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Effects of blocking agents on molecular imaging of bcl-2 expression in chronic lymphocytic leukemia

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B-cell lymphoma/leukemia-2 (bcl-2) genes are overexpressed in many cancers. These genes increase cell survival by blocking apoptosis, or programmed cell death. The objective of this study was to evaluate radiolabeled peptide nucleic acid (PNA)-peptide blocking agents, in order to reduce kidney uptake while improving targeting and imaging of bcl-2 gene expression by single photon emission computed tomography (SPECT). Three blocking agents, lysine, unmodified anti-bcl-2 PNA, and non-radioactive anti-bcl-2 PNA-peptide conjugate, were evaluated in human HEK293 kidney cells and Mec-1 chronic lymphocytic leukemia cells. SCID mice bearing Mec-1 tumors were imaged by microSPECT/CT after administration of an ¹¹¹In-labeled, targeted anti-bcl-2 PNA-peptide conjugate, with and without treatment using the three blocking agents. By using radiolabeled peptide nucleic acids, imaging of bcl-2 expression has the potential to recognize early molecular events associated with cancer recurrence and treatment failure.

