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Albumin-Induced Turn-on Fluorescence in Molecular Engineered Fluorescent Probe for Biomedical Application

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Abstract : Serum albumin (SA) is a highly rich water-soluble protein in plasma. It is known to maintain the living organisms' health and help to maintain the proper liver function, kidney function, and plasma osmolality in the body. Low levels of serum albumin are an indication of liver failure and chronic hepatitis. Therefore, it is important to have a low-cost, accurate and rapid method. In this study, we designed a fluorescent probe, triphenylamine rhodanine-3-acetic acid (mRA), which triggers the fluorescence signal upon binding with serum albumin (SA). mRA is a bifunctional molecule with twisted intramolecular charge transfer (TICT)-induced emission characteristics. An aqueous solution of mRA has an insignificant fluorescence signal; however, when mRA binds to SA, it undergoes TICT and turns on the fluorescence emission. A SA dose-dependent fluorescence signal was performed, and the limit of detection was found to be less than ng/mL. The specific binding of SA was tested from the cross-reactivity study using similar structural or functional proteins.

Keywords : serum albumin, fluorescent sensing probe, liver diseases, twisted intramolecular charge transfer
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