We describe here 16 patients with N0M0 stage prostate cancer and 11 patients with prostate cancer with bone metastasis (stage M1) as well as two control groups (eight patients with bladder cancer and nine patients with benign prostatic hyperplasia). So that we could determine the number of PSA/CD14-double-stained cells in the peripheral blood of the patients by flow cytometry, 10 mL of EDTA-treated blood was drawn from the patients by venipuncture, and the erythrocytes were depleted by density-gradient centrifugation. The cells were stained simultaneously with anti-PSA–fluorescein isothiocyanate (FITC) (Coulter-Immunotech, Hamburg, Federal Republic of Germany) and an antibody labeled with CD14–phycoerythrin (PE) (Di-anova, Hamburg). Controls for nonspecific binding of the antibody, negative controls with blood from healthy women, and positive controls with LNCaP cells were performed. The PSA-positive and PSA/CD14-double-positive cells were counted by a count gate discrimination procedure adjusted to the exclusion of nonspecific, stained cells in the FL1 (FITC)/FL2 (PE) plot of the negative control; two million peripheral white blood cells were analyzed for each sample after erythrocyte depletion.

The data in Fig. 1 suggest that the exclusive detection of molecular signals, either by immunologic means or by polymerase chain reaction, representing PSA-positive cells in the circulation, is not sufficient to estimate the risk of metastasis in prostate cancer.

We are entering a new period of research on circulating cancer cells. In 1991, Smith et al. (3) introduced the polymerase chain reaction for tissue-specific cell detection. Modern tools in immunology and in molecular biology now provide a means to unveil the meaning of circulating cancer cells (4).

### References


### Notes

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**Circulating Prostate-Specific Antigen/CD14-Double-Positive Cells: a Biomarker Indicating Low Risk for Hematogeneous Metastasis of Prostate Cancer**

The presence of cells in the blood stream of prostate cancer patients that stain positively for both prostate-specific antigen (PSA) and the monocyte marker CD14 seems to indicate a low risk of metastasis formation. This cellular biomarker might be helpful in the assessment of the prognosis for prostate cancer patients with organ-restricted disease. It could be used to define a subgroup of patients with a low risk of life-threatening bone metastasis, although these patients show evidence of circulating prostate cancer cells by flow cytometry (1) or PSA-PCR2 (2).

Notes

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**Fig. 1.** In patients with N0M0 or M1 stage prostate cancer (PCa), prostate-specific antigen (PSA)-positive cells (right Y axis) were increased compared with those in the control patients. Only in patients with stage M1 disease were the PSA/CD14-double-positively stained cells (left Y axis) significantly decreased compared with those in the control patients (P < .05, paired Wilcoxon test). A statistically significant increase in PSA/CD14-double-positive cells was measured in patients with M1 stage prostate cancer compared with patients with N0M0 prostate cancer (P < .01). BPH = benign prostatic hyperplasia. Error bars represent standard deviations.