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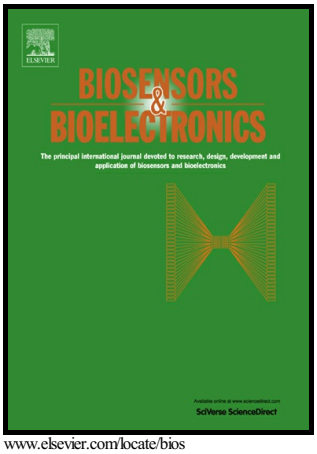

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Inner filter with carbon quantum dots: a selective sensing platform for detection of hematin in human red cells

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Abstract

Hematin plays a crucial role in various physiological functions, and the determination of hematin in complex biological matrixes is a significant but difficult issue. Considering the unique photophysical/photochemical properties of carbon quantum dots (CQDs) prepared with p-aminobenzoic acid (PABA) and ethanol, a new strategy for the design of fluorescent probes for hematin has been achieved. The proposed sensor array is fabricated based on the inner filter effect (IFE) between hematin and CQDs with phenomenon of selective fluorescence quenching of CQDs which results from the strong absorption of the excitation and emission spectrum of CQDs by hematin. The fluorescence quenching of CQDs is closely related to the amount of hematin and there is a good linear relationship over the range of 0.5 μM–10 μM with a detection limit of 0.25 μM. What's more, the fluorescence assay has been successfully applied for hematin sensing in healthy human red cells showing this