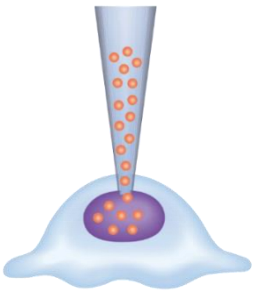
Application Notes

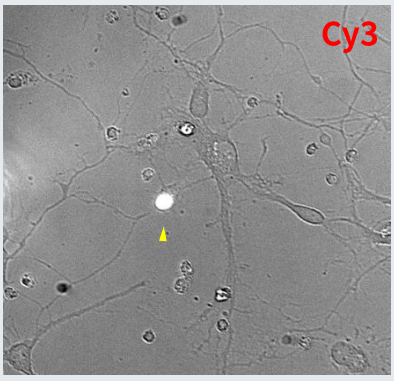
Single Cellome™ Unit SU10
Delivery to Primary Cells and Stem Cells



The SU10 is a novel technology that can deliver target substances into cells (nucleus or cytoplasm) by using a "nano" pipette made of glass capillary with an outer tip diameter of just tens of nanometers.
It is often difficult to introduce substances into primary cells and stem cells by conventional methods due to the low introduction efficiency. The SU10 is specifically designed to deliver into these cell types.
This application note will provide examples of delivering plasmid vector as well as fluorescent reagents into primary cells and stem cells using the SU10.

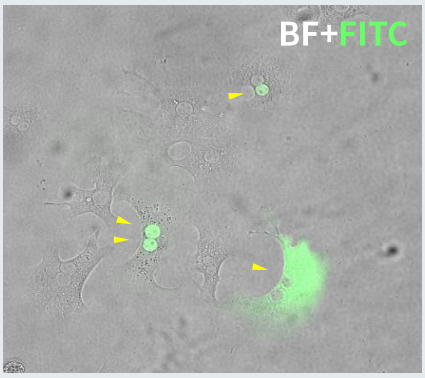
Delivery of Fluorescent Reagents into Primary Cells and Stem Cells with the SU10

Cells : Primary mouse hippocampal neuron
Reagent : Cy3-oligonucleotide (10 µM)

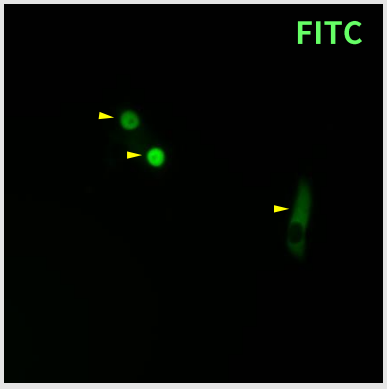


Provided by Kanako Iwasaki
Yasushi Okada Lab, The University of Tokyo

Cells : Primary mouse hepatocytes
Reagent : FITC-dextran (MW 70K, 10 mg/mL)



Cells: Human iPS cells (201B7, 2D culture)
Reagent: FITC-dextran (MW 70K, 10 mg/mL)



Provided by Matsuzaki Lab, RIKEN

Results

[Upper left]
Delivery into nucleus of primary mouse neuron

[Upper right]
Delivery into nucleus and cytoplasm of primary mouse hepatocytes

We have succeeded in injecting the fluorescent reagent into one of the two nuclei or both nuclei in the targeted cells.

[Lower left]
Delivery into nucleus and cytoplasm of iPS cells

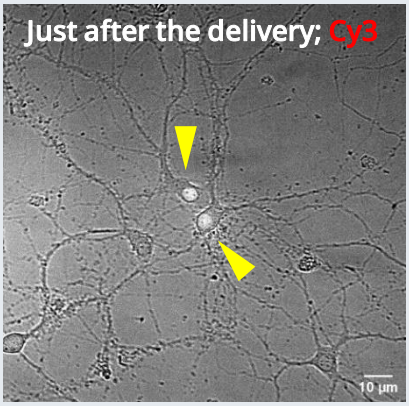
Delivery of Plasmid Vectors into Primary Mouse Neurons with the SU10

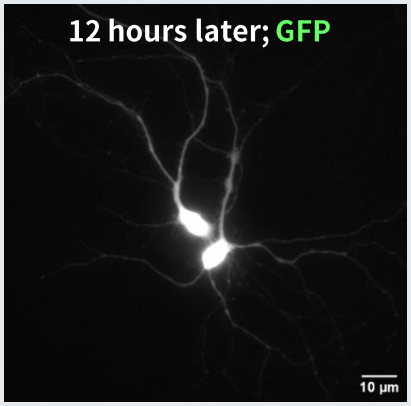
The SU10 can dramatically improve the gene expression efficiency in primary neurons.
To evaluate the physical success rate of SU10 delivery, Cy3-labeled oligonucleotide was co-delivered with GFP expression plasmid vector into neurons. The delivery success rate with the SU10 was 94.4%.
To examine the gene expression efficiency, GFP fluorescent signal was observed 12 hours after plasmid vector delivery with the SU10. The GFP expression efficiency was 0.1-1.0% when using the calcium phosphate transfection method, while it increased to 24.8% (23.4% of total delivered cells) with the SU10.

User's voice

The SU10 expands the possibilities of experiments and live-cell imaging of primary neurons. We would like to try delivering mRNA and proteins in addition to DNA with the SU10.

Cell : Primary mouse hippocampal neurons cultured for 12 days
Reagents : Cy3-oligonucleotide (10 µM) + pEGFP-N1 (10 ng/µL)





Total delivered cells (4 nanopipettes)	Delivery success rate ($Cy3^+$/ total delivered cells)	GFP expression rate ($GFP^+/Cy3^+$ cells)	Conventional method (Calcium phosphate transfection)
162	94.4%	24.8%	0.1–1.0%

Provided by Kanako Iwasaki, Yasushi Okada Lab, The University of Tokyo

Conclusion

- The SU10 can be applied to deliver different substances into a variety of primary cells and stem cells.
- The SU10 can achieve a high delivery success rate to cells that have been difficult to transfect.
- The SU10 can simultaneously deliver multiple reagents into the cells.

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