CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J1008

Project Title
Can You Hear Me Now? Assessing Canine Hearing Loss

Abstract

Objectives/Goals
Until now there has been no reliable method available to specifically determine the frequency range at which hearing-impaired dogs can hear. The goal of this experiment was to design a test that could be used to determine a dog's exact frequency hearing range. A Portable Wide-range Audio Frequency Generator (PWAFG), invented for this experiment by a gadget specialist, was used to test how large and small breed, along with young and aged dogs, differ in their degree of hearing loss.

Methods/Materials
Forty dogs were tested to see if aged small breed dogs had a lower degree of hearing loss than aged large breed dogs. Eighteen of the dogs tested were small; 22 were large; 11 were young; 29 were old.

Each dog was tested using a Portable Wide-range Audio Frequency Generator (PWAFG). The PWAFG was placed 300 cm away from the dog. Eight frequencies were played to observe the dogs' reaction. To distinguish which exact frequency the dog was unable to hear, sounds just above and below the frequency to which the dog reacted were played.

Results
The large breed dogs heard 3.513 kHz higher than the small breed dogs. The young small dogs heard 14.695 kHz higher than the old small dogs. (Large dogs were classified as "old" if they were six years or older; Small, if they were eight years or older.)

The young large dogs heard 6.861 kHz higher than the old large dogs. The young dogs heard 10.205 kHz higher than the old dogs. The young small dogs heard 0.036 kHz higher than the young large dogs. The old large dogs heard 7.798 kHz higher than the old small dogs. The average of all 40 dogs was 25.738 kHz.

Four dogs were BAER (Brainstem Auditory Evoked Response) tested to confirm that the PWAFG was accurate. The BAER test results confirmed that the PWAFG was an accurate test to determine canine hearing loss.

Conclusions/Discussion
The results of the experiment did not support the hypothesis, as the aged large dogs had a lower degree of hearing loss than the aged small dogs.

The questionnaires filled out by the owners showed that many owners thought their dog had significant hearing loss. It was surprising to owners that their dog could hear high frequency sounds. This is significant because owners of hearing-impaired dogs now have a way to communicate with their dogs through high frequency whistles or other devices that their dog can hear.

Summary Statement
In this experiment, 40 dogs were tested using a Portable Wide-range Audio Frequency Generator specially invented for this study to see how small breed and large breed dogs differ in their degree of hearing loss.

Help Received
Dr. Benita Keiss, D.V.M, recruited the many dogs needed for this experiment and supervised the testing; Mike Palazzola designed and built the Portable Wide-range Audio Frequency Generator used in this experiment; Dr. David Lipsitz, veterinary neurologist, gave up his time to conduct the BAER tests.