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Fluorescence Optical Imaging in Anticancer Drug Delivery

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Abstract

In the past several decades, nanosized drug delivery systems with various targeting functions and controlled drug release capabilities inside targeted tissues or cells have been intensively studied. Understanding their pharmacokinetic properties is crucial for the successful transition of this research into clinical practice. Among others, fluorescence imaging has become one of the most commonly used imaging tools in pre-clinical research. The development of increasing numbers of suitable fluorescent dyes excitable in the visible to near-infrared wavelengths of the spectrum has significantly expanded the applicability of fluorescence imaging. This paper focuses on the potential applications and limitations of non-invasive imaging techniques in the field of drug delivery, especially in anticancer therapy. Fluorescent imaging at both the cellular and systemic levels is discussed in detail. Additionally, we explore the possibility for simultaneous treatment and imaging using theranostics and combinations of different imaging techniques, *e.g.*, fluorescence imaging with computed tomography.

Keywords: Fluorescence imaging, drug delivery, theranostics