**Detection of succinylation in charge rich proteins using a label free approach: ProCharTS**

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Succinylation is type of protein post-Translational modification that regulates various protein function. Dysregulation of succinylation is attributed with different diseases such as cardiovascular disease and cancer. Present techniques that detect Lysine succinylation includes mass spectrometry1 and chemically labelled probes2. However, detecting succinylation using a label free intrinsic probe is limited. Recently our group discovered a new intrinsic non-aromatic chromophore in a monomeric charged rich protein. The charged residues (Lysine, Arginine, Glutamate and Aspartate) participate in photoinduced electron transfer with the peptide backbone or among themselves. This gives rise to broad UV- Vis electronic absorption ranging from 250-800 nm called as Protein Charge Transfer Spectra (ProCharTS).3 Herein we established ProCharTS as a comprehensive detection and analysis tool to study succinylated protein. We use α3W and Human Serum albumin (charge rich proteins) and titrate with succinic anhydride to obtain different degrees of succinylation. We further perform CD spectroscopy and Tryptophan fluorescence to analyse the change in the structure of protein post succinylation. Our studies show that change in the charge of amino group of Lysine after succinylation perturbs the ProCharTS profile of both the proteins by altering the pool of charge in the protein.

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