"Though it is not practical to eliminate all deleterious mutations, the incidence of affected individuals may be significantly reduced through a combination of intelligent breeding practice and the development of DNA tests."

Dr. John B. Armstrong, 1999

ALL DOGS ARE CARRIERS.....

All dogs (and living organisms) are carriers of multiple mutations. If a genetic disease is produced in an animal, it is not necessarily the result of poor breeding practices, but is the nature of inheritance as a random event. There is no such thing as a perfect animal.

Chromosomes, exist in cells in pairs, one from the sire and one from the dam. Dogs have 39 sets of chromosomes. Each set or pair is composed of two chromosomes, one from the sire, and one from the dam. In the case of a simple recessive mutation, one of the chromosomes, either from the sire or the dam, makes enough protein from for the animal to survive. Therefore, the "wild type" chromosome of the pair provides enough protein (gene product) to compensate for the chromosome that carries a mutation.

With every generation of breeding, new mutations can arise, but since they are present at a low frequency, they are generally lost in subsequent breedings.

Genetic tests are designed to manage and eventually eliminate disorders without compromising the diversity in a gene pool.

If you have just found out that your dog carries the mutation for juvenile renal dysplasia, do not panic. Now you have the opportunity to manage and eliminate this disease. The frequency of this mutation is extremely high in many breeds. This mutation has been elusive and impossible to eliminate prior to the development of a genetic test, as the disease appears sporadically because it is inherited with incomplete penetrance, meaning that an animal that carries this mutation may or may not show clinical signs of the disease, but can still pass it on to the next generation.

With the identification of one of the many mutation that your animal carries, you can now proceed to at least eliminate this identified mutation, and not inadvertenly select for another deleterious mutation that your animal carries. Wholesale elimination of carriers is the worst decision that you can make as this would deplete the gene pool.
As in any breeding you must consider the positive and negative traits of each partner, and how the parents traits can best balance each other.

In order to protect and preserve your gene pool, you will most likely have to breed two carriers at first due to the high frequency of the mutation in your breed. After all, you have unknowingly been doing this throughout the development of your breeding program.

All first generation puppies should be tested to determine if you have produced any clears. The chances of this are one in four from a carrier to carrier breeding. From your clear pick you can begin to eliminate the mutation from your breeding program. If your clear pick is bred to a carrier in the next generation, you have a 50% chance of producing a clear.

Best wishes

Mary H. Whiteley, Ph.D.
DOGenes Inc.

Use Your Knowledge Wisely

Protect Your Gene Pool and Preserve Genetic Diversity in your breed