P-12 10:50 – 11:00

Study of RGD-DOTA-Gd Complexes as tumor targeting MRI Contrast Agents

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Introduction : The RGD(Arg-Gly-Asp) conjugated with gadolinium complexes are attractive candidates for tumor-targeting contrast agent because RGD has been used as a specific ligand for αvβ3 integrin. The endothelial integrin αvβ3 is overexpressed in various tumor types thus it plays an important role in angiogenesis and diagnosis of tumors. In this study, RGD-DOTA-Gd was synthesized and evaluated as a tumor targeting agent for MRI.

Methods : A cyclic RGD peptide conjugated with 1,4,7,10-Tetraazacyclododecane-1,4,7,10-tetraacetic acid (DOTA) and labeled with Gd. All RGD-DOTA-Gd was purified by reversed phase HPLC and structural identity was proved using MALDI-TOF mass spectrometry. The relaxivity of RGD-DOTA-Gd was measured and their tumor targeting properties assessed in H-ras 12V transgenic mice with hepatocellular carcinoma on 1.5T MRI scanner.

Results : The relaxivity of RGD-DOTA-Gd was similar to the clinically used MRI contrast agent, Omniscan® at 1.5T. Comparison of the signal intensity as a function of time in the MR images obtained after injecting RGD-DOTA-Gd with the blocking experiment, where RGD and RGD-DOTA-Gd were injected, shows the efficiency of RGD-DOTA-Gd as the tumor targeting MRI contrast agent.

Conclusions : The RGD-DOTA-Gd has been developed as a tumor targeting MRI contrast agent.