

The Effect of Inbreeding (or linebreeding) on the Immune System by Sue Thatcher

This article appears on Sue Thatcher's website, copyright 2005, and is reproduced with permission.

I decided to write this article after overhearing yet another breeder saying they were proposing to do a half brother/half sister mating "just to see what it produces". One of the things such a close mating will produce is an impaired immune system. Unfortunately you won't be able to see an impaired immune system nor will you be able to test for it. However your baby puppies will grow up to be more prone to infections and more likely to suffer autoimmune disease (such as Dry Eye) or allergies.

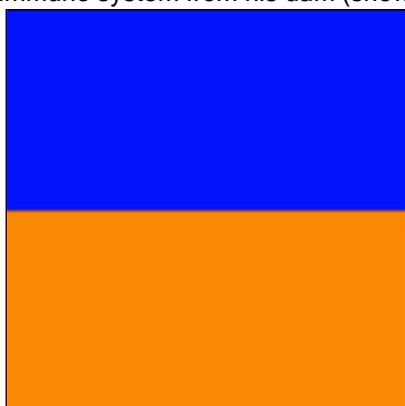
Sue Thatcher

The immune system is inherited as a whole, ie the puppy inherits a complete immune system from it's sire and a complete immune system from it's dam. The more different complete immune systems the puppy has the stronger it's immune system will be. MHC genes code for proteins that detect pathogens and label infected cells so that the immune system can destroy them. The more diverse the genes at the MHC, the more pathogens can be recognized and hence the stronger the immune function is.

example 1. A puppy from unrelated parents

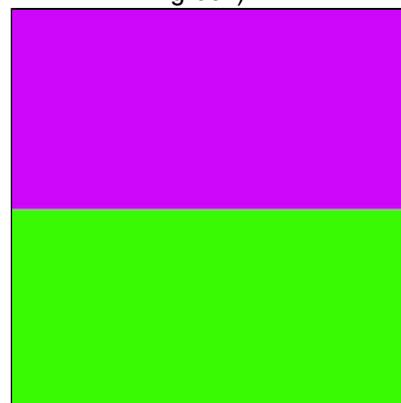
SIRE

The sire has inherited an immune system from his sire (shown as blue) and an immune system from his dam (shown as orange).



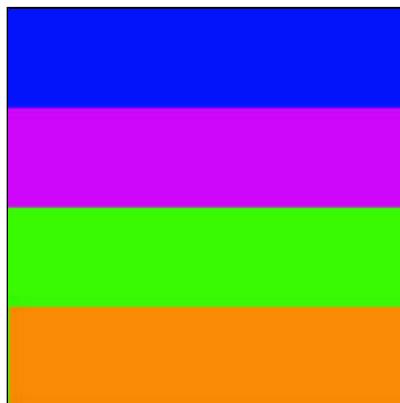
DAM

The dam has inherited an immune system from her sire (shown as purple) and an immune system from her dam (shown as green).



PUPPY

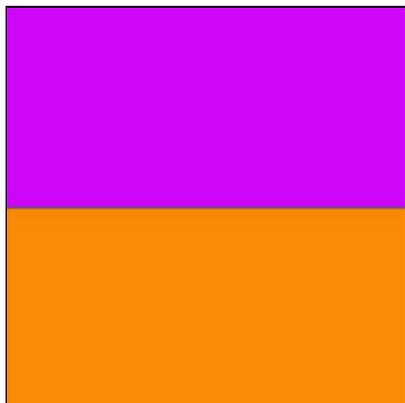
The puppy inherits it's sire's immune system and it's dam's immune system. In effect the puppy has four different immune systems all working for it.



example 2. A puppy from a half brother/half sister mating

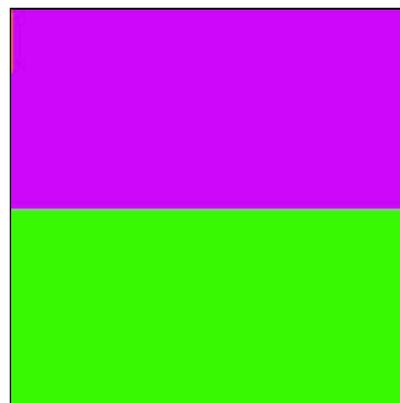
SIRE

The sire has inherited an immune system from his sire (shown as purple) and an immune system from his dam (shown as orange)



DAM

The dam has inherited the same immune system from the same sire (shown as purple) and an immune system from her dam (shown as green)



PUPPY

The puppy inherits its sire's immune system and its dam's immune system but as the sire and dam were half siblings in this case the puppy only inherits three different immune systems. You have impaired the immune system by 25%. This diminishes the body's capability to mount an effective immune response. Such dogs are more prone to infections and are more likely to suffer autoimmune disease (such as Dry Eye, Thyroiditis, Demodex, Hemolytic Anemia) or allergies. An animal with a diverse immune system can produce a greater variety of proteins and so deal with a greater variety of pathogens than an animal with an immune system limited by inbreeding. That's the individual benefit. Even more significant is the population benefit - in a population with many different immune systems, at least some individuals will be able to mount an effective immune response against almost anything that might come along.

