

Ultrasensitive Colorimetric Detection of Dopamine Based on Formation of Gold Nanorods/Silver Nanostructures

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Abstract: Dopamine is one of the most important neurotransmitters in central and peripheral nervous system. The measurement of the level of dopamine in biological fluids has an essential role in the diagnostics of diseases and controlling medicine because many diseases are related to the change of dopamine concentration. So, the development a simple and fast methods like colorimetric methods for its detection has received great interest. This assay relies on dopamine oxidation reaction-induced silver deposition on the surface of gold nanorods (AuNRs). In the presence of dopamine, reduction of silver ions by dopamine generates a silver shell on the surface of AuNRs, resulting in the blue shift of the longitudinal localized surface plasmon resonance peak of AuNRs and solution color changes from light green to orange-red. Under optimized conditions, the detection limit for dopamine is 500 ng/ml and the linear rang is 0.5µg/ml to 50 µg/ml. Due to the simplicity and spending short time for analysis , the assay is well suited for the detection of dopamine in real samples instead of time consuming and expensive common methods like HPLC.

Keyword: Colorimetric, Gold Nanorods, Metallization, Dopamine

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