The Dog's Nose Knows

TADEUSZ JEZIERSKI
Institute of Genetics and Animal Breeding, Jastrzębiec
Polish Academy of Sciences
e-mail: t.jezierski@ighz.pl

Sniffer dogs can detect explosives, drugs or lost people. But the most exciting project is now underway: dogs can actually sense cancer in human subjects!

Dogs' legendary sense of smell has been put to practical use by humans for different purposes, such as helping the police identify criminals, aiding customs officials detect narcotics and explosives, searching for tourists buried by avalanches, etc. Canine detection is based not just on the acuity of dogs' sense of smell, but also on their susceptibility to training (operant conditioning) and on the interaction between handler and working dog. It thus represents a prominent example of applied ethology.

The first research on canine detection began at our Institute's Department of Animal Behavior in the late '80s, with a project on the behavioral aspects of oestrus detection in cows. The dogs in this study demonstrated a 94% detection rate of cows in full oestrus, and a rate of 41% for cows with no visible symptoms of oestrus (undetectable to the breeder).

In 1997 the question of canine olfactory detection was again taken up, in relation to how reliably criminals can be forensically identified based on a scent left behind at the scene of a crime. The present author acted as a scientific consultant for two research projects implemented by the police involving sniffer and rescue dogs, and developed teaching materials on canine ethology and scent perception physiology.

Piotr Maciejczak, SMP

Certified police dogs, on average, performed slightly better than the experimental set. However, they displayed greater variability: the best and the worst dogs in our trial were both from the police set

In the period 2000-2002, a research project was carried out concerning the ethological evaluation of mistakes made by police dogs when identifying individuals based on scent. Reliable methods of identifying criminals are vital for combating increasing crime and terrorism. Within this project, 6 dogs were trained by operant conditioning and compared to operational police dogs. The influence of different kinds of control trials on the dogs' reliability was evaluated,

> Our experiment indicated that we can trust the sniffer dog in eleven out of every twelve cases

and the limits of scent-based evidence were analyzed from the forensic and judiciary point of view. There were marked differences between dogs: the best and the worst dog provided correct identifications in 72.7% and 32.1% of trials, respectively.

The year 2003 has seen a new direction of canine detection research at our Department. According to some anecdotal reports dogs are able to detect the presence of human cancers on the basis of odorous volatile organic compounds produced by cancer tissue. In cooperation with the Pine Street Medical Education & Research Group in California, a randomized controlled pilot study using 5 dogs was conducted in order to verify previous reports. The trained dogs were able to distinguish breath samples taken from patients with lung or breast cancer versus healthy volunteers with a sensitivity and specificity of about 97%! This is a significantly higher rate than that achieved using gas chromatography and mass spectroscopy. Early detection of cancer is crucial for successful therapy but current diagnostic methods often result either in a relatively high proportion of false negative indications (X-ray) or in a high proportion of false positive indications (computer tomography). Therefore, canine detection may be a promising, low-tech and low-cost, reliable prescreening method for cancer detection.

Further reading:

Jezierski T. (1992). The effectiveness of estrus detection in cows by a trianed dog, *Animal Science Papers and Reports, 10*, 57-66.

Orłowski T., Jezierski T., Bednarek T. (1999). Effectiveness of corpse scent search on land by trained dogs with relation to various factors, *Problemy Kryminalistyki, 225*, 43-48.