

Validation and utilization of genetic tests in dog breeding



Introducer:
Cathryn Mellersh



Workshop facilitator:
Jerold Bell



Notes:
Katarina Sundberg

To be addressed

What are the potentials and risks with an abundance of genetic tests?

Who should validate a test and how?

Utilization of genetic tests in dog breeding requires strategies. Prepared by whom?

Is there a cost/benefit aspect to consider?



BREEDING HEALTHIER DOGS -
FROM ATTENTION AND AWARENESS TO ACTION!

Validation and utilization of genetic tests in dog breeding

Introducer: Cathryn Mellersh Head of Canine Genetics at the Animal Health Trust, UK

Workshop facilitator: Jerold Bell Veterinarian and Clinical Associate Professor of Genetics at Tufts Cummings School of Veterinary Medicine, USA

Invited Expert: Anne Thomas Head of Research and Development at Antagene, France

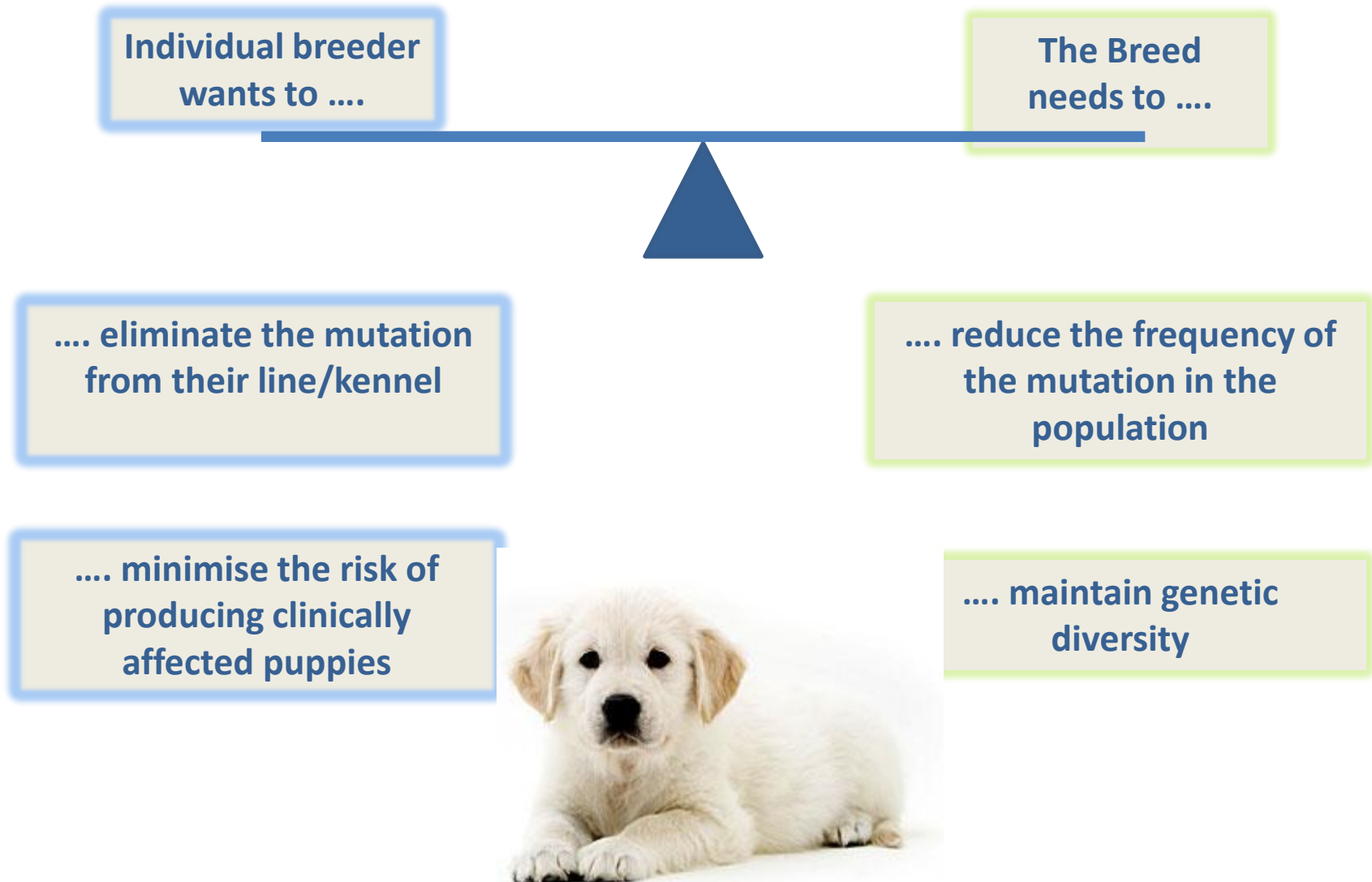
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Introduction Layout

- What is the role of the DNA test in dog breeding?
- What requirements do DNA tests need to meet to fulfil their role?
- Current concerns for the future of DNA tests in light of the rapid advances in canine genetic research.
- Who are the various stakeholders in DNA test development and delivery and what are their respective roles?
- Topics for discussion



What is the role of the DNA test?



**Individual breeder
wants to....**

requires ...

**The Breed
needs to....**

**.... eliminate the mutation
from their line/kennel**

**.... accurate DNA test
that reliably
determines
genotype**

**.... reduce the frequency of
the mutation in the
population**

**.... minimise the risk of
producing clinically
affected puppies**

**... disease-associated
risk of each
genotype**

**... breeding strategy
based on:**
**i) disease-associated
risk of each genotype**
**ii) mutation freq
within population**
**iii) (ideally)
population structure**

**.... maintain genetic
diversity**



Comments & Concerns



- The number of genetic variants associated with inherited canine disorders will increase dramatically in coming years.
- Many will be **risk factors** as opposed to fully penetrant causal variants.
- If these are common within breeds they need to be eliminated **slowly** and **carefully** to avoid reducing genetic diversity.
- If DNA tests are based on variants with minor roles in disease development there is a real risk that collateral damage to diversity by inappropriate elimination strategies will outweigh benefit gained by reduction in disease prevalence.
- Breeders will lose faith in DNA tests.
- Many gene–disease associations are intriguing & worthy of publication but **not all** are appropriate for DNA test.

Who should do what?

Stakeholders

Role & responsibility

- Researcher →
 - mutation identification
 - disease-associated risk of each genotype
- Testing laboratory →
 - accurate DNA testing service
- Individual breeder →
 - use the DNA test
 - make sensible breeding decisions
- Breed Club →
 - Disseminate information about test
- Kennel Club →
 - Facilitate researcher with follow-up studies, e.g. recruit random dogs to estimate mutation frequency
 - Collate DNA test results



Topics for discussion

... accurate DNA test
that reliably
determines
genotype

... disease-associated
risk of each
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... breeding strategy
based on:

i) disease-associated
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- Q. Can anything be done to ensure quality of DNA tests offered?
- Q. Who should validate a test and how?
- Q. Should there be a requirement for all DNA tests to be based on peer-reviewed data?
- Q. What level of disease risk is appropriate for a DNA test?
- Q. Development of breeding strategy is essential but **not trivial** –whose responsibility is it?
- Q. Some DNA test will be patented by their inventors but does that practice compromise the benefit to dogs?



Thank you for listening

