

## ANIMAL GENETICS

### **PROGRESSIVE RETINAL ATROPHY – PROGRESSIVE ROD CONE DYSTROPHY (PRA-PRCD)**

Progressive Rod-Cone Degeneration, or PRA-prcd, is a form of Progressive Retinal Atrophy (PRA) in which the cells in the dog's retina degenerate and die. PRA for dogs is similar to retinitis pigmentosa in humans. Most affected dogs will not show signs of vision loss until 3-5 years of age. Complete blindness can occur in older dogs. Progressive Rod-Cone Degeneration is a form of PRA known to affect over 40 different breeds and is the form most commonly seen in Labradors.

The retina is a membrane located in the back of the eye that contains two types of photoreceptor cells. These cells take light coming into the eyes and relay it back to the brain as electrical impulses. These impulses are interpreted by the brain to "create" images. In dogs suffering from PRA-prcd, the photoreceptors begin to degenerate, causing an inability to interpret changes in light. This results in a loss of vision. Rod cells, which normally function in low-light or nighttime conditions, begin to degenerate first. This leads to night-blindness. The cone cells, which normally function in bright-light or daytime conditions, will deteriorate next. This often leads to complete blindness over a period of time.

PRA-prcd is inherited as an autosomal recessive disorder. A dog must have two copies of the mutated gene to be affected by PRA, ie it must inherit the mutation from BOTH its parents. A dog can have one copy of the mutation and won't experience any symptoms of the disease. Dogs with one copy of the mutation are known as carriers, meaning that they can pass on the mutation to their offspring but not experience symptoms themselves. If they breed with another carrier, there is a 25% chance that the offspring can inherit one copy of the mutated gene from each parent and be affected by the disease.

Source: [https://www.animalgenetics.us/canine/Genetic\\_Disease/prcd.asp](https://www.animalgenetics.us/canine/Genetic_Disease/prcd.asp)

#### **ACTION:**

Responsible breeders will test all their breeding dogs for PRA-prcd with a simple genetic test that verifies the presence of the PRA-prcd mutated gene. When buying a puppy, ask the breeder for the genetic test results of both parents. Note that if both parents are certified "clear" of the disease, it is not necessary to test the offspring as all offspring will automatically be clear as demonstrated in the table below. Also note that many breeders will include carriers of the disease in their breeding programme, always making sure that the mate is clear. This carefully implemented strategy ensures continued genetic diversity in the breed and poses no risk to the puppies.

BREEDING IMPLICATIONS				MATERNAL CANDIDATE				
				CLEAR		CARRIER		AFFECTED
PATERAL CANDIDATE		CLEAR	G	G	G	A	A	A
			CARRIER	G	A	GG	GG	GG
ALL CLEAR		50% CLEAR 50% CARRIER				ALL CARRIER		
AFFECTED	A	A	GA	GA	GA	AA	AA	AA
			ALL CARRIER		50% CARRIER 50% AFFECTED		ALL AFFECTED	

Source: Inqaba Biotec