particularly evaluation for splenectomy, and imaging thrombi. Monoclonal antiplatelet antibodies labeled with ^{111}In or ^{123}I show promise for imaging thrombi and vascular lesions. ^{111}In-leukocytes are now widely used in a sensitive and specific procedure for acute abscess localization. Oxine is the most popular lipophilic chelating agent for labeling mixed leukocytes for scintillation camera imaging of focal inflammation. Recent experience with tropolone, another indiscriminate lipophilic cell-labeling agent, demonstrates its superiority because of its ability to label cells in small volumes of plasma. Procedure time is reduced, injury from washout is eliminated, and subsequent in vivo lung sequestration is avoided, thereby permitting more rapid localization and imaging of granulocytes. A number of continuing efforts to develop a ^{99m}Tc cell-labeling agent comparable to the ^{111}In lipophilic chelates have yet to succeed. Significant recent advances include isolation and labeling of specific leukocyte cell types such as granulocytes, lymphocytes, and their specific subsets, in order to study their migration and kinetics in vivo. New techniques of cell harvesting are utilized and more selective ligands for specific cell surface receptors are being developed so as to avoid laborious separation techniques and decrease radiation injury. Current labeling of lymphocytes with lipophilic chelating agents internalizes the radionuclide so that radiation injury of the sensitive lymphocyte is a major problem in the study of its migration. Use of a gamma-emmitting agent which binds irreversibly to the cell membrane would reduce radiation of the nucleus. Selective labeling of lymphocyte subsets is required to discover differences in their migration and function in health and disease. Radiolabeled monoclonal antibodies against cell-surface antigens appear particularly promising for selective leukocyte labeling.

The past fifty years in nuclear hematology have encompassed remarkable advances in radionuclide production, instrumentation, radiochemistry, molecular biology, cell receptor, and immunologic techniques. During this entire period, the central guiding and productive motivation of the development of nuclear hematology has been and continues to be the demonstration of human function in health and disease. These demonstrations are permanent advances. A recent prospective controlled prolonged comparative study of ^{32}P, chemotherapy and venesection demonstrated that ^{32}P therapy of polycythemia vera still remains the treatment of choice.

III

DIAGNOSIS AND THERAPY FOR SOLID TUMORS WITH RADIOLABELED ANTIBODIES AND IMMUNE FRAGMENTS

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Antibodies which are directed against human tumor associated antigens can potentially be used as carriers of radioactivity for in vivo diagnosis (radioimmunodetection) or treatment (radioimmunotherapy) of tumors, including colon, hepatome, cholangiocarcinoma and melanoma. Murine monoclonal antibodies (MOAB), produced by the hybridoma technique of Kohler and Milstein, are replacing conventional heterosera as sources of antibodies because MOAB can be produced in large quantities as reproducible regents with hemogeneous binding properties.

We have studied human melanoma using MOAB IgG and Fab fragments that recognize the human melanoma associated antigens p97 and high-molecular-weight antigen. Both antigens are found in the membrane of melanomas as much larger concentrations than in normal adult tissues. We have performed radioimmunodetection studies with whole immunoglobulin and have detected 88 of lesions 1.5cm.

We have used Fab fragments for radioimmunotherapy and have found that large dosis of radiolabeled antibodies (up to 342 mCi) can be repetitively given to patients without excessive end-organ toxicity. Two of three patients treated with high-dose radiolabeled antimelanoma Fab showed an effect from the treatment. Although both technical and biologic problem remain. The use of promise as a new therapeutic approach to solid tumors that are resistant to conventional therapy (Cancer Treat.Rep., 68: 317-328, 1984).

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