

# DeliverX™ Peptide Transfection Kit

## Efficiently Transfect Peptides into a Wide Range of Cell Types

Delivery of peptides into cells has traditionally been difficult to accomplish, both in terms of efficiency and retaining normal cellular function post transfection. With the introduction of the DeliverX Peptide Transfection Kit, it is now possible to reproduce and easily deliver a wide variety of peptides into many cell types. Peptide transfection is being pursued for various applications including modulation of cell signaling pathways for basic research, as potential therapeutic agents and for the study of the consequences of pseudo up-regulation of specific cellular peptides.

## DeliverX Peptide Transfection Kits

Unlike lipid-derived and other transfection systems, the mechanism of entry of DeliverX Transfection Reagents is independent of receptor-mediated and endocytic pathways—preventing potential degradation of your precious cargo.

DeliverX Peptide Transfection Kits are suitable for the efficient transfection of most cell types with minimal cell damage and good reproducibility when following the optimization guidelines provided in the User Manual.

## Highlights

**Novel**—peptide-based, non-endosomal delivery mechanism

**Versatile**—form a single transfection complex and dilute to evaluate multiple peptide concentrations

**Efficient**—high transfection efficiency to a variety of cell types

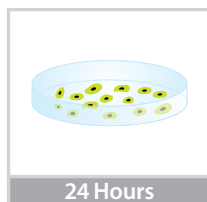
**Easy-to-use**—simple workflow, does not require medium change during transfection

**Low toxicity**—cells remain healthy at optimal transfection conditions

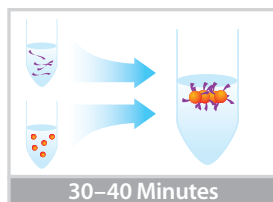
**Reproducible**—excellent inter-well and inter-day precision

## Easy-to-Use—Simple Workflow

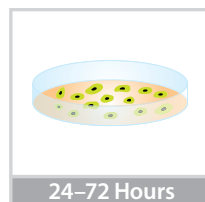
1 Plate Cells 24 Hours Before Transfection



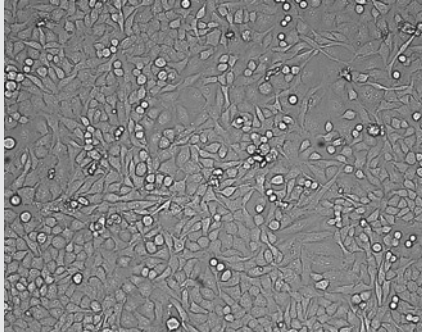
2 Form Transfection Complex



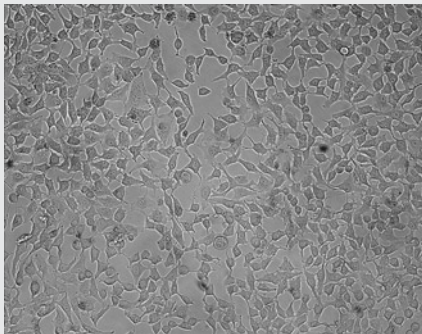
3 Transfect Cells/ Monitor Modulation



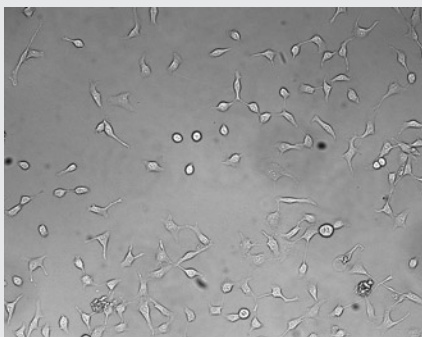
**Inhibition of Cell Proliferation by Cdk2 Peptide Inhibitor**



Cell Only, Time = 48 Hours

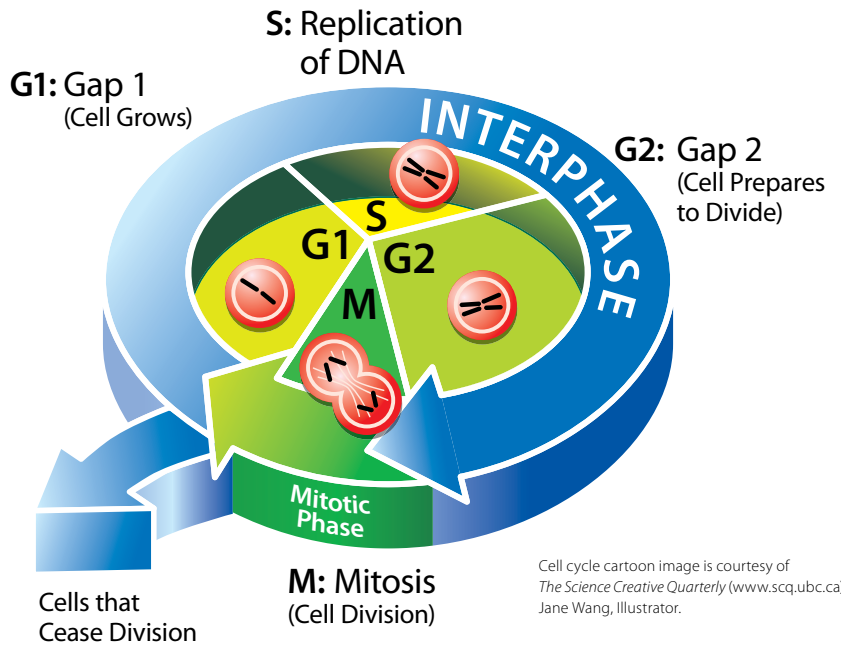


DeliverX Peptide Transfection Reagent + Negative Control Peptide, Time = 48 Hours



DeliverX Peptide Transfection Reagent + Cdk2 Peptide Inhibitor, Time = 48 Hours

HeLa cells grown in 96 well microplate were transfected with a Cdk2 peptide inhibitor using DeliverX Peptide Transfection Reagent and incubated for 48 hours.



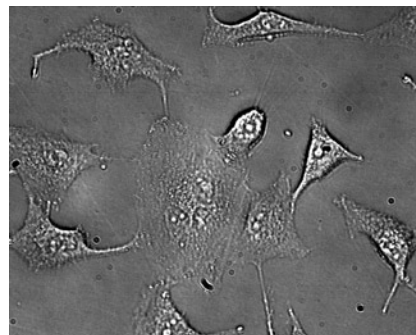
**Case Study: Delivery of a Cdk2 Peptide Inhibitor to Inhibit Cell-Cycle Progression**

Cyclin dependent kinase (Cdk) 2 is required at multiple stages for progression through the mammalian cell cycle. In association with cyclin E, Cdk2 promotes the transition from G1 to S phase, and Cdk2/cyclinA complexes drive cells through S phase.

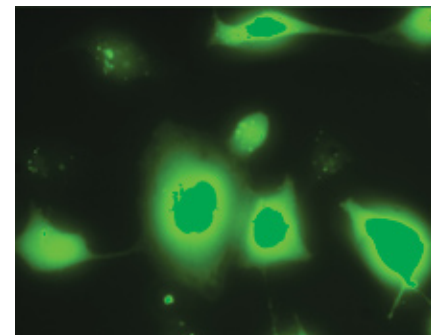
The activities of Cdks are highly regulated by association with cyclins, whose temporal expression throughout the cell cycle is tightly controlled, by phosphorylation or dephosphorylation by kinases and phosphatases, and through the actions of inhibitory proteins such as Ink4 and Cip/Kip.

These key regulators of mammalian cell proliferation are excellent targets for anti-cancer agents. Here we demonstrate that cellular proliferation can be inhibited by transfection of a Cdk2 inhibitory peptide into HeLa cells using the DeliverX Peptide Transfection Reagent.

**Transfection of FITC-labeled Cdk2 Peptide Inhibitor**



Brightfield Image



Fluorescent Image

FITC-labeled Cdk2 peptide inhibitor was transfected into HeLa cells using DeliverX Peptide Transfection Reagent.

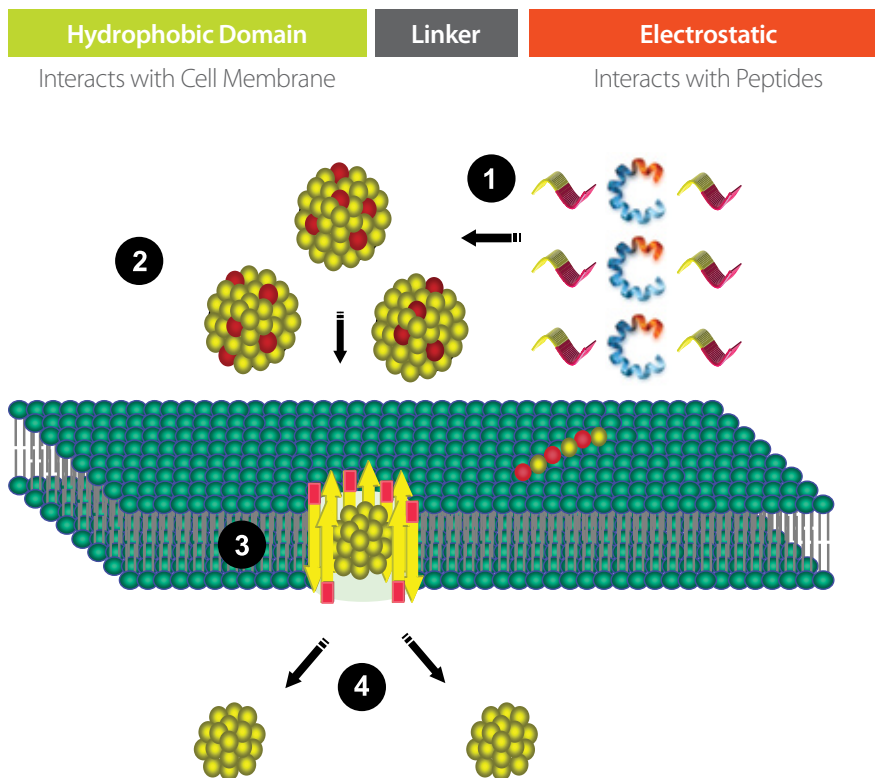
## Novel, Peptide-based Delivery Mechanism

The DeliverX Peptide Transfection Reagent is based on novel “MPG” delivery technology developed at Centre de Recherches en Biochimie Macromoléculaire (CNRS) in Montpellier (France) in the laboratory of Dr. F. Heitz and Dr. G. Divita. MPG technology uses virus-derived amphipathic peptides that directly interact with biological cargos to form nanoparticles capable of diffusing through plasma membranes and releasing their contents inside the cell. The mechanism of entry is receptor-independent, involves MPG/lipid interactions, and avoids the endocytic pathway, thereby preventing endosomal or lysosomal degradation of cargos.

## Predictive Software Tool

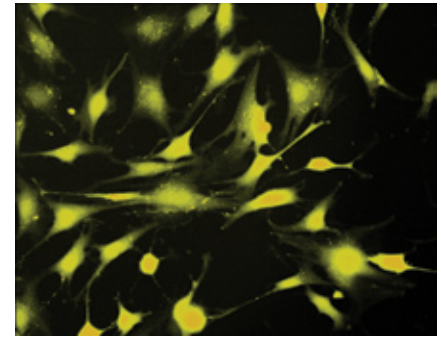
A proprietary software program has also been developed which, based on the peptide sequence of interest, gives a qualitative assessment of the likely effectiveness of transfection. This tool can then be used to create theoretical analogues of the peptides being transfected to increase transfection efficiency while at the same time retaining those elements of the peptide sequence that modulate the desired biological target.

## Structure of MPG Peptide



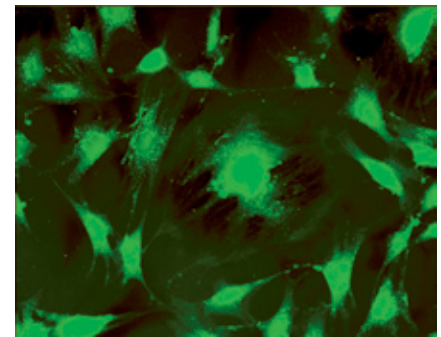
- 1 MPG peptide interacts with peptide to form nanoparticle.
- 2 MPG/peptide nanoparticle interacts with the external side of the cellular membrane.
- 3 The MPG/peptide particle inserts into the membrane (a pore-like structure is created).
- 4 MPG/peptide particle is internalized and the peptide is decoupled from the complex.

## Transfection of Labeled Peptides into NIH/3T3 and HeLa Cells

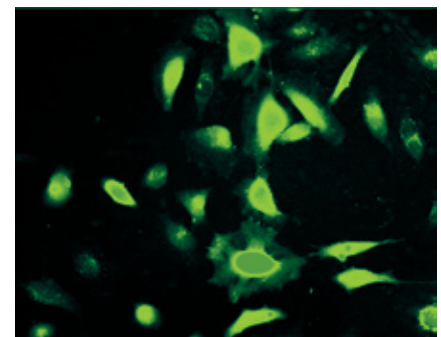


### TAMRA Labeled Proficiency Control

A TAMRA (Carboxytetramethylrhodamine) labeled peptide control is also provided, as an initial proficiency control for new users.



FITC(ahx)-RFARKGALRQKN-AMIDE peptide transfected at 0.6  $\mu$ M concentration into NIH/3T3 cells.



FITC(ahx)-LGDLIVQNRIKKN-AMIDE peptide transfected at 0.6  $\mu$ M concentration into HeLa cells.

For pricing and more information visit our website at [www.panomics.com](http://www.panomics.com) or call us at 1.877.726.6642.

We are always pleased to talk to customers regarding transfection of specific cell types and peptides or molecular cargo of interest, contact us at 1.877.726.6642 or [techsupport@panomics.com](mailto:techsupport@panomics.com).

## References

1. Morris, M.C., Vidal, P., Chaloin, L., Heitz, F., Divita, G., A new peptide vector for the efficient delivery of oligonucleotides into mammalian cells, *Nucleic Acids Res.*, 25, 2730-2736, (1997).
2. Morris, M.C., Chaloin, L., Mery, J., Heitz, F., Divita, G., A novel potent strategy for gene delivery using a single peptide vector as a carrier, *Nucleic Acids Res.*, 27, 3510-3517, (1999).
3. Simeoni, F., Morris, M.C., Heitz, F., Divita, G., Insight into the mechanism of the peptide-based gene delivery system MPG: implications for delivery of siRNA into mammalian cells, *Nucleic Acids Res.*, 31, 2717-2724, (2003).
4. Deshayes, S., Plenat, T., Aldrian-Herrada, G., Divita, G., Grimmellec, C.L., Heitz, F., Primary amphiphatic cell-penetrating peptides: structure requirements and interactions with model membranes, *Biochemistry*, 43, 7698-7706, (2004).
5. Deshayes, S., Gerbal-Chaloin, S., Morris, M.C., Aldrian-Herrada, G., Charnet, P., Divita, G., Heitz, F., On the mechanism of non-endosomal peptide-mediated cellular delivery of nucleic acids, *Biochimica et Biophysica Acta*, 1667, 141-147, (2004).

## Acknowledgements

We would like to thank Dr. Gilles Divita for supplying the CDK2 peptide inhibitor.

Product	Size	Catalog No.
DeliverX Peptide Transfection Evaluation Kit*	0.6 mL	DX1001
DeliverX Peptide Transfection Kit	3.0 mL	DX1002
DeliverX TAMRA-labeled Peptide Control	75 µL	DX1100
DeliverX Pre-formed Peptide Transfection Complex Control	1.5 mL	DX1101
DeliverX Peptide Buffer-1	4 mL	DX1500
DeliverX Peptide Buffer-1	20 mL	DX1501
DeliverX Peptide Buffer-2	4 mL	DX1502
DeliverX Peptide Buffer-2	20 mL	DX1503

\* *DeliverX Peptide Transfection Evaluation Kit is configured for new users and contains the following:*

- 0.6 mL *DeliverX Peptide Transfection Reagent*
- 75 µL of *DeliverX TAMRA-labeled Peptide Control*
- 1.5 mL *DeliverX Pre-formed Peptide Transfection Complex Control*



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