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Letter to the Editor

Radioimmunodetection of Cancer

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WE READ with interest the paper by Warenius *et al.* [1] on attempted targeting of a monoclonal antibody in a human tumour xenograft system using labelled monoclonal antibody W6:32 against HT29R tumours in immunodeficient mice. They concluded that shedding of antigen, HLA in this instance, interfered with the targeting of antibodies against the antigens on the surface of tumours.

We would like to report successful targeting [2] of a different antibody in a similar animal model of immunodeficient (nude) mice and rats bearing HT29 tumours. We used a monoclonal antibody [2] AUA1 which was raised by immunising BALB/c mice with the colon carcinoma cell line LoVo [3].

The antibody was directed against an epithelial proliferating antigen, as found by testing against epithelial cell lines and sections of normal and malignant human epithelial tissues.

As a negative control we used a monoclonal antibody M236 which was raised by immunising BALB/c with the lymphoblastoid cell line MOLT4 [4]. This antibody reacted with cells of the T-lymphocyte lineage and not with cells of epithelial origin. The antibodies were labelled with iodine, and [I^{125}] and iodine [I^{123}] and were injected into mice or rats bearing subcutaneous, intraperitoneal or intramuscular HT29 tumours.

Radioscans of the animals were taken with a gamma scintillation camera at intervals varying from immediately to sixty-five days after injection. Radiolocalisation was achieved in all the animals. Tumours were visualised after a period ranging from four hours to one week, depending on the site of the tumour, i.e. intramuscular tumours were seen earlier than subcutaneous ones. The uptake of specific antibody in the tumours remained relatively constant, in contrast with the rest of the body from where it was mostly cleared by eighteen hours. The uptake of specific antibody in the tumours ranged from 0.5 to 25% of the injected amount, the average being 6%. Detectable label was found to be present in the tumours up to sixty-five days. Therefore, in this model shedding of antigen from tumours did not interfere with radiolocalisation.

Figure 1 shows the radioscans of a nude rat bearing a subcutaneous HT29 tumour. The first scan was taken after 18 hr from injection of antibody AUA1 labelled with [I^{125}] and the second scan was taken after 3 days. As can be seen, tumour uptake of antibody remained relatively constant while it cleared up considerably from the rest of the body, its half-life in the blood being 24 hr.

Scan 3 shows the distribution of the negative control antibody M236 labelled with [I^{123}] after 24 hr of injection. As can be seen, there was no uptake in the tumour region.

The exact antigen that the antibody AUA1 reacts with has not been determined yet. It is probably a CEA-like substance which is not shed to any significant extent into the circulation, and is found on some malignant tissues such as colon and breast adenocarcinomas as well as proliferating normal colonic villi [2].

Therefore, we conclude that it is possible to develop antibodies that are directed against cell-surface antigens which are not shed and therefore achieve selective localisation into tumours.

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REFERENCES

1. WARENIUS HM, GALFRE G, BLEEHEN NM, MILSTEIN L. Attempted targeting of a monoclonal antibody in a human tumour xenograft system. *Eur J Cancer Clin Oncol* 1981, **17**, 1009–1015.
2. EPENETOS AA, NIMMO CC, ARKLIE J *et al.* Radioimmunodiagnosis of human cancer in an animal model using labelled tumour associated monoclonal antibodies. *Br J Cancer* 1982, **46**, 1–8.
3. STRAGARD JJ, BERGERAT JP, WHITE R *et al.* Biological and cell kinetic properties of a human colonic adenocarcinoma (LoVo) grown in athymic mice. *Cancer Res* 1980, **40**, 2846–2852.
4. MINOWADA J, OHNUMA T, MOORE GE. Rosette forming human lymphoid cell lines I. Establishment and evidence for origin of thymus-derived lymphocytes. *J Natl Cancer Inst* 1972, **49**, 891–895.

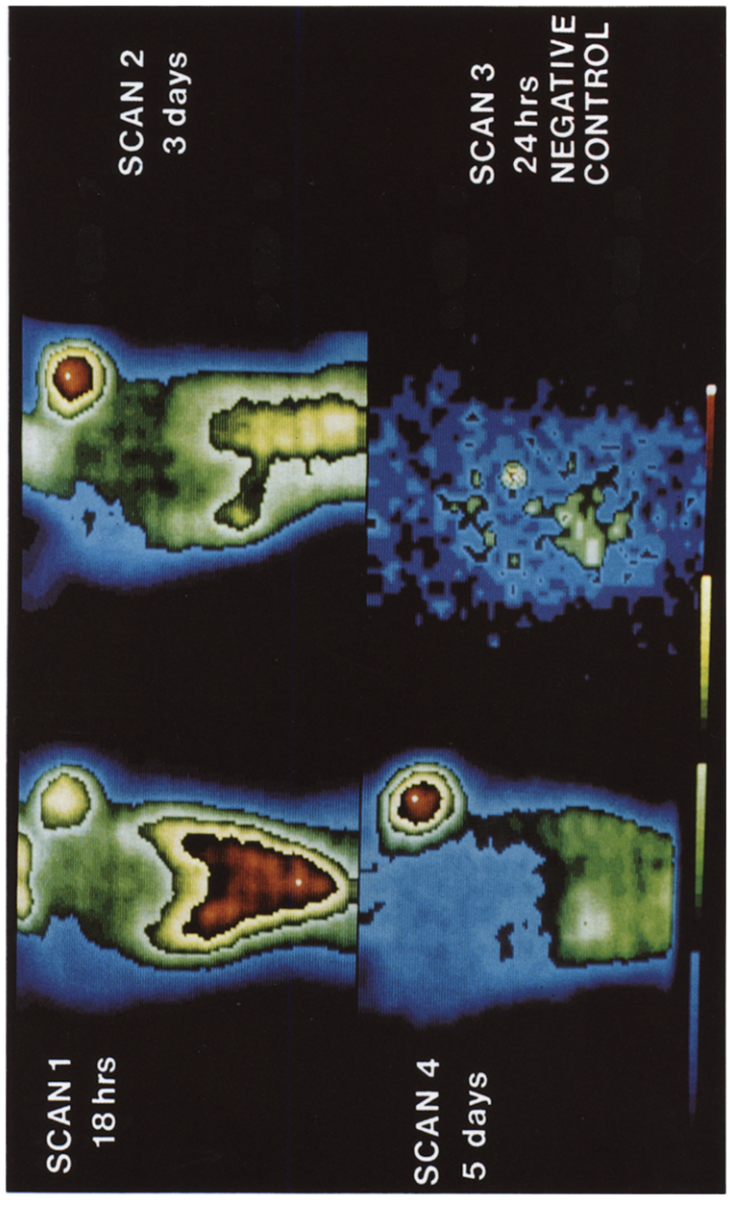
SCAN 1
18 hrs
SCAN 2
3 days
SCAN 3
24 hrs
NEGATIVE
CONTROL
SCAN 4
5 days

Fig. 1.