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A new aggregation-induced emission fluorescent probe for rapid detection of nitroreductase and its application in living cells

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Abstract

The biological activity of nitroreductase (NTR) is closely related to biological hypoxia status in organisms. The development of effective methods for monitoring the activity of NTR is of great significance for medical diagnosis and tumor research. Toward this goal, we have developed a new aggregation-induced emission (AIE) fluorescence NTR probe **TPE-HY** used the tetraphenylethene as the fluorophore, and used the nitro group as the NTR recognition site. The probe **TPE-HY** has many excellent properties, including rapid response, AIE characteristics, high sensitivity and selectivity, and low cytotoxicity. Importantly, the probe **TPE-HY** is successfully applied to monitor endogenous NTR in living HeLa cells.

Keywords

Fluorescent Probe; Nitroreductase; Aggregation-Induced Emission; Tetraphenylethene; Hypoxia

1. Introduction

Hypoxia, caused by the lack of oxygen supply [1], is associated with a variety of diseases, such as, cardiac ischemia [2-4], stroke [5], inflammatory diseases [6, 7], and solid tumors [8, 9]. Especially, inadequate supply of oxygen ($\leq 4.4\%$) is an important characteristic of solid tumors.

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