# Cephalopod-Inspired Bioelectronic Platform For Engineering Intercellular Communication

Tech ID: 34219 / UC Case 2021-779-0

## BRIEF DESCRIPTION

This technology represents a groundbreaking approach to generating and using biomolecule-loaded extracellular vesicles (EVs) for targeted cellular reprogramming.

## FULL DESCRIPTION

We have developed an innovative methodology that utilizes electrical stimulation of engineered source cells to produce biomolecule-loaded extracellular vesicles (EVs). These EVs are designed to harness cell-to-cell signaling capabilities, thereby reprogramming the fate of primary recipient cells. The technology employs bioelectronic platforms comprising a proton-conductive polymer membrane, with one tier or dual-tier configurations for enhanced control over EV production. This method allows for precise control over the composition, sizes, and numbers of EVs produced, leveraging them for applications such as inducing luminescence in target cells or directing stem cell differentiation.

## SUGGESTED USES

- Therapeutic drug delivery systems, particularly for targeted cellular therapy and regenerative medicine.
- Biotechnological research tools for cellular and molecular biology studies.
- Non-invasive diagnostics and biomarker delivery for early detection and monitoring of diseases.
- Advanced systems for controlled gene and protein delivery in genetic engineering and synthetic biology.

## ADVANTAGES

- Enables precise control over the production of EVs in terms of size, number, and composition.
- Utilizes electrical stimulation for straightforward and efficient actuation of cellular vesicle production.
- Compatible with a wide range of source cells for producing both native and designer cargo-loaded vesicles.
- Ensures high concentrations of vesicles are released, maintaining the long-term viability of both source and recipient cells.
- Facilitates targeted delivery and functional application of EVs across organismally-relevant distances.
- Allows for reversible cycling and amplification of vesicle production from source cells.

## CONTACT

Richard Y. Tun
tunr@uci.edu
tel: 949-824-3586.



## OTHER INFORMATION

## CATEGORIZED AS

- **Medical**
  - Delivery Systems
  - Diagnostics
- **Research Tools**
  - Other

## RELATED CASES

2021-779-0

UCI Beall
Applied Innovation

5270 California Avenue / Irvine,CA
92697-7700 / Tel: 949.824.2683