



A Novel Contrast Enhancement Technology for the Diagnosis of Cancer Cells – An Investigation

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Abstract:

Several advances in the medical technology in the diagnostic of cancer cell and analysis have been evolved, but yet there is no satisfactory detection and imaging of human cancer is obtained. Unless the ratio of the tumor to background ratio improves by three to four orders of magnitude, a satisfactory observation on the cancer cell identification, treatment cum screening and staging is not possible. This research focuses on the identification of the malignant tumor cells which lies behind the background of the normal cells, the fundamental principles of the cancer cell imaging is also discussed in this paper. In this paper we have discussed and analyzed about, existing several radiotracers, contrast agents for cancer cell imaging, since there are some limitations in the magnetic resonance imaging (mri), positron emission tomography (pst), ultrasound etc. There are certain recent innovative technology that promises the patient such as positron emission mammography for the breast cancer diagnosis and for the cancer screening, spectroscopy enhanced colonoscopy is used and infrared fluorescence guided surgery for cancer treatment. This investigation exploits the recent emerging methods in the field of cancer cell analysis using contrast imaging and analyzing their impact in the medical field. The nonlinear optical methods of two-photon excited fluorescence (TPEF) and coherent anti-Stokes Raman scattering (CARS) with infrared laser excitation were applied to study the localisation of SiNPs in cells. Advantages of the nonlinear Methods, such as rapid imaging, which prevents cells from overheating and larger penetration depth compared to the single-photon excited HR-SIM, are discussed. The obtained results reveal new perspectives of the multimodal visualization and precise detection of the uptake of biodegradable non-toxic SiNPs by cancer cells and they are discussed in view of future applications for the optical diagnostics of cancer tumors.

Keywords: contrast enhancement, cancer cell analysis, screening, staging, tumour cells, (HR-SIM), Raman spectroscopy, coherent anti-Stokes Raman scattering (CARS), two-photon excited fluorescence (TPEF).