

Real-time Galectin Recognition by Dynamic SERS using Glycan-decorated Au Nanoparticles

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The monitoring of biomarkers, as indicators of physiological conditions, holds great promise as clinical diagnostics to facilitate successful treatment of diseases. [1] Most approaches in clinical diagnostics are accomplished using ELISA-based sandwich assays which are, however, time-consuming, tedious, and require experienced personnel. Efforts are still required at addressing these problems in the detection of biomarkers in real biological fluids. Surface-enhanced Raman scattering (SERS) is a promising surface-sensitive technology for assay readouts, [2] which offers simplified instrumentation, enhanced sensitivity and increased multiple analytical throughput.

Galectins are a family of galactoside-binding proteins that are found in multiple intracellular compartments and are secreted into the extracellular space. Altered expressions of galectins, usually increased, is commonly seen in pathological states, particularly inflammation, fibrosis, and regulation of various stages of cancers. [3] This research illustrates the use of SERS-active glycan decorated Au nanoparticles for the detection of galectins by surface enhanced Raman spectroscopy (SERS). The work presents an on/off SERS aggregation probe to investigate the multivalent carbohydrate-galectin interactions in real-time and in the use of SERS-active glyconanoparticles for the detection of galectins at nanomolar level in samples which mimic clinical biofluids. Additionally, the availability of portable Raman spectrometer testing these specific interactions is also demonstrated.

References

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