

## A case of breast cancer detected by a pet dog

In 1989, Williams and Pembroke<sup>1</sup> described the detection of a malignant melanoma by a pet dog. A 44-year-old woman's border collie/Doberman mix sniffed and bit at a specific mole on her leg while ignoring other moles and lesions, prompting medical attention that led to the diagnosis. Church and Williams<sup>2</sup> later reported a patient whose Labrador retriever doggedly sniffed at a lesion on the patient's left thigh, eventually leading to a diagnosis of basal cell carcinoma. In both cases the dogs detected the lesions through the patients' clothing and ceased interest once the lesions were excised. Here we report a case of breast cancer that was detected after similar peculiar behavior in a pet dog.

### Case study

A 44-year-old Caucasian female was in her usual state of good health when her dachshund puppy began the odd habit of sniffing and poking at her left axilla while she sat on the sofa watching television. After a month of this behavior, she pushed the dog aside one day and discovered a lump in her upper, outer left breast. Biopsy provided the diagnosis of infiltrating ductal carcinoma. She underwent segmental mastectomy, which revealed two discrete foci of high-grade, estrogen receptor-positive, infiltrating ductal carcinoma. Surgical resection margins were clear, and axillary sentinel node biopsy revealed no evidence of metastases. Her dog continued sniffing and poking at her axilla postoperatively. She went on to receive chemotherapy followed by radiation therapy and tamoxifen. Unfortunately, she developed metastatic disease and succumbed to her cancer only 1 year later.

### Discussion

With approximately 50-fold more olfactory receptors than humans have,

dogs purportedly possess a sense of smell up to 100,000 times more sensitive than humans'. Given such olfactory prowess, dogs have valuable roles in police work, detecting hidden explosives and drugs, tracking criminals, and finding cadavers or missing persons. It therefore would not be surprising if certain dogs can detect subtle odors emitted by human cancers. This field, popularly referred to as "dognoseis," has drawn much attention on the Internet,<sup>3-5</sup> although rigorous peer-reviewed data are sparse.

Pickel et al<sup>6,7</sup> conducted an investigation involving two dogs (a standard schnauzer and a golden retriever) trained to detect melanoma in human patients. The dogs were first trained to

localize melanoma tissue samples hidden on healthy human volunteers and then tested on seven patients suspected of having melanoma. One dog "reported" melanoma in five patients whose disease was subsequently confirmed by biopsy. A sixth patient with suspected, but not biopsy-proven, disease was reported as "positive" by the dog; further workup confirmed the diagnosis, vindicating the dog. The second dog examined four patients and agreed with the first dog in every case. The odds of these results being obtained by chance were less than  $10^{-7}$  and  $10^{-3}$  for the two dogs, respectively.

Some astute physicians have a general sense about a patient's condi-

continued on **page 326**

## Canine detective

continued from page 324

tion through body odor, which may be helpful in generating a differential diagnosis.<sup>8,9</sup> Studies have shown the presence of volatile organic compounds in the breath of some patients with lung<sup>10,11</sup> or breast<sup>12</sup> cancer. Willis et al<sup>13</sup> evaluated the ability of dogs to distinguish patients with transitional cell bladder cancer through urine odor. Dogs were trained to discriminate urine from bladder cancer patients and controls and then tested for their ability to select cancer patients. The dogs correctly identified patients 22 out of 54 times (41%)—substantially better than the 14% positive rate predicted by chance alone. Interestingly, some patients were consistently identified or missed, suggesting that the strength of the scent varies among patients. Intriguingly, the dogs consistently identified one of the controls as a cancer case; further evaluation of this patient uncovered a transitional renal cell carcinoma.

To our knowledge, the case report-

ed here represents the first instance of an internal malignancy having been sensed by a pet dog. Just what the dog was sensing is uncertain, but Phillips et al<sup>12</sup> have reported the presence of volatile markers in the breath of some breast cancer patients. Although our case represents only anecdotal evidence of a breast cancer being detected by a dog, it intensifies our curiosity about this subject; controlled experiments should be conducted to assess the true potential of dogs in the detection of human cancer.

James S. Welsh, MS, MD

Darryl Barton, MD

Harish Ahuja, MD

UW Cancer Center/Wausau Hospital  
Wausau, WI

### References

1. Williams H, Pembroke A. Sniffer dogs in the melanoma clinic? *Lancet* 1989;1:734.
2. Church J, Williams H. Another sniffer dog for the clinic? *Lancet* 2001;358:930.
3. Dog being trained to detect cancer. Personal MD. Available at: <http://www.personalmd.com/news/n0611084339.shtml>. Accessed June 8, 2005.
4. Newell J. Dogs who scent sickness. *K9 Perspective*. Available at: [http://www.k9magazinefree.com/k9\\_perspective/iss7p3.shtml](http://www.k9magazinefree.com/k9_perspective/iss7p3.shtml). Accessed June 8, 2005.
5. Onion A. Dog doctors: training dogs to detect prostate cancer with their noses. Available at: <http://freerepublic.com/focus/news/699114/posts>. Accessed June 8, 2005.
6. Pickel DP, Cognetta AB, Manucy GP, Walker DB, Hall SB, Walker JC. Preliminary evidence of canine olfactory detection of melanoma. Presented at the 23<sup>rd</sup> Annual Meeting of the Association for Chemoreception Sciences, April 25–29, 2001; Sarasota, Fla.
7. Pickel D, Manucy GP, Walker DB, Hall SB, Walker JC. Evidence for canine olfactory detection of melanoma. *Appl Anim Behav Sci* 2004;89:107–116.
8. Lukas T, Berner ES, Kanakis C. Diagnosis by smell? *J Med Educ* 1977;52:349–350.
9. Smith M, Smith LG, Levinson B. The use of smell in differential diagnosis. *Lancet* 1982;1452–1453.
10. Phillips M, Gleeson K, Hughes JM, et al. Volatile organic compounds in breath as markers of lung cancer: a cross-sectional study. *Lancet* 1999;353:2897–2898.
11. Di Natale C, Macagnano A, Martinelli E, et al. Lung cancer identification by the analysis of breath by means of an array of non-selective gas sensors. *Biosens Bioelectron* 2003;18:1209–1218.
12. Phillips M, Cataneo RN, Ditkoff BA, et al. Volatile markers of breast cancer in the breath. *Breast J* 2003;9:184–191.
13. Willis CM, Church SM, Guest CM, et al. Olfactory detection of human bladder cancer by dogs: proof of principle study. *BMJ* 2004;329:712–714.