Imaging and Therapy of Hematological Malignancies Using Radiolabeled Antibodies

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Radioimmunodetection and Radioimmunotherapy of tumors with radiolabeled antibodies are techniques that have been developed based on the specificity of antibodies for their antigens. At present almost all reagents used are murine monoclonal antibodies or genetically engineered variants. Most of the original work targeted antigens present in epithelial tumors. While successful targeting of solid tumors has been obtained with many of these reagents, radioimmunotherapy results have in general been limited. More recently radiolabeled antibodies have been evaluated as imaging and therapeutic reagents for lymphomas and leukemias. The results in hematological malignancies both as imaging and therapeutic reagents have been more promising than those seen in epithelial tumors. These trials have targeted various T-cell and B-cell antigens including CD5, IL-2 receptor, and CD20. Many of these trials have demonstrated excellent targeting of known sites of disease and partial and complete clinical responses.

A variety of methods have been used to radiolabel antibodies for tumor imaging. Initially I-131 was the isotope of choice for imaging and therapeutic trials. Several trials have utilized I-131 labeled antibody for treatment of lymphoma and leukemia. Among the most successful is the work utilizing I-131 B1 for therapy of B-cell lymphoma. However, because of problems frequently encountered with dehalogenation and release of isotope from the tumor site, other labeling methods that are thought to be more stable have been developed, including the use of radiometals such as In-111 and Y-90. These trials performed at NIH have demonstrated excellent localization of In-111 T101, B1 and Anti-Tac murine monoclonal antibody in patients with lymphomas or leukemias. Therapeutic responses with Y-90 T101 and anti-Tac have also been observed.

The cumulative experiences using radiolabeled MoAbs are that they can be given safely with acceptable toxicity. While several preparations appear promising for radioimmunodetection and radioimmunotherapy, additional confimatory studies are necessary before the routine clinical application can be recommended.