The Office of Technology Management

UNIVERSITY OF TEXAS ARLINGTON

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Nanotechnology for Assessing Cancer Treatment

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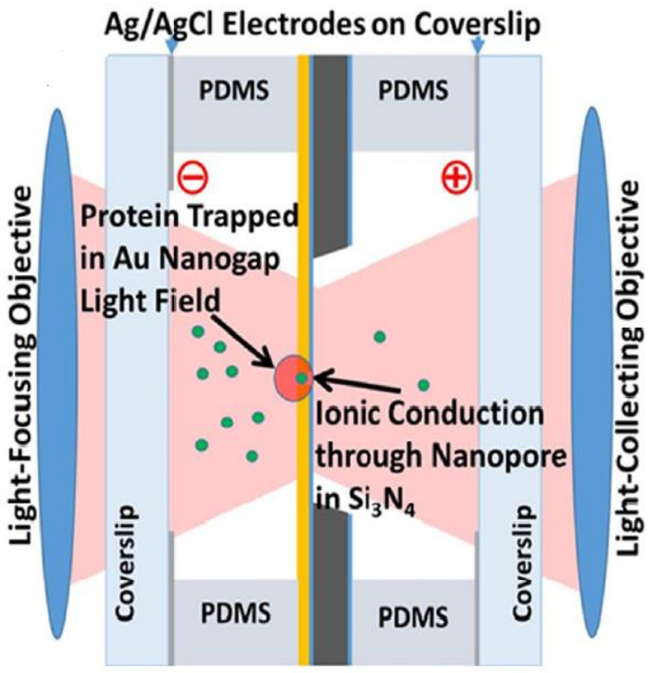
TECHNOLOGY NEED

The heterogeneity of cancer, polyclonal resistance development against drugs and rise of new genetic mutations make it hard to define precise and tailored therapies to stop disease progression. Although existing analytical technologies have contributed greatly in identifying key protein partners that disrupt cancer signaling pathways, there is a need for molecular analysis technologies that can precisely determine how and when a certain target stops responding to specific drugs. Currently available techniques for quantifying molecular interactions are time sensitive, require tags, and suffer from issues such as non-specific binding, sample overheating, settling of aggregates. Therefore, there is a great requirement for developing clear point-of-care molecular analysis technologies that overcome the drawbacks the current systems have, thus providing actionable information to clinicians for assessing treatment efficacies.

INVENTION DESCRIPTION/SOLUTION

Researchers have developed a novel approach to combine two biosensing modes of biosensors onto a single solid-state chip for nanoscale biomolecular sensing. Here, optical plasmonic sensing through a dual nanohole structure is coupled with an electrical sensing nanopore system to dynamically arrest individual protein complexes targeted by an inhibitor. The sensor then simultaneously records optical signal drift and amount of current drop of each isolated molecule to determine its mass and effective charge. This data is used to verify whether the protein complex formation is disrupted and when a therapeutic agent stops binding to the intended receptor.



APPLICATIONS

- Drug development
- Food safety
- Agricultural applications
- Environmental monitoring
- Bio surveillance

KEY BENEFITS

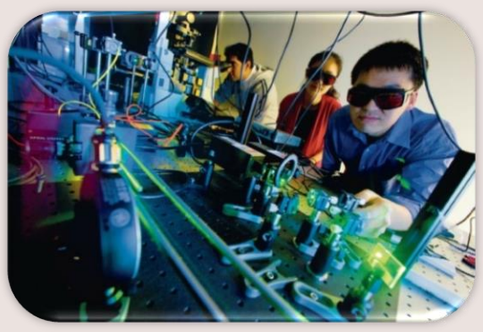
- Label-free
- Accurate
- Prevents clogging
- Resolves solution heterogeneity
- Enables working with low protein concentrations(pM range)

STAGE OF DEVELOPMENT

Prototype

INTELLECTUAL PROPERTY STATUS

PCT



More about the Inventors:

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