Contribution ID: **39** Type: **talk**

Targeted nanoparticles for cancer detection in animal models.

Monday, 11 October 2021 15:00 (20 minutes)

Magnetic Resonance Imaging (MRI) has been used for early cancer detection, as it provides high spatial resolution and soft tissue contrast. Yet its specificity is low. Standard contrast enhanced MRI is based on tumors vasculature (i.e. Gd-based) and it does not provide sufficiently high specificity for tumor diagnosis and thus targeted contrast agents providing T2 contrast have been applied to provide information on tumor specificity[1,2].
Therefore, we have developed core/shell NaDyF4/NaGdF4 nanoparticles changing both T1 and T2 relaxation times of surrounding water molecules. The NPs were conjugated with tumor specific antibodies and proteins. The relaxation times (T1 and T2) of the nanoparticles with various core/shell sizes and concentrations were measured at 9.4T and 3T to find the optimum T1/T2 ratio for maximum contrast. T1- and T2-weighted images using core/shell nanoparticles of the animal models of brain, breast and prostate cancer were collected. Mouse models of cancer were used at 9.4T. We imaged 6 weeks nude mice with the tumor before the injection of the targeted and non-targeted contrast agents and in different time after injection (10 min after,1h, 2h and 24h). The core/shell based NPs provided improved tumor contrast when the T1 and T2-weighted MR pulse sequences were applied. The results show that the developed NPs may improve the efficacy of MRI in cancer detection.
References:
1. Blasiak B, Tomanek B, et al Detection of T2 changes in an early mouse brain tumor. Mag Res Imag 2010, 28:784-9.
2. Tomanek B, Iqbal U, Blasiak B, at al. Evaluation of Brain Tumor Vessels Specific Contrast Agents for Glioblastoma Imaging. Neuro-Oncology, 2012, 14(1):53-63.

Primary author: BŁASIAK, Barbara (Polish Academy of Sciences, Institute of Nuclear Physics; Department of Clinical Neurosciences, University of Calgary)

Co-authors: Prof. VAN VEGGEL, Frank C. J. M. (Department of Chemistry, University of Victoria,); Dr DASH, Armita (Department of Chemistry, University of Victoria,); Dr MATYAS, John (Faculty of Veterinary Medicine, University of Calgary); Ms PONJEVIC, Dragana (Faculty of Veterinary Medicine, University of Calgary); Dr SUTHERLAND, Garnette (Department of Clinical Neurosciences, University of Calgary); Prof. TOMANEK, Boguslaw (Polish Academy of Sciences, Institute of Nuclear Physics; Department of Clinical Neurosciences, University of Calgary; University of Alberta, Department of Oncology)

Presenter: BŁASIAK, Barbara (Polish Academy of Sciences, Institute of Nuclear Physics; Department of Clinical Neurosciences, University of Calgary)

Session Classification: Monday Afternoon Session