

# Eye Diseases and Genetic in Dogs

OFA

Genetic diseases are those that are passed on from parent to offspring through genes that carry the codes for each specific trait. Many of the diseases and disorders that affect the eyes have genetic factors.

## How do we identify an inherited eye disease?

Although there are noteworthy exceptions, most of the ocular diseases of dogs presumed to be hereditary have not been adequately documented. Genetic studies require examination of large numbers of related animals in order to characterize the disorder (age of onset, characteristic appearance, rate of progression) and to define the mode of inheritance (recessive, dominant). In a clinical situation, related animals are frequently not available for examination once a disorder suspected as inherited is identified in an individual dog. Maintaining a number of dogs for controlled breeding trials through several generations is a long and costly process. Both of these obstacles are compounded by the fact that many ocular conditions do not develop until later in life. Until the genetic basis of an ocular disorder is defined in a peer-reviewed published report, we rely on what statistical information is available from registry organizations, informed opinions and consensus from ACVO diplomates. We must satisfy ourselves with terms like “presumed inherited” and “suspected to be inherited.” Several companies provide information on genetic testing and greatly assist in providing more information and data to aid in defining the canine genetics of ocular diseases.

There are eye diseases in the dog for which there is evidence of a genetic or heritable cause. The American College of Veterinary Ophthalmologists has listed ten of these diseases as automatic “fails” (*this means the affected dog is ineligible to receive an eye certification*) because of the significance of the condition to vision and/or the very strong evidence of heritability.

## Eye Exam

### ***Eye Evaluation Criteria: What to Expect During the Exam***

OFA Eye Certification examinations are screening exams performed by board certified veterinary ophthalmologists. The exams can take place either in the veterinary office or at a special clinic held in conjunction with another event (such as a dog show).

Bring your dog’s information to the exam so the exam form may be completed properly. Required information includes: registration number, owner’s name and contact information, dog’s registered name, date of birth, sex, breed/variety, and if applicable, permanent identification (via microchip or tattoo).

The exam is performed 30 to 40 minutes after pupil-dilating drops are placed in the eyes. The Eye Certification exam consists of indirect ophthalmoscopy and slit lamp biomicroscopy. It is not a comprehensive ocular health examination, but rather an eye screening exam. For example, Eye Certification exams do not entail measuring tear production, staining the eyes for the presence of corneal ulcers, or measuring intraocular pressures. Gonioscopy, tonometry, Schirmer tear test, electroretinography, and ultrasonography are not routinely performed; thus, dogs with goniodysgenesis, glaucoma, keratoconjunctivitis sicca, early lens luxation/subluxation or some early cases of progressive retinal atrophy might not be detected without further testing. If a serious ocular health problem (such as glaucoma) is suspected during the Eye Certification exam, the examiner will recommend a more comprehensive ocular examination. The diagnoses obtained during an OFA Companion Animal Eye Registry exam refer only to the observable **phenotype** (clinical appearance) of an animal. Thus it is possible for a clinically normal animal to be a carrier (abnormal **genotype**) of genetic abnormalities.

### **Eye Registration Procedures**

After the painless examination of the dog's eyes, the board certified veterinary ophthalmologist will complete the OFA Companion Animal Eye Registry (CAER) form and indicate any specific disease(s) found. The forms are in triplicate. One copy is for the vet's records, one is for the owner, and one is for the OFA's Clinical Database.

Breeding advice will be offered based on guidelines established for that particular breed by the Genetics Committee of the American College of Veterinary Ophthalmologists (ACVO). Bear in mind that the OFA and the ACVO are separate, but cooperating entities. The ACVO only provides their professional services and expertise to ensure that uniform standards are upheld for the certification of dog's eyes with the OFA.

Certification is valid for 12 months from the date of the eye exam. Annual re-examination is recommended.

### **Conditions that prevent eligibility for an OFA CAER Number**

There are currently ten disorders for which there is an unequivocal recommendation against breeding in all breeds. These diagnoses are ineligible for OFA Eye Registry certifications. These are conditions which frequently result in blindness and for which there is definite evidence of heritability in one or more breeds.

*\*Note: The prudent approach to these disorders is to assume they are hereditary except in cases specifically known to be associated with trauma, other causes of ocular inflammation, specific metabolic diseases or nutritional deficiencies.*

1. Keratoconjunctivitis sicca (KCS) – Breeding is not recommended for any animal demonstrating keratitis consistent with KCS. The prudent approach is to assume

KCS to be hereditary except in cases suspected to be non-genetic in origin. See above note.

2. Cataract – Breeding is not recommended for any animal demonstrating partial or complete opacity of the lens or its capsule unless the examiner has also checked the space for “significance of above cataract unknown” or unless specified otherwise for the particular breed. See above note.
3. Lens luxation or subluxation – See above note.
4. Glaucoma – See above note.
5. Persistent hyperplastic primary vitreous (PHPV)
6. Retinal detachment – See above note.
7. Retinal dysplasia – geographic or detached forms – See above note.
8. Optic nerve coloboma
9. Optic nerve hypoplasia
10. Progressive Retinal Atrophy (PRA) – Breeding is not advised for any animal demonstrating bilaterally symmetric retinal degeneration (considered to be PRA unless proven otherwise).

#### **OTHER FACTORS REGARDING ELIGIBILITY FOR AN OFA CAER NUMBER**

Two categories of advice regarding breeding have been established by the Genetics Committee of the ACVO:

- **“NO”**: Substantial evidence exists to support the heritability of this entity AND/OR the entity represents a potential compromise of vision or other ocular function. Refer to the section titled “Conditions that prevent eligibility for an OFA Eye Certification Number” for a list of disorders with an unequivocal recommendation against breeding, regardless of breed. Click here to see a complete listing of conditions which may make the dog ineligible for a certification number. Some of these conditions are breed specific.
- **“BREEDER OPTION”**: Entity is suspected to be inherited but does not represent potential compromise of vision or other ocular function. Please note, although the dog will ‘pass’ it will have additional documentation on its OFA Eye Certification number with a category listing the problem. Click here to see a listing of Breeder Option Codes. Some Breeder Option Codes are breed specific.
- When the breeding advice is “NO,” even a minor clinical form of the entity would make this animal unsuitable for breeding. When the advice is “BREEDER OPTION,” caution is advised. In time, it may be appropriate to modify this stand to “NO” based on accumulated evidence. If it becomes apparent that there is insufficient evidence that an entity is inherited, it may be deleted from the list.

*Reference: Orthopedic Foundation For Animals. Portions of the material above have been reprinted with permission of the American College of Veterinary Ophthalmologists from the publication “Ocular Conditions Presumed to be Inherited in Purebred Dogs”, 5th Edition, 2010, produced by the Genetics Committee of the American College of Veterinary Ophthalmologists, © American College of Veterinary Ophthalmologists.*

**Eye Exams & Genetic Testing Help Breeders Reduce Blindness in Labradors.**