

Rapid and Simple Detection of Protein Glycosylation using Nanoparticle-based Energy Transfer

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Glycan moiety of glycoproteins plays an essential role in its biological activity *in vivo*, and the analysis of glycosylation is of great importance in the development of protein therapeutics. However, most analyses have relied on conventional methods involving complex and laborious procedures.¹ In this study, we report a rapid and simple detection approach of the protein glycosylation based on the fluorescence resonance energy transfer (FRET) between concanavalin A-conjugated gold nanoparticles (ConA-AuNPs) and dextran-conjugated quantum dots (Dex-QDs). The changes in the photoluminescence (PL) quenching of Dex-QDs were well correlated with the degree of mannosylation and the length of branched mannose-chains attached onto proteins. This simple but powerful approach enabled detection of glucose oxidases with different glycan profiles as well as diversely mannosylated bovine serum albumin (Man-BSA). The parallel analysis of the Man-BSAs using an image analyzer further demonstrated the potential of this new technique in high-throughput screening of glycoprotein and carbohydrate therapeutics.