MAGNETIC IMMUNODETECTION OF CELLULAR MARKERS BY RELAXOMETRY.

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Magnetic resonance (MR) techniques as those of molecular imaging have highest potentials to overcome the challenges of translational medicine. We propose to develop a magnetic immunodetection method of cellular markers associated with high incidence diseases, specifically epidermal growth factor receptor (EGF-R) in cancer and CD4 molecule on helper T-cells in AIDS. Mononuclear cells from healthy human blood and exfoliated cells from oral mucosa of the healthy individuals and patients were used. Cells were labeled with a following system: specific biotinylated antibody/IgG anti-biotin conjugated with paramagnetic particles. Relaxation times T₁ and T₂ were measured at 4 MHz. Results show that magnetically labeled CD4+ cells from control and treated samples (α=0.05) are statistically different in both systems comparing the mean of relaxation times for both groups. The results demonstrated that it is possible to differentiate CD4+ population in vitro using antibody systems and magnetic particles by MR relaxometry. Magnetically labeled oral cells from healthy individuals showed a decrease of 28% in both relaxation time of the magnetically labeled cells compared to those no labeled and were statistically significant (α=0.05). When comparing T₁ and T₂ values of the labeled cells in the lesion of patients and healthy subjects there was a significant decrease of relaxation times. By comparing the relaxation time of healthy cells and different injuries statistically significant differences appears in cells of oral leukoplakia and lichen planus in both T₁ and T₂, but not in keratosis cells. The results show that it is possible to detect cells expressing the EGF-R by relaxometry using these combined antibodies and that EGF-R overexpression should be semiquantitative assayed in cells from lesions such as leukoplakia and lichen planus.

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