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Nano-Particle of π-Conjugated Polymer for Near-Infrared Bio-Imaging

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Abstract : Molecular imaging has attracted much attention recently, which visualizes biological molecules, cells, tissue, and so on. Among various in vivo imaging techniques, the fluorescence imaging method has been widely employed as a useful modality for small animals in pre-clinical researches. However, the higher signal intensity is needed for highly sensitive in vivo imaging. The objective of the current study is the development of a fluorescent imaging agent with high brightness for the tumor imaging of a mouse. The strategy to enhance the fluorescence signal of a bio-imaging agent is the increase of the absorption of the excitation light and the fluorescence conversion efficiency. We developed a nano-particle fluorescence imaging agent consisting of a π-conjugated polymer emitting a fluorescence signal in a near infrared region. A large absorption coefficient and high emission intensity at a near infrared optical window for biological tissue enabled highly sensitive in vivo imaging with a tumor-targeting ability by an EPR (enhanced permeation and retention) effect. The signal intensity from the π-conjugated fluorescence imaging agent is larger by two orders of magnitude compared to a quantum dot, which has been known as the brightest imaging agent. The π-conjugated polymer nano-particle would be a promising candidate in the in vivo imaging of small animals.

Keywords : fluorescence, conjugated polymer, in vivo imaging, nano-particle, near-infrared
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