

- 3 Yu H, Diamandis EP, Monne M, Croce CM. Oral contraceptive-induced expression of prostate specific antigen in the female breast. *J Biol Chem* (in press).
- 4 Yu H, Diamandis EP. Prostate specific antigen in milk of lactating women. *Clin Chem* 1995; **41**: 54–60.
- 5 Monne M, Croce CM, Yu H, Diamandis EP. Molecular characterization of prostate specific antigen mRNA expressed in breast tumors. *Cancer Res* 1994; **54**: 6344–47.

Prostate-specific antigen and lack of specificity for prostate cells

SIR—Bilgrami and colleagues¹ reported one patient with lung adenocarcinoma whose tumour was positive for prostate-specific antigen (PSA), and stated that cases of non-prostatic cancer staining with monoclonal antibodies have not been reported. They fail to cite numerous publications from our group that have convincingly shown that PSA is a ubiquitous biochemical marker present in many tumour types and normal tissue. Briefly, we have shown that 30–40% of female breast tumours produce PSA and that this production is mediated by steroid hormone receptors.² Breast tumours metastatic to the ovary produce PSA. PSA is a good prognostic indicator for women with breast cancer. Oral contraceptives can induce normal breast tissue to produce PSA.³ PSA is present in amniotic fluid and in the milk of lactating women.⁴ Some colon, ovarian, liver, kidney, adrenal, and parotid tumours also contain PSA. In many of these studies PSA was characterised by immunological and molecular techniques. With PCR and nucleic acid sequencing we have shown that mRNA extracted from breast or ovarian tumours or normal breast tissue, reverse-transcribed, amplified with PSA gene-specific primers and sequenced, is identical in sequence to mRNA from prostatic tissue.⁵ These events were reproduced in-vitro with breast carcinoma cell lines. These cell lines, when induced by androgens, progestagens, mineralocorticoids, and glucocorticoids, but not oestrogens, produce and secrete PSA. Others have shown that PSA is present in human endometrium. A detailed study by our group of 57 patients with lung carcinoma has shown that 15% of adenocarcinomas and 5% of squamous cell carcinomas were positive for PSA. All these data suggest that PSA is a ubiquitous marker produced by many tumours, by normal tissue, and during pregnancy. The biological role of this serine protease in non-prostatic tissue is under investigation.

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- 1 Bilgrami S, Singh NT, Shafi N, Ciesielski T. Raised prostate-specific antigen in adenocarcinoma of lung. *Lancet* 1994; **344**: 1371–72.
- 2 Diamandis EP, Yu H, Sutherland DJA. Detection of prostate specific antigen immunoreactivity in breast tumors. *Breast Cancer Res Treat* 1994; **32**: 301–10.