidism

The causes of hypothyroidism are classified as primary, secondary or tertiary. Primary causes are the most common and are associated only with the thyroid gland. Secondary causes are associated with the pituitary gland, such as a deficiency of TSH. Tertiary causes, such as a

deficiency of TRH, are associated with the hypothalamus. Secondary and tertiary hypothyroidism are uncommon.

Primary causes of hypothyroidism can be classified as lymphocytic thyroiditis, idiopathic atrophy, neoplastic destruction, iodine deficiency and goitrogenic substances. At least 50 percent of hypothyroidism cases are caused by lymphocytic thyroiditis. This is an auto-immune or immune-mediated condition in which the gland is infiltrated by lymphocytes, white blood cells which function as part of the immune mechanism. The result is gradual destruction of the functional thyroid cells that produce, store, and secrete thyroxin. Symptoms will not appear until about 75 percent of the gland is destroyed. It has been established that lymphocytic thyroiditis is inherited most likely as a polygenetic trait.

Idiopathic atrophy is a condition in which functional thyroid cells are replaced by scar tissue. As the

Hypothyroidism is blamed for a wide range of common and uncommon symptoms. It is not known whether an inadequate level of circulating thyroxin is the culprit behind all of them.

name implies, the cause is not known. Research is beginning to suggest that idiopathic atrophy may be the end product of lymphocytic thyroiditis. Tumors of the thyroid gland are relatively rare, so lymphocytic thyroiditis and idiopathic atrophy may cause the vast majority of hypothyroidism cases. It is easy to see that

selective breeding could prompt a dramatic reduction in the disease.

Since iodine is essential for thyroxin production, an iodine-deficient diet can cause hypothyroidism. However, this is virtually never seen with today's modern diets.

Hypothyroidism can also be classified as true thyroid disease, thyroid responsive disease or sick euthyroid syndrome. True thyroid disease is an actual alteration in the thyroid gland, such as lymphocytic thyroiditis, that causes a reduction in thyroxin output.

Thyroid responsive disease is a condition in which the thyroid gland performs normally, but administration of thyroid drugs show improvement in particular symptoms or characteristics.

Sick euthyroid syndrome occurs when the thyroid gland is adversely affected by another disease. This is a temporary situation since the thyroid will return to normal when the other abnormality is corrected.

Symptoms and history



Rarely are symptoms of hypothyroidism seen in dogs under one year of age. Some dogs may not exhibit signs until closer to mid-life. Owners are often slow to recognize the symptoms because of their late and gradual onset.

Hypothyroidism is blamed for a wide range of common and uncommon symptoms. These may appear singly, in combinations or not at all. It is not known whether an inadequate level of circulating thyroxin is the culprit behind all of them.

Common Symptoms

- Skin changes
- Lethargy
- Weight gain
- Mental dullness
- Exercise intolerance

Uncommon Symptoms

- Female infertility
- Neuromuscular signs
- Ocular changes
- Cretinism
- Myxedma

Symptoms of Unknown Association

- Male infertility
- Clotting disorders
- Cardiovascular changes
- Behavioral changes
- Gastrointestinal signs

Diagnosis of Hypothyroidism

Diagnosis of hypothyroidism requires laboratory testing. Many thyroid panels are available to the veterinarian but, as in human medicine, the T4 and TSH assays provide the most accurate information at minimum cost.

T4 is most accurately measured by the test known as free T4 by dialysis (FT4D). FT4D is more accurate than measurement of total T4. FT4D measures the functional T4 that is not bound to protein and available to act upon the metabolism whereas total T4 measures all T4 in the circulating blood, including the non-functional portion bound to protein. The TSH assay (cTSH) and (FT4D) are the best tests for diagnosing hypothyroidism, but do not identify the cause.

The Thyroglobulin Autoantibody (TgAA) assay is a test used that is highly specific for lymphocytic thyroiditis. Information from this three-part testing panel is used in the OFA thyroid registry database as the best possible means of diagnosing thyroid disease. The first two tests tell us if the dog is hypothyroid and the third reveals if the dog has inherited thyroid disease.

Test Results

There have been 1,225 thyroid applications submitted to the OFA thyroid registry from January 1996 through June 1998. Looking at all breeds combined, 71.8 percent of the tested dogs were normal. The normal percentage of dogs from major breeds with more than 30 submissions include:

1. Bouvier Des Flanders – 77.9% (131 dogs)
2. Doberman Pinscher - 66.1% (62 dogs)
3. Golden Retriever - 64.9% (111 dogs)
4. German Shepherd - 97.2% (36 dogs)
5. Labrador Retriever - 73.2% (41 dogs)
6. Mastiff – 75.5% (98 dogs)
7. Newfoundland - 90.2% (51 dogs)
8. Rottweiler - 70.2% (47 dogs)
9. Rhodesian Ridgeback - 76.4% (72 dogs)

Establishment of a Genetic Registry

Two years ago the OFA established a registry for hypothyroidism with the help and guidance of Dr. Ray Nachreiner. The purposes of the registry are to assist breeders in selecting sound dogs for breeding purposes and to develop and maintain a database for the study of hypothyroidism in dogs.

To submit a dog to the registry, it is taken to the

This information will aid breeders in selection of their breeding stock and accumulate information to further research that will benefit breeders and dogs in the future.

owner's regular veterinarian, who draws blood for submission to a certified laboratory. The sample is handled and shipped following guidelines described by the laboratory. The laboratory performs the tests (FT4D, cTSH and TgAA) and reports to the owner, veterinarian and the OFA.

At the time of submission the owner has the option of placing results in an open or closed registry.

Approximately 61.8 percent of owners elect to have the information stored in a closed database and 38.2 percent choose to have the information in an open database. OFA will enter a dog in the thyroid database earlier than one year of age but a registry number is not assigned until the animal is tested at a minimum of 12 months of age.

Since the disease may not become apparent until later in life, the OFA certification number will reflect the dog's

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OFA Is An Advocate for Animal Welfare

The Orthopedic Foundation for Animals pursues its mission of advancing animal health by supporting activities within and beyond its own walls. OFA has contributed more than \$1.5 million to support research on canine hip dysplasia, elbow dysplasia and genetics since 1966. It also reads radiographs without charge for organizations that breed and raise guide dogs.

OFA contributed \$105,000 to animal medical research projects in 1997. It contributed \$75,000 for canine genetic research at the University of Michigan and Michigan State University and \$20,000 for canine genetic research at the University of Missouri. The foundation also donated \$10,000 to the American Kennel Club's Canine Health Foundation.



Coming Soon to a Screen Near You

A videotape describing OFA's hip radiography and registry procedures is available to veterinary and breeder groups. At left, Dr. Greg Keller demonstrates proper hip alignment techniques during taping at the University of Missouri College of Veterinary Medicine. For more information on obtaining the video, call OFA at (573) 442-0418.

Diagnosing Thyroid Disease

(continued from page 5)

age at the most recent testing. Since the majority of affected dogs will have autoantibodies by four years of age, annual testing for the first four years is recommended. After four years testing every other year should suffice. If the dog tested positive for lymphocytic thyroiditis, further testing is not necessary except to guide the treatment for hypothyroidism.

Each laboratory establishes its own fees. The OFA charges \$15.00 for entering normal thyroid information into the registry's database and offers litter and multiple dog discounts. This fee is a one-time event — for each successive submission there is no charge.

Laboratories are certified after undergoing a site visit from the OFA certifying committee, which currently is comprised of Dr. Ray Nachreiner from Michigan State Veterinary School, Dr. Tom Reimers from Cornell University and Dr. Steve Stockham from the University of Missouri. The certification process assures that all laboratories follow standardized testing techniques so testing

results will be accurate and consistent within and between laboratories.

Presently the OFA will accept thyroid results from five labs, the Endocrinology Laboratory at Michigan State University, Cornell Veterinary Laboratory, the Laboratory at Guelph in Canada and the veterinary laboratories at the University of Minnesota and the University of California at Davis. These laboratories can be contacted for information on fees and instructions for sample preparation and shipping.

The OFA's goal is identification of normal dogs and/or dogs with lymphocytic (autoimmune) thyroiditis so information can be stored and maintained in an easily accessed data bank. This information will aid breeders in selection of their breeding stock and accumulate information to further research that will benefit breeders and dogs in the future. The information also is available at the OFA web site at www.offa.org.

Meet the Orthopedic Foundation for Animals

The Board of Directors

The board of directors of the Orthopedic Foundation of Animals provides the organization a rich history of concern for animal welfare and decades of experience in breeding and training. Its members are:

Ernest Engberg of Madison, Wisc., was a breeder and exhibitor of Chow Chows for 44 years. As a member of the Chow Chow Club Inc., he served as president for two years, secretary for 12 years and director for 10 years. He joined the OFA board in 1990.

William J. Feeney is an attorney who lives in Cotati, Calif. He joined the OFA board in 1997. He and his wife, Sylvia Donahey-Feeney, have been breeding and showing Golden Retrievers under the kennel name Birnam Wood for more than 20 years. They have bred and shown many champions, including several multiple best-in-show dogs, and their stud dogs have been among the top producers in the breed. Feeney also served the Golden Retriever Club of America as a member of the board of directors from 1990 to 1996 and as president from 1994 to 1996.

Eric Jimenez, M.D., of New Haven, Conn., is chief of pulmonary and critical care at Danbury Hospital and assistant clinical professor of medicine at Yale University Medical School. He has been breeding and showing Rottweilers for 17 years and has bred a number of specialty-winning dogs, including the youngest dog ever to win the national specialty. He has been chairman of specialty and all-breed shows and has been a board member and vice president of the Newtown Kennel Club for five years.

Constance Josse of St. Louis, Mo., a former Labrador Retriever owner, was administrative assistant to John M. Olin when he guided the formation of OFA in 1966. She oversaw the financial management of the foundation from its inception through 1994. She was elected to the board as its treasurer in 1985.

Edward L. Kozicky of Godfrey, Ill., an English Setter owner and trainer, has been part of the dog fancy for 70 years. He was an original member of the OFA board of directors when the organization was founded in 1966. He was administrator of Olin Corporation's Nilo Kennels from 1956 to 1982.



Greg Keller Is Your Information Resource at OFA

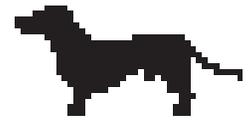
G. Gregory Keller, D.V.M., M.S., Dipl. ACVR, became executive director of the Orthopedic Foundation for Animals Inc. on Jan. 1, 1997, upon the retirement of E.A. Corley, D.V.M., Ph.D., Dipl. ACVR.

Dr. Keller graduated from the University of Missouri College of Veterinary Medicine, where he also earned a master of science degree in veterinary medicine and surgery. He was in private practice from 1973 until 1987, when he joined OFA as associate director.

He is board certified by the American College of Veterinary Radiology and is an adjunct instructor in the College of Veterinary Medicine at the University of Missouri.

U.V. Mostosky, D.V.M., of Haslett, Mich., is a veterinarian and owner and exhibitor of German Wirehaired Pointers. One of his dogs is a current AKC champion. Dr. Mostosky was president of the German Wirehaired Pointer Club of America for five years, during which it became an AKC member club. He has served on the OFA board since 1980 and has been involved in the dog fancy for 38 years. Dr. Mostosky is training to reach the master level of pointing dog hunt tests and is developing a privately-owned wildlife management area in conjunction with Ducks Unlimited and the Fish and Wildlife Service of the Michigan Department of Natural Resources.

Sally McCarthy Munson of Waunakee, Wisc., has been breeding and exhibiting dual-purpose Labradors since 1957. Her Shamrock Acres Kennels has produced 520 champions, two dual champions, 25 field champions, one national field champion, 37 amateur field champions, two OTCH and more than 600 dogs with obedience titles and 78 with hunt test titles. She has been a member of the OFA board since 1975.



The OFA Board of Directors at its spring 1998 meeting in Chicago. Standing, from left: Emeritus member Dr. E.A. Corley, Jack Newton, Marshall Simonds, Dr. Richard Wayburn, Dr. Eric Jimenez and William J. Feeney. Seated, from left: Dr. U.V. Mostosky, Dr. Ray Weitkamp, Constance Josse, Dr. Fran Smith, Sally Munson and Ernest Engberg.

Jack Newton of Woodland Hills, Calif., is a retired engineer and breeder of German Shepherd dogs who has four AKC champions. He regularly judges AKC German Shepherds and is a member of the board of directors of the German Shepherd Dog Club of America. He has been involved in the dog fancy for 40 years and joined the OFA board in 1997.

Marshall Simonds of Carlisle, Mass., is an attorney who has been a Labrador Retriever performance event trainer and handler for more than 40 years. He and his wife have trained and handled more than a dozen Labrador field and amateur field champions. Simonds, a delegate to the American Kennel Club, has been chairman of the AKC Retriever Advisory Committee on Field Trial Rules for more than 20 years and is chairman of the Delegates' Standing Committee on Field Trial Clubs. He is an occasional breeder of performance Labradors and is an active member of four retriever field trial clubs. He is a director of the Labrador Retriever Breed Club and serves as a judge at retriever field trials. In addition to Labrador Retrievers, Simonds also owns Brittanys, Pointers and English Setters. He joined the OFA board of directors in 1990.

Frances O. Smith, D.V.M., Ph.D., of Lonsdale, Minn., has been involved in the sport of purebred dogs since 1956. She is a veterinarian who is board certified in theriogenology (reproduction). Dr. Smith breeds Danikk Labradors, which have produced more than 20 conformation champions and many other obedience trial, utility, companion and hunter champions. Dr. Smith serves as a judge at hunting retriever tests and has been a member of the OFA board since 1990.

She also serves on the boards of directors of the Labrador Retriever Club Inc. and the Labrador Retriever Club of the Twin Cities. Her family currently includes a Great Dane, a Bregue d'Auverne, cats and horses.

Richard Wayburn, M.D., of Irmo, S.C., is a retired anesthesiologist who has owned Rottweilers for 24 years. He and his wife have exhibited in obedience and confirmation and owned Mirko, which won the largest all-breed shows ever won by a Rottweiler in 1985 and 1986. Three of his dogs have performed therapy work at the general hospital in Columbia, S.C. In 1991, Mrs. Wayburn and a Mirko son were awarded the Individual Volunteer of the Year Award for the mid-lands of South Carolina. Dr. Wayburn is a member of two regional Rottweiler clubs that have mandatory codes of ethics and is a past board member of the American Rottweiler Club. He has been a member of the OFA board since 1983 and currently owns a Rottweiler and a Whippet.

Ray Weitkamp, D.V.M., of Arcadia, Calif., graduated from the University of California at Davis Veterinary School in 1956 and was a veterinarian in private practice until retiring in 1997. He was elected to the OFA board in 1987. He was an active leader in the southern California veterinary profession during his career, serving as the head of continuing education for the Southern California Veterinary Medical Association for 18 years and as a chairman of the annual meeting of the American Animal Hospital Association. His veterinary practice specialized in the care of breeding dogs. Dr. Weitkamp had a particular interest in animals with orthopedic and neurological problems. He currently owns a Golden Retriever.



The OFA Registries

In addition to the thyroid registry described in the cover story, OFA conducts registries for these diseases:

Hip Dysplasia

OFA veterinary radiologists have screened more than 700,000 hip radiographs since 1966. Hip dysplasia is a genetic disease, arising from malformations of the hip socket.

Through OFA screening and selective breeding, many dog breeds have realized significant decreases in dysplastic hip rates and increases in excellent hips. The hip registry serves canine and feline breeders.

Elbow Dysplasia

Elbow dysplasia, also genetic in origin, is a degenerative joint disease. Elbow dysplasia has been found in 78 of 164 breeds evaluated by OFA, which opened this registry in 1990.

Patellar Luxation

Patellar luxation is a deformity of the hind leg that permits the kneecap to dislocate. Patellar luxation can lead to lameness or a limb-carrying gait.

Cranio-mandibular Osteopathy

Cranio-mandibular osteopathy is an inherited bone disease that produces proliferation of bone tissue along the mandible, interfering with jaw mobility. The disease is most commonly found in West Highland Terriers and Scottish Terriers but may occur in other breeds.

Congenital Heart Disease

Congenital heart diseases can arise from a number of malformations of valves, vessels and chambers. This registry is based upon protocols established by veterinary cardiologists.

A dog is classified as normal if no heart murmur is detected. If a murmur is detected, echocardiography, electrocardiography or cardiac catheterization may be used to determine whether the murmur is innocent or caused by a deformity.

Copper Toxicosis

Copper toxicosis is a genetic disorder that affects several breeds, permitting copper accumulation in the body which leads to liver disease. The OFA registry serves Bedlington Terriers. It is estimated that 25 percent of this breed is affected by the disease and 50 percent carries the gene.

Von Willebrand's Disease

Von Willebrand's disease is an inherited disease that leaves dogs susceptible to abnormal bleeding following injuries or surgical procedures. This OFA registry serves Scottish Terriers, Doberman Pinschers, Shetland Sheepdogs, Manchester Terriers, Poodles and Pembroke Welsh Corgis.

Phosphofructokinase Deficiency

The phosphofructokinase registry lists English Springer Spaniels and Cocker Spaniels. The genetic deficiency causes mild to moderate anemia with severe episodes of bleeding.

Progressive Retinal Atrophy

Progressive retinal atrophy is an inherited degenerative eye disorder that leads to blindness. The PRA registry serves the Irish Setter breed.

Pyruvate Kinase Deficiency

Pyruvate kinase is an enzyme normally found in red blood cells. When the levels of this enzyme are deficient, the blood cells break down prematurely, the dog becomes anemic and exhibits lack of energy, low exercise tolerance and probably reduced fertility. The pyruvate kinase deficiency registry is devoted to Basenjis.

Cystinuria

Cystinuria is an inherited disorder characterized by stone formation in the kidney, urethra and urinary bladder in Newfoundlands.

First Health and Breeding Registry Instituted

In recent years the OFA Board of Directors has established the Animal Health and Breeding Registry to honor or distinguish animals within designated breeds that have been cleared on specific health issues.

Parent breed clubs select these health issues and the minimum age of testing and determine whether retesting for specific health issues is required at a later date. OFA's only requirement is that the individual animal is positively and permanently identified by tattoo, microchip or DNA profile.

The Bull Terrier Club of America recently accepted OFA's offer to maintain the health database for its breed. The club determined that there is a need to monitor animals within its breed for congenital cardiac disease and patellar luxation. OFA maintained existing registries for both diseases. In addition, BTCA determined that animals with the breed also should be monitored for kidney disease and congenital deafness for which OFA, based on valid phenotypic documentation, established registries.

BTCA elected to permit individual owners and breeders to decide whether to maintain their data in open or semi-closed registries. All data, regardless of the type of registry, will be available for confidential scientific review.

The OFA Board of Directors looks forward to establishing similar databases with other parent breed clubs. For more information, please contact the foundation.

For More Information

Applications or more information on OFA registries and databases are available by calling (573) 442-0418, faxing (573) 875-5073 or writing the Orthopedic Foundation for Animals, 2300 Nifong Boulevard, Columbia, Mo. 65201-3856. Information also is available at the OFA website, <http://www.offa.org>.



**Taking
A Closer
Look:**

**Is hypothyroidism really
the leading genetic disease
of dogs?**