



DNA Detectives | Dog Health & Disease

A half-day workshop focused on DNA gel electrophoresis. Students will be introduced to the work of Dr Jeffery Schoenebeck and will analyse DNA samples to discover their genotype for an important, health-related gene.

Scientists have discovered a DNA mutation linked to breathing problems in popular dog breeds. Breathing difficulties are most often associated with flat-faced breeds, such as French bulldogs and pugs, but scientists have found the mutation is also carried by Norwich terriers, which have longer noses. In this workshop, students will learn about the work of Roslin Institute scientists and analyse four DNA samples to look for a mutation in a health-related gene. The workshop is supported by scientists, technicians and vets working on our campus, and includes an opportunity for students to find out more about studying and working in science.

Learning Level: Higher Biology & Higher Human Biology

Availability: See website

Cost: £5 per student

Minimum attendance: 16

Maximum attendance: 30

Learning objectives

- To appreciate that scientists work to solve real-world problems
- To understand that we can identify the genotype of individuals using DNA technology
- To recognise that the identification of health-related genes can help with the prevention of disease
- To realise that genotype and phenotype analysis can inform future disease-prevention strategies
- To interpret and discuss experimental results



Dr Jeffery Schoenebeck studies the DNA mutations that cause breathing problems in dogs.

Techniques used

- Micropipetting
- Centrifugation
- DNA gel electrophoresis

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with real-life
science



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Workshop timeline

- Introduction to the breathing problems found in dogs
- Introduction to micropipettes
- Preparation of DNA samples
- Introduction to genome-wide association studies (GWAS)
- DNA electrophoresis using agarose gels
- Analysis and interpretation of results
- Discussion with scientists from the Roslin Institute

Curriculum links

Higher Biology (2018-2019)

1 The structure of DNA (a) Structure of DNA

2 Replication of DNA (b) Polymerase chain reaction (PCR)

3 Gene expression (e) Phenotype is determined by the proteins produced as the result of gene expression.

6 Mutations (a) Mutations (b) Single gene mutations

8 Genomic Sequencing (c) Comparison of genomes from different species (d) Individual genome analysis

Higher Human Biology (2018-2019)

2 Structure and replication of DNA

(a) Structure of DNA (c) Polymerase chain reaction (PCR)

3 Gene expression (e) Phenotype is determined by the proteins produced as the result of gene expression.

4 Mutations (a) Mutations are changes in the DNA that can result an altered protein being synthesized (b) Single gene mutations

5 Human genomics (b) Individual genome analysis

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