Public Abstract

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Title:Development of a Rhodium Tetrathioether Bombesin Analogue and Investigation of Cyclic and Acyclic Ligand Systems for $^{105}\text{Rh(III)}$

A radiopharmaceutical is a drug that contains a radioactive nuclide. Radiometals can be coupled to biomolecules which target receptors on the surface of tumor cells using the bifunctional chelate technique. When localized at the tumor site the drug delivers a therapeutic dose to the tumor cells while limiting damage to bystander tissues. This work reports the synthesis of a new radiotherapeutic analogue $[\text{Rh-S4-8Aoc-BBN(7-14)NH}_2]^+$ which shows high affinity for PC-3 cancer cells. However, multiple ^{105}Rh labeled species were obtained under the radiolabeling conditions investigated.

To better understand the results observed for $[\text{105Rh-8Aoc-BBN(7-14)NH}_2]^+$, the chemistries of previously investigated macrocyclic and acyclic-dicarboxylate tetrathioether chelates were re-evaluated using more recently available techniques. Our research revealed that traditional labeling conditions for ^{105}Rh analogues are not compatible with carboxylic acid functional groups. Future studies involving a ^{105}Rh bombesin analogue are recommended using a chelate system with methyl ester pendant groups instead of carboxylates.