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SHORT COMMUNICATION

THE ACCUMULATION OF 5α-DIHYDROTESTERONE (5α-DHT) BY HUMAN BREAST TISSUE

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It is now established that between 70–80% of human breast tumours have a cytoplasmic receptor for 5α-dihydrotestosterone 5α-DHT) [1, 2]. Furthermore, many breast tumours can convert testosterone to this hormone [3, 4] but it has not been shown that they can accumulate and retain 5α-DHT *in vivo*. An attempt was made to test whether human breast tumours are capable of retaining 5α-DHT against a concentration gradient as has been shown for oestradiol-17β [5].

Ten patients in this pilot study were women with breast cancer undergoing mastectomy, whose informed consent was obtained. Tritiated 5α-DHT (S.A. 55 Ci/mmol) was purchased from the Radiochemical Centre, Amersham, England, and was purified by paper chromatography in the Bush A system [6]. It was then dissolved in ethanol to a concentration of 20 μCi/ml. The ethanol solution (1.0 ml) was further diluted with 9 ml of 0.9% NaCl just before injection. The hormone was injected into a vein in the antecubital fossa over a period of 1 min at various times before the operation (see Table 1) and at mastectomy, tumour, non-cancerous tissue (i.e. tissue well removed from the malignant focus) and a blood sample were obtained. The radioactivity from the tissues and blood was extracted and counted as described previously [7]. 5α-DHT was separated from the purified extracts by paper chromatography (Bush A, 5 h) and the amounts of radioactive hormone accumulated by tumour, adipose tissue and blood are shown in Table 1.

In both, the tumours and adipose tissues, the proportion of total radioactivity which was associated with 5α-DHT varied between 70–100% at all times up to 6 h. Whereas there was a continuous drop in the percentage from 88% at 30 min to 16% at 6 h in blood. Furthermore, tumour uptake of 5α-DHT remained fairly constant (400 d.p.m./g) between 30 min and 4 h after injection of radioactive hormone, in contrast to adipose tissue which showed an increase in retention up to 2 h followed by a continuous decrease, indicating that it is incapable of retaining the hormone. Although the average concentrations of radioactive hormone in adipose tissues were higher than those in the tumour up to approximately 2 h, the decreased retention time indicates binding of a non-specific nature. In conclusion, our preliminary study indicates that human breast tumours have the ability to retain 5α-DHT which is not observed in adipose tissue. Furthermore, these preliminary results together with the published evidence for the presence of a cytoplasmic receptor indicate that human breast tumours act as a target organ for 5α-DHT and attempts are now being made to investigate the mechanism of action of the androgen.

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Table 1. The accumulation of tritiated 5α-DHT by human breast tumours, adipose tissue and blood following the injection of 20 μCi of the radioactive hormone into a vein in the antecubital fossa. The radioactivity from the tissues was extracted and 5α-DHT was separated by paper chromatography. The results are expressed as d.p.m./g of tissue

Patient no.	Age	Time Interval Min.	Tumour	Adipose tissue	Blood	Tumour/ blood	Adipose Tissue/ blood
1	30	30	350	570	980	0.36	0.58
2	68	60	470	330	330	1.42	1.00
3	74	85	290	880	880	0.33	1.00
4	74	90	450	840	190	2.37	4.42
5	68	120	300	1040	230	1.30	4.52
6	83	180	560	330	290	1.93	1.14
7	55	225	290	480	150	1.93	3.20
8	54	240	290	90	60	4.83	1.50
9	66	270	530	610	250	2.12	2.44
10	75	360	150	70	30	5.00	2.33

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