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Title:	Ultrasensitive Characterization of the Prion Protein by Surface-Enhanced Raman Scattering: Selective Enhancement via Electrostatic Tethering of the Intrinsically Disordered Domain with Functionalized Silver Nanoparticles
Authors:	Singh, Swapnil (/jspui/browse?type=author&value=Singh%2C+Swapnil) Agarwal, Aishwarya (/jspui/browse?type=author&value=Agarwal%2C+Aishwarya) Avni, Anamika (/jspui/browse?type=author&value=Avni%2C+Anamika) Mukhopadhyay, Samrat (/jspui/browse?type=author&value=Mukhopadhyay%2C+Samrat)
Keywords:	Ultrasensitive Characterization Prion Protein Surface-Enhanced
Issue Date:	2021
Publisher:	ACS Publications
Citation:	Journal of Physical Chemistry Letters, 12(12), 3187-3194.
Abstract:	Surface-enhanced Raman scattering (SERS) circumvents the inherent insensitivity of Raman spectroscopy and offers a powerful tool for the ultrasensitive detection and characterization of biomolecules at low concentrations. Here we show that SERS via electrostatic tethering between surface-modified negatively charged silver nanoparticles and highly positively charged intrinsically disordered N-terminal domain of the prion protein allows highly sensitive and reproducible protein detection and characterization at as low as hundreds of nanomolar protein concentrations. These measurements preferentially illuminate a selective part of the protein due to a sharp dependence of the near-field intensity on the distance between the nanoparticle surface and the protein. We also demonstrate that by shortening the length of the disordered tail it is possible to achieve a domain-selective Raman enhancement to study the C-terminal globular domain. Our tether-length-dependent SERS methodology will serve as a potent, noninvasive, and label-free strategy to detect and characterize a wide range of proteins possessing disordered segments.
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