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Empowering Ideas

Carbon-based nanopipettes for single cell injection

Multiplexed, nanoscale electrochemical sensor for analyte delivery and detection

Inventor

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STAGE OF DEVELOPMENT

- *In vitro* testing

INTELLECTUAL PROPERTY

US patent 8,702,927
US patent 8,877,518

REFERENCE MEDIA

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DESIRED PARTNERSHIPS

• License
• Co-development

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Technology

The Bau lab has developed carbon-based nanopipettes (CNPs) that allow for reliable single cell injection. These CNPs use an AC electrical impedance measurement to detect cell and nucleus penetration, which greatly improves upon standard pulled glass pipette injections. The small dimensions of the nanopipette enhance temporal resolution. Small volumes can be injected in a minimally invasive, controlled manner. Because carbon lining is conductive, CNPs can be used as accurate biosensors. This improved platform for single cell injection allows for automated, high-throughput methodology. This technology has been successfully demonstrated with fluorescent tRNA transfection of both the cytoplasm and nucleus of single cells.

Advantages

- Small dimensions, minimally invasive, does not break or clog easily
- Compatible with biomaterials, micromanipulators, micropipette fittings, and amplifiers
- Accurate injection into cytoplasm and/or nucleus
- Mass producible

Applications

- Single cell injection of probes, oligonucleotides, tracers, fluids, transfer of nucleic acid populations
- Injection of very small amounts
- Biosensors
- Reliable, automated high-throughput platform for cell injection