

Breeding Healthier Dogs

Virtually all diseases result from the interaction of genetic susceptibility factors and modifiable environmental factors, broadly defined to include infectious, chemical, physical, nutritional, and behavioral factors. This is perhaps the most important fact in understanding the role of genetics and environment in the development of disease.

"Most research, however, has focused on unraveling the genetic component of disease risk while ignoring the effect of environmental stimuli."

Jake Lusis, professor of medicine, human genetics and microbiology, immunology and molecular genetics at the David Geffen School of Medicine at UCLA.

"You can't effectively study genes divorced from their environment. The missing link lies in the intersection of genes with their environment."

Casey Romanoski, a UCLA graduate student in human genetics

Genetic + Environmental

On a pedigree, polygenic diseases do tend to "run in families" and there is a strong environmental component to many of them.

Modes of inheritance:

Single gene disorder

The result of a single mutated gene

Autosomal dominant

Only one mutated copy of the gene will be necessary

Autosomal recessive

Two copies of the gene must be mutated

X-linked dominant

Caused by mutations in genes on the X chromosome

X-linked recessive

Caused by mutations in genes on the X chromosome. Males are more frequently affected than females

Y-linked

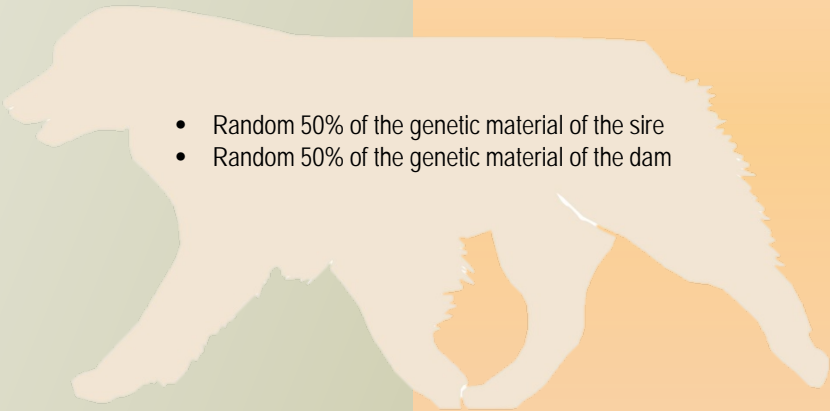
Caused by mutations on the Y chromosome

Mitochondrial

Also known as maternal inheritance, applies to genes in mitochondrial DNA

Multifactorial and polygenic (complex) disorders

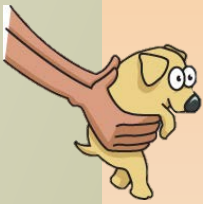
Likely associated with the effects of multiple genes in combination with lifestyles and environmental factors



- Random 50% of the genetic material of the sire
- Random 50% of the genetic material of the dam

The air, the water, the sun, the dust, plants and animals, the chemicals and metals of our world...

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Healthier Puppies

Healthy Dogs Have Healthy Immune Systems

Influences on the Canine Immune System

- ✓ Genetic predisposition
- ✓ Hormones
- ✓ Viral infections
- ✓ Stress

Environmental Factors that can contribute to a poor immune system

- Vaccines
- Monthly heartworm medication
- Flea and tick preventatives
- Poor nutrition
- Chemicals in water supply
- Pesticides
- Fatigue/Stress

Genetic disorders may or may not be inheritable:

- inherited genetic condition in some,
- by new mutations in some
- and mainly by environmental causes in others

Lack of balance between the three genetic tools:

- inbreeding,
- linebreeding
- and outcrossing

The relative contribution of various etiologies to the overall frequency of human birth defects is estimated to be:

