

Photothermal Cell Lysis via Plasmonic Gold Nanostructures

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Metal nanostructures such as nanoparticles, nanoshells and nanocages have been focused on the optical properties which make it possible to detect chemical/biological substances. Here, we investigated the optical (Localized Surface Plasmon Resonance (LSPR)) and physical properties of gold nanostructures for the cell lysis. Various cells have been lysed due to the heat generated by light radiation on plasmonic metal nanostructures, known as 'photothermal effect'. The photothermal effect occurs strongly on metal nanostructures when the incident light is resonant with surface plasmon. The gold nanostructures were fabricated via colloidal lithography and each cell was put into a gold nanostructure by centrifugal force. Finally, the cells captured in the gold nanostructures were lysed by using tunable laser, Ti:Sapphire laser with surface plasmon wavelength about 800 nm. It enables us to analyze the single cell in a microfluidic chip without any reagents or equipment.