

A radiolabeled antibody is an antibody that has been tagged with a radioactive isotope. This combination is often used in medical diagnostics and therapies, especially in fields like oncology, immunology, and nuclear medicine. The radiolabeled antibody retains its ability to specifically bind to target antigens, such as those present on cancer cells or other diseased tissues, while the radioactive isotope allows for detection or treatment.

Applications of Radiolabeled Antibodies: Diagnostic Imaging:

Radiolabeled antibodies can be used in imaging techniques such as Positron Emission Tomography (PET) or Single Photon Emission Computed Tomography (SPECT). These methods allow physicians to visualize the distribution of the antibody in the body, revealing the location of specific cells or tissues. Example: Immuno-PET or Immuno-SPECT can identify tumors by targeting tumor-specific antigens. Radioimmunotherapy (RIT):

Radiolabeled antibodies can also be used therapeutically. In Radioimmunotherapy, the antibody delivers the radioactive isotope directly to cancer cells, thereby damaging or destroying them with radiation. Example: Zevalin (ibritumomab tiuxetan) is used to treat non-Hodgkin's lymphoma by targeting the CD20 antigen on B cells. Common Radioisotopes Used: Iodine-131 (I-131): Often used for both imaging and therapeutic purposes. Technetium-99m (Tc-99m): Primarily used for diagnostic imaging because of its favorable properties, including a short half-life. Indium-111 (In-111): Used for imaging and tracking the distribution of antibodies. Yttrium-90 (Y-90): Commonly used in therapeutic applications due to its beta-emitting properties. Radiolabeled antibodies are powerful tools that combine the specificity of immunology with the power of radiation for diagnostic and therapeutic purposes.

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