

## Efficient Delivery of Biomaterials into Living Organism by Using Noble Metal Nanowire Injector

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**Abstract :** Introduction of biomaterials such as DNA, RNA, proteins is important for many research areas. There are many methods to introduce biomaterials into living organisms like tissue and cells. To introduce biomaterials, several indirect methods including virus-mediated delivery, chemical reagent (i.e., lipofectamine), electrophoresis have been used. Such methods are passive delivery using an endocytosis process of cell, reducing an efficiency of delivery. Unlike the indirect delivery method, it has been reported that a direct delivery of exogenous biomolecules into nucleus have been more efficient to expression or integration of biomolecules. Nano-sized material is beneficial for detect signal from cell or deliver stimuli/materials into the cell at cellular and molecular levels, due to its similar physical scale. Especially, because 1 dimensional (1D) nanomaterials such as nanotube, nanorod and nanowire with high-aspect ratio have nanoscale geometry and excellent mechanical, electrical, and chemical properties, they could play an important role in molecular and cellular biology. In this study, by using single crystalline 1D noble metal nanowire, we fabricated nano-sized 1D injector which can successfully interface with living cells and directly deliver biomolecules into several types of cell line (i.e., stem cell, mammalian embryo) without inducing detrimental damages on living cell. This nano-bio technology could be a promising and robust tool for introducing exogenous biomaterials into living organism.

**Keywords :** DNA, gene delivery, nanoinjector, nanowire

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