

## Study of Magnetic Nanoparticles' Endocytosis in a Single Cell Level

**Authors :** Jefunnie Matahum, Yu-Chi Kuo, Chao-Ming Su, Tzong-Rong Ger

**Abstract :** Magnetic cell labeling is of great importance in various applications in biomedical fields such as cell separation and cell sorting. Since analytical methods for quantification of cell uptake of magnetic nanoparticles (MNPs) are already well established, image analysis on single cell level still needs more characterization. This study reports an alternative non-destructive quantification methods of single-cell uptake of positively charged MNPs. Magnetophoresis experiments were performed to calculate the number of MNPs in a single cell. Mobility of magnetic cells and the area of intracellular MNP stained by Prussian blue were quantified by image processing software. ICP-MS experiments were also performed to confirm the internalization of MNPs to cells. Initial results showed that the magnetic cells incubated at 100  $\mu\text{g}$  and 50  $\mu\text{g}$  MNPs/mL concentration move at 18.3 and 16.7  $\mu\text{m}/\text{sec}$ , respectively. There is also an increasing trend in the number and area of intracellular MNP with increasing concentration. These results could be useful in assessing the nanoparticle uptake in a single cell level.

**Keywords :** magnetic nanoparticles, single cell, magnetophoresis, image analysis

**Conference Title :** ICMMM 2017 : International Conference on Magnetism and Magnetic Materials

**Conference Location :** Tokyo, Japan

**Conference Dates :** November 13-14, 2017