

عنوان مقاله:

Glucosamine Conjugated Gadolinium (III) Oxide Nanoparticles as a Novel Targeted Contrast Agent for Cancer Diagnosis in MRI

محل انتشار:

مجله فیزیک و مهندسی پزشکی، دوره 10، شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 14

نویسندگان:

T Mortezaazadeh - *PhD, Department of Medical Physics and Biomedical Engineering, Tehran University of Medical Sciences, Tehran, Iran*

E Gholibegloo - *PhD, Department of Pharmaceutical Biomaterials and Medical Biomaterials Research Center (MBRC), Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*

N Riyahi Alam - *PhD, Department of Medical Physics and Biomedical Engineering, Tehran University of Medical Sciences, Tehran, Iran*

S Haghgoo - *PhD, Pharmaceutical Department, Food and Drug Laboratory Research Center, Food and Drug Organization (FDO), Ministry of Health, Tehran, Iran*

A E Musa - *PhD, Department of Medical Physics and Biomedical Engineering, Tehran University of Medical Sciences, Tehran, Iran*

M Khoobi - *PhD, Department of Pharmaceutical Biomaterials and Medical Biomaterials Research Center (MBRC), Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*

خلاصه مقاله:

Background: Glucose transporter (Glut), a cellular transmembrane receptor, has a key role in the metabolism of cell glucose and is also associated with various human carcinomas. **Objective:** In this study, we evaluated a magnetic resonance (MR) imaging contrast agent for tumor detection based on paramagnetic gadolinium oxide (Gd_2O_3) coated polycyclodextrin (PCD) and modified with glucose ($Gd_2O_3@PCD-Glu$) for the targeting of overexpressed glucose receptors. **Material and Methods:** In this experimental study, 3T magnetic resonance imaging (MRI) scanner was used to assess the specific interactions between Glut1-overexpressing tumor cells (MDA-MB-231) and $Gd_2O_3@PCD-Glu$ NPs. Furthermore, the capacity of transporting $Gd_2O_3@PCD-Glu$ NPs to tumor cells was evaluated. **Results:** It was found that the acquired MRI T_1 signal intensity of MDA-MB-231 cells that were treated with the $Gd_2O_3@PCD-Glu$ NPs increased significantly. Based on the results obtained, $Gd_2O_3@PCD-Glu$ NPs can be applied in targeting Glut1-overexpressing tumor cells in vivo, as well as an MRI-targeted tumor agent to enhance tumor diagnosis. **Conclusion:** Results have shown that glucose-shell of magnetic nanoparticles has a key role in diagnosing cancer cells of high metabolic activity.

کلمات کلیدی:

Magnetic Resonance Imaging, Gadolinium, Contrast media

