

## Monitoring magnetic nanoparticles in the body

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### Abstract

© 2016 Trans Tech Publications, Switzerland. In this paper we present a new method for the monitoring of super-paramagnetic nanoparticles (SPANs) in the body. Nowadays, reliable and inexpensive device and method for monitoring the spatial distribution of SPANs in the body are not present in the market of clinical imaging equipments. Importantly, since SPANs can be conjugated to a huge variety of organic (antibodies, proteins, synthetic polymers) and inorganic molecules they can be used to selectively detect targets (e.g. cancer cells) with striking specificity. The existing imaging methods used for clinical diagnostic purposes are the nuclear magnetic resonance (NMR) and computerized axial tomography scan (CAT or CT scan). Detection of SPANs with these methods is still controversial and most import they used strong magnetic field and harmful X-ray radiation, respectively, and the cost for a single analysis is high as well. Herein we describe an innovative magnetic method promises the measurement of the distribution of SPANs with sensitivity quite better than  $1 \mu\text{m}^3$ . The method (patented device by our group) is based on magnetic excitation and consequent detection of nanoparticles using super-conducting or magnetic sensors (magnetometers). The device is innovative and novel, and could be considered as a universal breakthrough in tumor diagnosis. Possible other applications could be simultaneous killing of the cancer cells applying inductive heating techniques.

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### Keywords

Cancer cells, Nanoparticles, Nuclear magnetic resonance, Super-paramagnetic