Filtroporation: A Simple, Reliable Technique for Transfection and Macromolecular Loading of Cells in Suspension

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Received 13 January 1999; accepted 20 May 1999

Cultured Chinese hamster ovary (CHO) cells suspended in their growth medium were forced by gas pressure through the uniformly sized micropores of filter membranes. This procedure caused transient damage to the plasma membrane, which increased the permeability of the cell to exogenous molecule. This "filtroporation" was indicated by uptake of fluorescent dextran molecules up to 500,000 MW in cells deemed viable by trypan blue dye exclusion. The macromolecular uptake was increase if the driving pressure was increases at constant micromolecular macropore size, or if the micropore size was decreases at constant driving pressure. Larger membrane perturbations permitted uptake of a luciferase reporter plasmid, which resulted in transfection of the CHO cells with the surviving cells expressing luciferase activity after 2 days in culture. This simple and general new method of porating cell in suspension may be optimized to incorporate the desired macromolecules while retaining the maximum viability.

 Biotechnol Bioeng **65:** 341-346, 1999.

USTUR-0154-00