SuperFect Transfection Reagent

Based on activated-dendrimer technology

SuperFect® Transfection Reagent is a new transfection reagent based on activated-dendrimer technology for super-high transfection results. SuperFect Reagent provides significant advantages over many other transfection methods, such as liposome technology.

The SuperFect Principle

SuperFect Reagent consists of activated-dendrimer molecules with a defined spherical architecture. Branches radiate from a central core and terminate at charged amino groups, which can then interact with negatively charged phosphate groups of nucleic acids (Figure 4). SuperFect Reagent assembles DNA into compact structures (Figure 6) optimizing entry of DNA into cells. Once inside the cell, SuperFect Reagent buffers the lysosome after fusion with the endosome, leading to pH inhibition of lysosomal nucleases. This ensures the stability of SuperFect–DNA complexes and efficient transport of intact DNA into the nucleus.

Dendrimer Structure

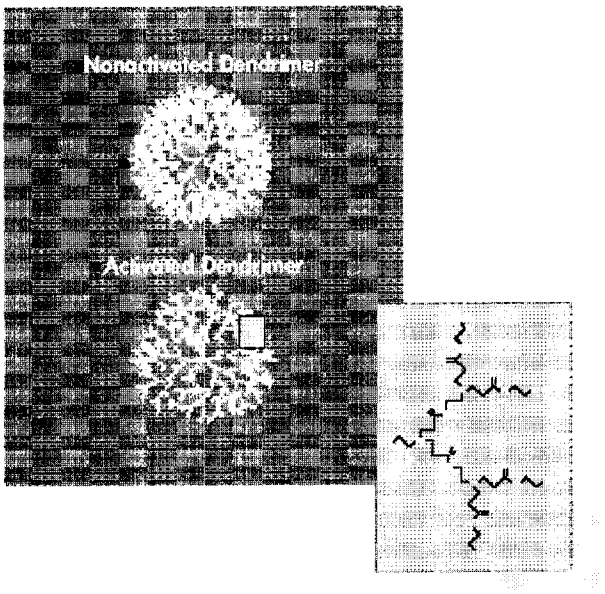
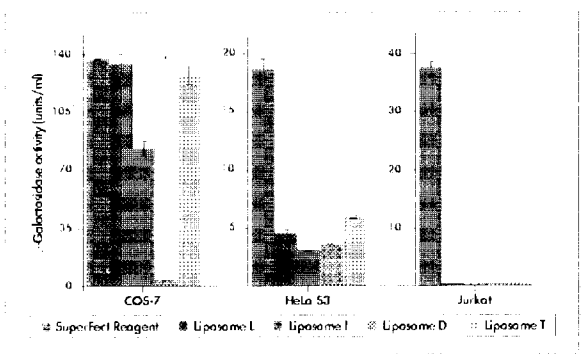


Figure 4. *Schematic diagram of an activated and non-activated dendrimer. A portion of the activated dendrimer molecule is enlarged to show the chemical structure of the molecular branches.*

Comparison of Transfection Efficiencies



Excellent reproducibility

Due to a highly controlled chemical synthesis procedure, the activated dendrimer molecules in SuperFect Reagent have a precise size and a defined shape. This ensures consistent transfection complex formation and reproducibility in transfection.

Figure 5. *Comparison of transfection efficiencies obtained using SuperFect Reagent and four of the most commonly used liposome reagents. COS-7, HeLa S3, and Jurkat cells as indicated were transfected in 96-well format using 0.5 µg pCMVβ. 2 x 10⁴ cells were seeded per well one day prior to transfection. Transfection efficiencies are given as β-galactosidase units per ml. Each bar represents the average efficiency from 4 replicates.*

Super-high transfection efficiencies

In many cases SuperFect Transfection Reagent yields significantly higher transfection efficiencies than commonly used liposomes and other transfection reagents. SuperFect can be used for both stable and transient transfection of a broad range of cell lines (Figures 5 and 7). For reagent recommendations on specific cell lines please refer to the table on page 6.

Decreased cytotoxicity

SuperFect Reagent is less toxic to cells than many other transfection reagents (Figure 8). In contrast to liposome reagents, SuperFect Reagent enables transfection in the presence of serum without lowering transfection efficiencies, resulting in minimized stress to cells.

Cytotoxicity Analysis

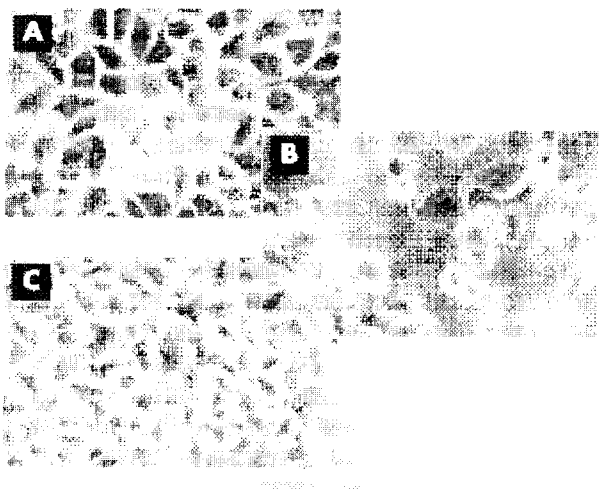


Figure 8. *Cytotoxicity studies of HeLa S3 cells 48 h post-transfection using* ***(A)*** *SuperFect Reagent or* ***(B)*** *a common liposome reagent (corresponding to Liposome L from Figure 5).* ***(C)*** *Untransfected cells. Magnification: 200x using phase-contrast microscopy.*

SuperFect–DNA Interaction

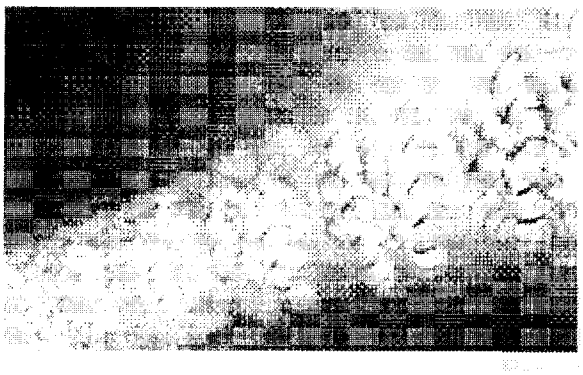


Figure 6. *Schematic diagram of SuperFect–DNA complex. DNA wraps around SuperFect molecules which condense the DNA in a similar manner to that of histones in eukaryotic nuclei.*

SuperFect Reagent with LMH Cells

Figure 7. *Expression of green fluorescent protein (GFP) from LMH cells transfected using SuperFect Reagent. Transfection was performed in 96-well format using 0.5 µg pTracer™-SV40 (Invitrogen) and 2 µl SuperFect Reagent. 2 x 10^4 cells were seeded per well one day prior to transfection. Cells were analyzed 48 h post-transfection by fluorescence microscopy. Approximately 50–60% of the cells are expressing GFP.*

Fast and efficient procedure

SuperFect Transfection Reagent is provided as a ready-to-use solution. Just add the required amount of SuperFect Reagent to the DNA solution, mix, incubate for 5–10 minutes, and pipet the SuperFect–DNA complexes onto the cells. After a 2–3 hour incubation perform a medium change and continue to incubate for gene expression.