

S29-2 Chemical design of radiolabeled antibodies for SPECT

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Single photon emission computed tomography (SPECT) is a tomographic imaging technique using gamma rays. Since the tracers emit gamma rays at sites of localization, SPECT devices for small animal provide high resolution images (<1 mm). The radionuclides for SPECT imaging are available from commercial sources, which allows molecular imaging without cyclotron facilities. Radiolabeled monoclonal antibodies and their fragments/constructs are attractive for SPECT imaging of a variety of molecules in the body. In particular, radiolabeled antibody fragments/constructs provide images of target molecules in short postinjection intervals. Radiolabeled antibody fragments/constructs, however, exhibit high radioactivity levels in the kidney from early postinjection times onwards. To circumvent the problem, a new radiochemical design has been developed to liberate radiolabeled compounds of urinary excretion from antibody molecules by the action of renal brush border enzymes present on the lumen of renal tubules before antibody fragments are incorporated into renal cells. The development of radiolabeling reagents for radioiodines and radorhenium based on the chemical design will be presented.