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[\[Bio-Chemistry\] Taiwan Scientists Advance Technology Used for Quantitative Measurement of Nano-/microparticle Uptake by Cells](#)

[Bio-Chemistry] Taiwan Scientists Advance Technology Used for Quantitative Measurement of Nano-/microparticle Uptake by Cells ([Chinese Version](#))

Academia Sinica Newsletter (2010/05/31) A Taiwan research team has developed a new approach for investigating the amount of nano-/microparticles taken up by mammalian cells. This project was led by Dr. Chung-Hsuan CHEN, Distinguished Research Fellow and Director of the Genomics Research Center (GRC) at Academia Sinica, and Dr. Wen-Ping PENG, a Jointly-appointed Assistant Professor of the GRC and the Department of Physics at National Dong Hwa University of Taiwan, in collaboration with Dr. Alice YU, Distinguished Research Fellow and Deputy Director of the GRC. The research was published online in the leading international journal, *Angewandte Chemie*, on April 13, 2010.

Nano-/microparticles have been pursued by researchers in recent years as possible carriers for drug delivery. Therefore, effective quantitative measurement of the cellular uptake of nano-/microparticles is of great importance. Conventionally these tiny particles have been measured using certain types of mass spectrometry (an analytical technique for the determination of the elemental composition of a sample or molecule) including Inductively Coupled Plasma Atomic Emission Spectroscopy and Inductively Coupled Plasma Mass Spectrometry (ICP-MS). However, these methods of measurement are limited to elemental particles such as gold nanoparticles.

For this study, scientists used a different type of spectrometer called the Charge-Monitoring Mass Spectrometer (CMS), a device which was itself developed by a group at the GRC and the Institute of Atomic and Molecular Sciences at Academia Sinica in 2007 to measure single cancer cells at higher speeds. This time, researchers from the GRC Physical and Computational Genomics group used this recently-developed device to measure the masses of cells of nano-/microparticle, a novel approach for investigating the amount of nano-/microparticle uptake into mammalian cells.

The group's findings indicate that the CMS is an adequate tool for time-resolved measurements of nanogold uptake by cells. They also found that the CMS could measure particles over a larger size range from 30 nm to 250 nm. In addition, as the CMS only takes two-steps to examine the nanogold and the ICP-MS takes five-steps, the CMS analysis is more time-efficient. Most importantly, however, the CMS will also be able to measure non-metal nano particles, including polymeric nanoparticles, carbon nanotubes, diamond nanoparticles, viruses, micelles and liposomes in addition to elemental particles.

The full-text of the study was published under the title Quantitative Measurement of Nano-/Microparticle Endocytosis by Cell Mass Spectrometry, available at the *Angewandte Chemie* website at: <http://www3.interscience.wiley.com/journal/123349954/abstract?CRETRY=1&SRETRY=0>.

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