Commentary: Teaching dogs new tricks

T J Cole

"You can't teach an old dogma new tricks"

Dorothy Parker

Dogs are widely recognised as smelling smells that humans miss. Yet the idea of turning this canine skill to clinical diagnosis is novel. The study by Willis et al takes a first cautious step in testing such an idea by training dogs to detect bladder cancer from urine samples and then seeing if their detection rate when tested blind is better than expected by chance.[1]

The design of the trial was simple and elegant. Six dogs were trained to recognise urine samples from patients with bladder cancer compared with diseased and healthy sex matched controls. Each dog was then offered a set of seven urine samples, from a person with cancer and six controls, and they identified the sample they considered to be different by lying next to it. This process was repeated eight times, so each dog effectively rolled a seven sided die nine times and by chance ought to have been successful one seventh of the time (14%). In practice the success rate was almost three times higher, 22 out of 54 or 41%. This is a highly significant result, especially with a fancy bootstrap confidence interval.

The study was carefully designed to include several features to minimise bias, and it is hard to fault the study in this respect. On balance the results are unambiguous—dogs can be trained to recognise and flag an unusual smell in the urine of patients with bladder cancer. This gives the lie to Dorothy Parker's epigram.

Some intriguing findings for dog lovers are in the detail. The dogs were deliberately chosen to cover a range of breeds and ages and they had no particular skills in scent discrimination. The papillon performed almost as well as the three cocker spaniels, while the mongrel did worst. The two dogs trained with dried urine samples fared less well (four successes out of 18) than the others who were trained with intact samples (18 out of 36).

Looking at the results by patient again showed some striking differences. Patient 1 was correctly identified by all six dogs, whereas patients 3 and 9 were consistently missed. This may be a fatigue effect, as the results were worse in later tests (exact P for trend = 0.0006), or it may simply indicate that the strength of the urine signal varies from one patient to another.

The most intriguing finding was the control patient seen during the training phase, whose urine sample was consistently identified by the dogs as a case. Despite the fact that the patient had negative cystoscopy and ultrasonography results, the consultant was sufficiently impressed by the dogs' performance to test the patient again and found a kidney carcinoma.

Competing interest: TJC owns a chocolate labrador.

1 Willis CM, Church SM, Guest CM, Cook WA, McCarthy N, Bransbury AJ, et al. Olfactory detection of human bladder cancer by dogs: proof of principle study. *BMJ* 2004;329:712-4.

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Renal transplantation: a paradox

It is barely 2 30 in the morning when the telephone rings: "Nephrologist on call?"

Though half asleep, I recognise the voice of the coordinator of Etablissement Français de Greffe (French National Institute of Transplantation), and my hand automatically reaches for the pen and paper by the bed. She gets right down to business: "Male, mid-20s, no medical history, group A positive, cause of death—road traffic crash, right kidney. . ." Fortunately, my pen is able to keep up with this stream of words, even though my brain is not fully awake yet. She continues without taking a breath: "CMV negative, EBV positive, Hep C negative. . ."

It's only after I put down the receiver that it dawns on me: I have a healthy young kidney, a precious jewel in the world of transplantation. Dressing quickly, I plunge into the cold December night in Besançon (a small town in eastern France, near the Swiss border). Once in the hospital, I hurry to my office. The computer finally finds the best match among the long list of patients awaiting a kidney transplant: a middle aged man whose kidneys lost the battle against disease two years ago and who has since been undergoing haemodialysis at Montbéliard.

I don't hesitate to contact the on-call nephrologist there: this is one of the very few times a doctor really appreciates being disturbed in the middle of the night. He assures me that the patient's general condition has not changed since he was enrolled on the waiting list. My next telephone call is even more satisfying: the tremor in the patient's voice and nearly hysterical cries of his wife in the background confirm my belief that this is some of the best news they have ever had. My final call is to the coordinator asking her to send us the kidney and related tissues.

Now all I have to do is wait. The *prélèvement* (organ harvest) is being done in Strasbourg, I know I have a few hours to wait. Leaning back in my chair and taking a sip of black coffee, I let my thoughts wander—the kidney, the happy recipient, his family, my colleague at Montbéliard, the result of cross matching, tomorrow's work—except for one subject: I try not to think about the young man whose life ended suddenly a few hours ago.

This is the thought that haunts me in the midst of the excitement accompanying each transplant. It is not the death itself that disturbs me: as a doctor, I know that life and death are two sides of the same coin; if I'm involved in one, I will necessarily face the other. What really bothers me is that the recipient's happiness—as well as that of his family, my colleagues, and even myself—is totally based on the grim reality of someone's death. Without that dark side, we might never get a chance to see the bright side. To me, renal transplantation has always represented giving not only the recipients, but also their whole family, a second chance at a normal life, but at what cost? That of having another family's loved one snatched away in the prime of life.

Four hours later, I wake to the sound of my pager going off: "The kidney's here." My mouth has a bitter taste, and I wonder whether it's the coffee I drank or my own dark thoughts. Getting up from the chair, I try to push back these conflicting feelings once more and concentrate on the task ahead.

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