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Label-free and selective sensing of uric acid with gold nanoclusters as optical probe

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Abstract

Clinically, the amount of uric acid (UA) in biological fluids is closely related to some diseases such as hyperuricemia and gout, thus it is of great significance to sense UA in clinical samples. In this work, red gold nanoclusters (AuNCs) with relatively high fluorescence quantum yield and strong fluorescence emission were facilely available using bovine serum albumin (BSA) as template. The fluorescence of BSA-protected AuNCs can be sensitively quenched by H₂O₂, which is further capable of sensing UA through the specific catalytic oxidation with uricase, since it generates stoichiometric quantity of H₂O₂ by-product. The proposed assay allows for the selective detection of UA in the range of 10 μM to 800 μM with a detection limit of 6.6 μM, which is applicable to sense UA in clinical samples with satisfactory results, suggesting its great potential for diagnostic purposes.

Keywords: Gold nanoclusters; Uric acid; Urate oxidase; Visual analysis; Clinical application

1. Introduction

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