

12-2018-5686 | Nano-patterned Surfaces for Triggered Delivery of Biologically Active Molecules into the Cell
[Shenhar Roy](#), HUJI, Faculty of Science, The Center for Nanoscience and Nanotechnology

Background

Multiple strategies exist for the targeted treatment of different cell pathologies. One ongoing challenge is the introduction of therapeutic molecules into cells. Current approaches rely on viral vectors, electroporation, or carriers. Nonetheless, many fragile cells (e.g., stem cells) do not survive the application of high voltages, and the long-term effects of viral vectors and carriers pose health concerns.

Improving current transfection means for small molecules and in the mid-term genes and proteins into cells may be a useful research tool to effect delivery under mild conditions.

Our Innovation

- The research team recently developed a nanopatterned block polymer surface that can release various bioactive substances with a low-voltage trigger
- The approach offers high temporal and spatial control
- Relevant for the growing interest in ex vivo cell therapies
- The precursor and process requirements do not require large capital expenditures

Technology

Nano-patterned surfaces comprising alternating neutral and positively charged domains, which enables the selective assembly of polyelectrolytes over the charged domains. Some of the polyelectrolytes are electrochemically active. Various bioactive compounds can be trapped in the nano-patterned multilayer, and their release can be electrochemically triggered to generate a high local concentration in the close vicinity of the cell, driving uptake by the cell. This platform can be tailored for different bioactive molecules.

Patent Status

Published US 2021/0154472 A1

Contact for more information:
Amit Hayuth
VP, BUSINESS DEVELOPMENT

Yissum Research Development Company of the Hebrew University of Jerusalem

Hi-Tech Park, Edmond J. Safra Campus, Givat-Ram, Jerusalem
P.O. Box 39135, Jerusalem 91390 Israel
Telephone: 972-2-658-6688, Fax: 972-2-658-6689