

ON THE RELATIONSHIP BETWEEN SURFACE ELECTRICAL POTENTIALS AND CANCER

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Surface electrical potentials (SEPs) are slowly varying direct-current potentials that can be measured between any two points on the intact surface of many organisms, including man. The physiological significance of SEPs is largely undetermined. Our hypothesis was that SEPs measured on the skin over a palpable tumor would differ depending on whether the tumor was cancerous or benign. SEPs were measured in HA/ICR mice that had been implanted with Lewis lung carcinoma. The tumor area was about 10 mV positive with respect to the feet 5-10 days after implantation. In sham-implanted animals, the implant area averaged about 1 mV negative.

SEPs were measured in 121 women, 40-80 years of age, each of whom presented with a breast mass 1.5-2.5 cm in diameter. The SEP was measured on each breast (with reference to the feet) using silver/silver-chloride electrodes, and the patients were stratified according to whether the tumor was found to be cancerous or benign during a subsequent biopsy. Among women whose tumor was benign (90), the SEPs in the tumor and control breasts were the same. Among the cancer patients (31), the average SEP on the tumor side was 20% greater than that of the control side ($P < 0.05$, paired t test).

In both an animal model and in patients, a correlation was found between development of positive SEPs (relative to the feet) and cancer. It may be possible to refine the techniques of SEP measurement so that it becomes a useful diagnostic tool.