allied academies Joint Event on
International Conference on
CELL AND GENE THERAPY
&
World Congress on
CLINICAL AND MEDICAL MICROBIOLOGY
September 10-11, 2018 | Dublin, Ireland
Shirley O'Dea, Biomed Res 2018, Volume 29 | DOI: 10.4066/biomedicalresearch-C3-006

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Biography

Shirley O'Dea has co-founded Avectas Ltd., in 2012 and is the company's CSO. She is charged with overseeing scientific programs. Her basic research provides a strong pipeline of applications for Avectas technology. She has previously served as a Principal Investigator with Johnson and Johnson and has led a large academic group specializing in Lung Biology at National University of Ireland, Maynooth.

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IN VIVO ENGRAFTMENT OF T CELLS TRANSFECTED USING SOLUPORE® IS SUPERIOR COMPARED WITH ELECTROPORATION-BASED SYSTEMS

Solupore is a vector-free intracellular delivery platform that enables development and manufacture of cell therapies. Membrane disruption-based methods, such as Solupore®, that enable intracellular delivery of various cargo types for clinical applications have been proposed as attractive candidates as next-generation delivery modalities because of potential benefits for safety, regulation and production. Electroporation is the most widely used method currently, this includes electroporation-based methods such as nucleofection, however disadvantages include toxicity and proliferation stalling. Solupore® uses reversible permeabilization to achieve rapid intracellular delivery of cargos with varying compositions, properties and sizes. A permeabilizing delivery solution containing a low level of ethanol is used as the permeabilizing agent. The technology achieves intracellular delivery and subsequent reversal of cell permeabilization by precisely controlling the contact of the target cells with this solution. The process is rapid and cargo transfers directly into the cytoplasm by diffusion in an endocytic-independent manner. We have termed the method soluporation. Comparisons of the phenotype and functionality of primary human T cells following soluporation (Solupore®), nucleofection (4D-Nucleofector™) and electroporation (Neon®) are outlined in this work. The extent to which the transfection systems perturb T cells was investigated as well as the effects on cell functionality. The results presented demonstrate that the Solupore® technology does not perturb gene expression or cell surface markers in T cells. Furthermore, cell proliferation and *in vivo* engraftment is superior in soluporated cells compared with nucleofected cells. Thus, the Solupore technology is gentle yet highly reproducible, automated, and scalable and has the potential to enable a broad range of T cell engineering applications.

Note: