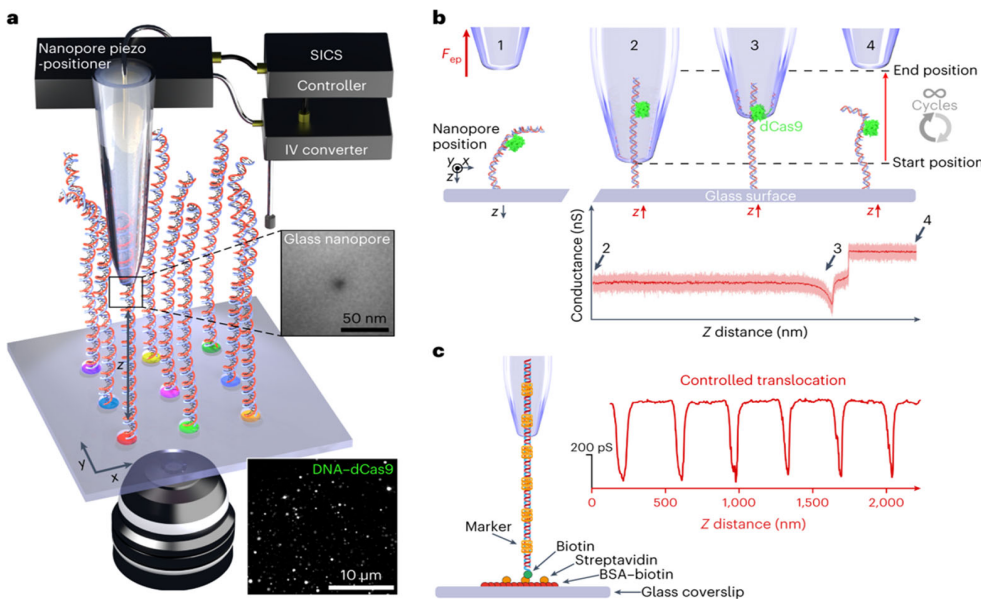


Nanopore-based scanning for controlled translocation



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6.2333

Keywords

Nanopore, sequencing, Q&A, SICS, controlled translocation

Intellectual Property

WO2023/233345

Publications

[Nature Nanotechnology](#) volume 18, pages 1078-1084 (2023)

Date

13/04/2026

Exemplary figure: (a) Schematic of the SICS system combined with fluorescence microscopy. Each colour represents spatially multiplexed molecules deposited on the glass surface. (b) Principle of SICS in a step-by-step manner, comprising molecule capture (i) followed by controlled translocation. (c) SICS-controlled translocation signature of a DNA ruler under optimal conditions.

Description

Nanopore sensing detects biomolecules by measuring ionic current changes during translocation through a nanoscale pore. However, conventional approaches suffer from uncontrolled and stochastic molecule movement, limiting accuracy and reproducibility. This technology relates to a nanopore-based system relying on scanning ion conductance spectroscopy (SICS) enabling controlled, bidirectional and repeatable translocation of single molecules for high-resolution molecular analysis.

Advantages

- CONTROLLED TRANSLOCATION** (deterministic motion: Replaces stochastic molecule passage with precise mechanically controlled displacement.
- REPEATABLE MEASUREMENT** on the same molecule: Enables multiple scans, improving signal quality and statistical confidence.
- HIGH-RESOLUTION MAPPING**: Allows detection of structural features and chemical modifications along a molecule.

Applications

- DNA and RNA sequencing (next-generation and beyond; Protein sequencing and characterization; Detection of post-translational modifications (PTMs)
- Single-molecule diagnostics and biomarker detection