Detection of Prostate Cancer in Urine by Dogs

The observation of higher levels of acid phosphatase in the serum of patients with prostate cancer and its subsequent decrease after castration or estrogen treatment was perhaps the first evidence of a potential prostate cancer tumor marker.

During the late 1970s and early 1980s urology residents at Northwestern University Medical Center would collect and store expressed prostate secretions for analysis. Grayhack and Bockrath believed that it was highly likely that perturbations in the cancerous prostate would produce detectable biochemical alterations in fluids obtained by prostate massage. It was their experience that digital massage fluid was relatively uncontaminated by other organ secretions or urine. This was confirmed by Fair and Cordonnier. Changes in the composition of enzymes, particularly lactate dehydrogenase (LDH), appeared promising. Patients with prostate cancer had a higher level of the isoenzyme LDH5 than their normal counterparts.

A reliable marker for the monitoring and early detection of carcinoma of the prostate remained an important but elusive clinical goal until the discovery of prostate specific antigen (PSA) in 1979 by Wang et al. Other careful studies clarified the utility of serum PSA as an effective means for early detection of prostatic cancer.

The quest for improved detection strategies persists. PSA screening has been criticized for its lack of specificity and prostate biopsy is invasive. There is also a small but significant risk of severe infectious complications (sepsis) and rare deaths.

In this issue of The Journal Taverna et al (page 1382) present evidence of the ability of highly trained dogs to detect prostate cancer in voided urine samples. The data encourage all of us to redouble our efforts to improve the detection of prostate cancer. Clearly noninvasive olfactory diagnosis by trained canines would likely be less expensive and also have fewer complications.

The observations of Taverna et al raise provocative and important scientific questions. What is the specific volatile organic compound or compounds that these dogs can distinguish? Identifying the abnormal substance would open the door for therapeutic targets and provide an avenue for molecular imaging. It has been known for decades that the highest levels of polyamines are in the prostate. Is it possible that one of the volatile organic compounds could be an altered spermidine or a precursor, putrescine or spermine?

I concur with Taverna et al that their results suggest that the volatile organic compounds in question might depend on a metabolic process of the tumor. The independence of tumor volume and aggressiveness from olfactory detection is surprising and extraordinary. In that regard the scent may be that of malignancy and dogs may truly be (hu) mans’ best friend.

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REFERENCES