
Targeted Radionuclide Oncology Therapy

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Malignant tumors have been treated with targeted radionuclides beginning with the treatment of thyroid cancers. More recently targeted radionuclides have been used to treat bone metastasis, lymphoma, hepatocellular carcinoma and neuroendocrine tumors (NETs). Many other treatment agents are under development for multiple types of cancer. Radioiodine treatment of thyroid cancer with iodine-131 targets the treatment to the tumor by using the tumor cell iodine symporter to deliver the therapy directly into the tumor cells. New targeted radionuclide treatment agents have used chemical binding, antibody binding, glass or resin embolization beads, or peptide receptor binding to selectively deliver the cytotoxic treatment to the cancer cells. Each of the target treatments agents uses a unique tumor specific localization method with a cytotoxic radionuclide. The radionuclides used are selected on the basis of the chemical binding, physical half-life, and path length of the therapeutic emission. Targeted radiation for cancer therapy allows the radiation doses to the tumor cells to be significantly higher due to lower radiation absorbed to the normal cells. As our knowledge of cancer cells increases we will be better able to more specifically deliver cytotoxic molecules including radionuclides to kill tumor cells and further improve cancer therapy.