INHERITED PROBLEMS IN AUSTRALIAN SHEPHERDS

Aussies are generally a healthy breed, but any dog, whether purebred, "designer dog", or mutt, can have genetic problems. In most breeds, certain kinds of problems are more commonly inherited than others. In Australian Shepherds, genetic disorders to be aware of include:

• *epilepsy • hip dysplasia • cataracts • auto immune disorders • double merle • MDR1*

You can increase your likelihood of ending up with a healthy Aussie by following the "best practices" outlined below. If your dog does develop a health problem, be sure to inform the breeder/s of his or her parents as soon as possible, so that they can use that information to make better future breeding decisions. The Australian Shepherd Genetic Institute (ASHGI) *http://www.ashgi.org/index.htm* has more information about all of the above and much more.

• EPILEPSY

description: Hereditary epilepsy is the condition in which the dog has recurrent seizures and all other causes have been ruled out. Genetic epilepsy has a very wide range of severity, from occasional faint tremors to grand mal seizures leading to death.
how it is inherited: the mode of inheritance in Aussies is presently unknown. It is under active study, and a breakthrough in identifying the gene/s responsible is believed to be imminent.
frequency in Aussies: no statistics are available, but ASHGI data places it among the most common serious genetic disorders.
best practice: avoid buying a pup from a breeding involving close relatives of dogs which have produced epilepsy.
for more information: Stop Epilepsy Now (AussieGenes website) *http://www.ashgi.org/aussiegenes/index.htm*

• HIP DYSPLASIA

description: progressive degeneration of the hip socket joint. Signs include pain, weakness, lameness, degenerative joint disease, and arthritis.
how it is inherited: HD is difficult to breed away from in part because it is polygenic; several separate gene pairs are involved, and it is also affected by environmental factors such as feeding and exercise.
frequency in Aussies: statistics from the Orthopedic Foundation for Animals (OFA) database, show that 5.8% of x-rays submitted are dysplastic. Probably the incidence in the entire population is somewhat higher, because "bad" x-rays are not necessarily sent in to the database.
best practice: choose a pup from parents which have been x-rayed and evaluated as normal by one of the orthopedic registries such as OFA or PennHIP. Due to the complexity of the mode of inheritance, it is possible for pups from normal parents to have poor hips. To reduce this risk, look for pups whose "horizontal pedigree" (parents' siblings, parents' other, older progeny) shows a preponderance of good hips.
for more information: Hip Check (article)

http://www.workingaussiesource.com/stockdoglibrary/bell_hipdysplasia_article.htm

• CATARACTS

description: a painless, gradual clouding of the lens of the eye, leading to partial or total blindness.

how it is inherited: Most inherited cataracts in Aussies are a type called "bilateral posterior" (meaning it starts in back of both eyes). This is caused by a dominant gene. That means only one copy of the gene (from one parent) is needed to cause the disease.

frequency in Aussies: no statistics are available, but ASHGI data places it among the most common serious genetic disorders.

best practice: Buy from breeders who screen for eye defects. Reputable breeders have their breeding stock examined by a board-certified veterinary ophthalmologist annually, with the results recorded by the Canine Eye Registration Foundation (CERF). In addition, there is a brand new DNA test for bilateral posterior cataracts. Presently this is only available from labs in England and Australia, but should become more widely available.

for more information: ASHGI Fact Sheet on Cataracts
http://www.ashgi.org/articles/fact_cataracts.htm

• AUTO-IMMUNE DISORDERS

description: any of a variety of typically chronic diseases in which the immune system attacks the body's own tissues. Those most commonly diagnosed in Aussies include thyroiditis (hypothyroid), lupus, generalized demodetic mange, and myasthenia gravis. For many auto-immune diseases, environmental factors play a large role
. Signs of auto-immune dysfunction can also be more subtle, such as recurring infections, or reproductive difficulties.

how it is inherited: There is no simple mode of inheritance, rather, there is a genetic predisposition which can be passed on. Inbreeding contributes to this problem: the immune system is controlled by a complex of genes which requires a high degree of diversity within itself in order to function correctly. Inbreeding reduces genetic diversity within the individual, including that of its immune system, thus inbred dogs are more at risk for auto-immune problems.

frequency in Aussies: no statistics are available, but ASHGI data places it among the most common serious genetic disorders.

best practice: avoid pups which have near relatives diagnosed with any of the abovementioned
auto-immune diseases. Avoid highly inbred litters. Good breeders calculate
the degree of inbreeding ("coefficient of inbreeding", or COI) of their matings and put this information on pedigrees. One general rule of thumb is that 8% inbreeding coefficient or below is low, and 9-13% is moderate.

for more information: The Rising Storm (article)
http://www.workingaussiesource.com/stockdoglibrary/sharp_risingstorm_article.html

• DOUBLE MERLE

description: also called homozygous merles, these dogs have irregular white markings. They may have large patches of white, be mostly white with patches of merle or solid color, or they may have a predominantly white head with or without a predominantly

white body. They have vision and hearing defects to varying degrees; some are both blind and deaf. They are sometimes inaccurately called "lethal whites"; this is not a fatal condition.
Double merles can be confused with "mismarked" Aussies, in which white covers one or both ears and/or eyes. They have no more vision problems than any other Aussie, but because hearing is dependent upon pigmented hairs in the inner ear, any Aussie that has white over an ear could be deaf in that ear.
how it is inherited: Double merles are homozygous for the merle gene; they have two copies of the gene for merle. When an Aussie inherits ONE merle gene copy, it is a normal merle. When it inherits TWO merle gene copies, it is a double merle. They can only be produced when two merles are bred together, because they must inherit a merle gene copy from each parent.
frequency in Aussies: Statistically, one quarter of the progeny of merle-to-merle matings will be double merles. For various reasons, breeders may sometimes make such matings, but a reputable breeder will euthanize any mostly-white pups at birth.
best practice: Avoid pups with abnormal and/or excessive white from merle-to-merle crosses. Avoid any pup with white over either ear, or get their hearing tested before purchase.
for more information: White Fright (article)
h*ttp://www.ashgi.org/articles/color_white_fright.htm*
White Aussies (website) *http://www.lethalwhites.com/*

• MDR1
description: the acronym letters stand for Multiple Drug Resistance. Dogs with this gene mutation suffer bad reactions, up to and including death, when given certain common drugs, such as ivermectin. Two copies of the gene causes considerably more serious drug reactions than one copy.
how it is inherited: Both parents must have at least one copy of the gene for a pup to inherit two copies, the most dangerous situation. If only one parent has the gene, your dog may or may not have one copy (but not two). If both parents of your dog have tested clear, you can assume your dog is clear also.
frequency in Aussies: Although the incidence is not fully known, in one study 32% of Aussies tested were positive for at least one copy of this gene.
best practice: There are safe substitutes for all the dangerous drugs; if you do not know that your dog is free of this gene, ask your vet to substitute drugs from the safe list. There is a cheek-swab DNA test for this gene which presently costs about $60. You do not need to go to a vet for it, you can just send it to the lab yourself. If your dog has two copies of the gene, his life may depend upon you and your vet knowing his status.
.***for more information:*** ASHGI Fact Sheet on MDR1 (includes information about how to obtain the test, and a link to a list of safe substitute drugs)
http://www.ashgi.org/articles/mdr1.htm

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This article can be found online at:
http://www.workingaussiesource.com/stockdoglibrary/spencer_inheritedproblems.htm
*information is current as of March 2008