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Thomsen-Friedenreich Antigen.

T.Aburano,K.Yokoyama and K.Hisada.Kanazawa University,Kanazawa.

The Thomsen-Friedenreich (T) antigen, β-D-galactosyl-(1-3)-α-N-acetyl-D-galactosamine, is exposed in reactive form on many human adenocarcinomata, but not on corresponding benign tissues. Peanut(Arachis hypogea) agglutinin(PNA), a 110,000 dalton plant peanut lectin, has strong binding affinity for the T antigen and reportedly to certain malignant tissues. We studied the potential of the radiolabelled PNA as a tumor localizing agent in a tumor bearing model system. The PNA was labelled with I-125 or I-131, using either chloramin-T method or Iodogen method. The biological activity of PNA after radiolabelling, which was examined by the hemagglutination ability of PNA to the neuramidase treated RBC, did not show any significant decrease compared to that after radiolabelling. The radioiodinated PNA showed good tumor localization and rapid blood clearance. Clear scintillation images of tumors were obtained in the animal models of Ehrlich ascites tumor. Yoshida sarcoma, Lewis lung cancer and B-16 melanoma, by 24hr and 48hr. No blood background subtraction was necessary. The tumor to blood ratios in Lewis lung cancer bearing mice were 1.2(at 6hr), 1.5(at 24hr),2.1(at 48hr) and 2.4(at 72hr). And the radioiodinated PNA also showed the direct strong binding affinity to tumor cells in in-vitro model systems.

(3) Metabolic imaging

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EXPERIENCE WITH THE USE OF ADRENOMEDULLARY IMAGING AND ADRENERGIC NEURON-BLOCKING AGENT, I-131 MIBG (METAIODOBENZYLGUANIDINE).

M.Nakajo, K.Shimabukuro, S.Shinohara, and B.Shapiro, J.C.Sisson and W.H.Beierwaltes. Kagoshima University, Kagoshima and University of Michigan, Ann Arbor.

I-131 MIBG was developed at the University of Michigan. In this presentation, application of this agent was reported for three major fields in clinical use.

1) Localization of catecholamine-secreting tumors. The sensitivity and specificity for locating pheochromocytoma including adrenal hyperplasia were 92% (67/73) and 99.6% (226/227) respectively at the University of Michigan. I-131 MIBG delineated tumors of 2 cases of pheochromocytoma and a case of metastatic neuroblastoma at the Kagoshima University. I-131 MIBG is very useful for locating catecholamine-secreting tumors.

2) Treatment of malignant pheochromocytoma. Two cases exhibited subjective and objective benefits out of 5 cases of malignant pheochromocytoma treated with I-131 MIBG at the University of Michigan. The tumors of the two cases appeared to be more rapidly growing, received more cumulative rads and were more predominantly in soft tissues in contrast to bone. Little toxic effects were encountered during the treatments and later.

3) Assessment of adrenergic function. Evidences for support of adrenergic neuronal uptake of I-131 MIBG were presented by showing I-131 MIBG images of patients with Horner's syndrome, idiopathic adrenergic neuropathy and taking tricyclic antidepressants which are known to block the neuronal uptake of norepinephrine and guanethidine. Three patients with adrenergic dysfunction showed more rapid clearance of I-131 MIBG in the heart than the control subjects did. Experiments with rats suggest that this difference in clearance may be due to the difference in relative amount of intact adrenergic neurons in the heart between the adrenergic dysfunction and control groups. Measurements of I-131 MIBG time activity of certain organs may be useful for the assessment of their adrenergic function and thus generalized disorders of autonomic innervation.

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