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Letter to the Editor

Correlation of Peroxidase activity in Human Breast Cancer with Oestradiol and Progesterone Receptors*

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CONFLICTING data have been published on the relation between progesterone and oestrogen receptors in breast cancer and the presence of peroxidase activity, a marker for oestrogenic activity in uterine and vaginal tissues [1].

Duffy and Duffy [2] found positive peroxidase activity in 78% of 37 oestrogen receptor-positive tumours. Collings and Savage [3] reported 65% peroxidase-positive tumours among their oestrogen receptor-positive tumours and 71% peroxidase-positive tumours among their oestrogen receptor-negative tumours. On the other hand, Keenan *et al.* [4] recently reported 24% peroxidase-positive tumours among both oestrogen and progesterone receptor-positive tumours and 57% peroxidase-positive tumours among oestrogen and progesterone receptor-negative tumours.

We examined 131 consecutive human breast cancer tissues obtained between 1976 and 1979. Cytosolic oestrogen receptors and progesterone receptors were routinely assayed. Peroxidase activity was assayed in 69 tumours. Biopsy material was received at the pathological laboratory and immediately placed at −70°C. On the day of the assay, usually within 3 weeks of the surgical procedure, the tissues were thawed, weighed and homogenized. Cytosolic oestrogen and progesterone receptors were assayed by the dextran-coated charcoal method, as previously described [5]. The labelled ligand for the progesterone receptor study was R-5020 (New England Nuclear, Boston, MA). Tumours were considered 'positive' for oestrogen receptors when the content was greater than 3 fmol/mg soluble protein and for progesterone receptors when the content was more than 4 fmol/mg soluble protein. Peroxidase activity was estimated quantitatively by the guaiacol method [1]. Values above 1 unit/g tumour (wet wt) were considered 'positive'. The statistical evaluation of differences between and among percentages was done by the uncorrected Chi-square test with the use of appropriate degrees of freedom.

Peroxidase activity was assayed in 69 tumours. The range of peroxidase activity was wide (Fig. 1). Forty-two per cent of the tumours were peroxidase-positive. The incidence of tumours positive for peroxidase activity was not significantly different in women under the age of 50 from that in women over the age of 50. The bivariate distribution of the tumours according to oestrogen receptors and peroxidase activity (in terms of positively and negatively) shown in Fig. 2b indicates a significant negative relationship between oestrogen receptors and peroxidase activity ($P < 0.025$). For comparison with other studies, the distribution of cytosolic oestrogen and progesterone receptors in 118 of the tumours is presented in Fig. 2a, which resembles previously published studies [6].

The demonstration of a significant inverse relationship between peroxidase activity and the presence of cytosolic oestrogen receptors re-

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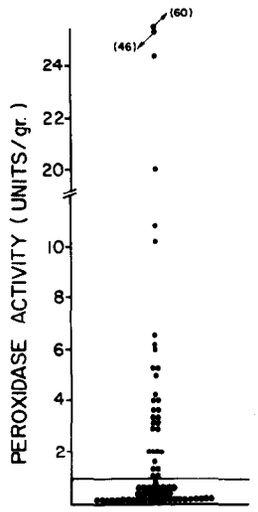

Fig. 1. Level of peroxidase activity in breast cancer.

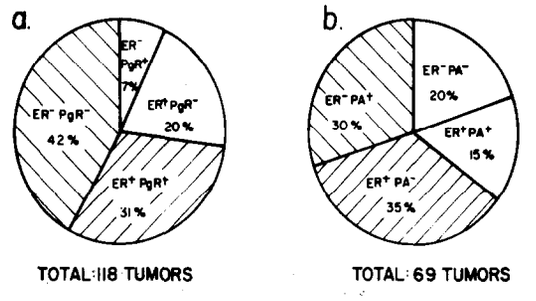

Fig. 2. Relationship between ER and the presence of PgR (a) and peroxidase activity (b). The striped area represents the dominant correlation: (a) a direct correlation between the presence of ER and PgR; (b) an inverse correlation between ER and peroxidase activity.

sembles previous results from our laboratory on the dimethylbenz(a)-anthracene (DMBA)-induced, oestrogen-sensitive tumours in rats [5]. In that study we demonstrated an inverse relation between peroxidase activity on the one hand and growth pattern, oestrogen receptors and progesterone receptors on the other hand in untreated and in tamoxifen-treated rats. We could detect no clues in the techniques used in the various studies [2–4], including our own, to explain the variability in the results. The clinical implications of the present data and those of our earlier animal data await further studies.

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