

Stem cell tracking: toward clinical application in oncology?

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ABSTRACT

Noninvasive cellular imaging allows the tracking of grafted cells as well as the monitoring of their migration, suggesting potential applications to track both cancer and therapeutic stem cells. Cell tracking can be performed by two approaches: direct labeling (cells are labeled with tags) and indirect labeling (cells are transfected with a reporter gene and visualized after administration of a reporter probe). Techniques for *in vivo* detection of grafted cells include optic imaging, nuclear medicine imaging, magnetic resonance imaging, microCT imaging and ultrasound imaging. The ideal imaging modality would bring together high sensitivity, high resolution and low toxicity. All of the available imaging methods are based on different principles, have different properties and different limitations, so several of them can be considered complementary. Transfer of these preclinical cellular imaging modalities to stem cells has already been reported, and transfer to clinical practice within the next years can be reasonably considered.

Key words: cell tracking, therapeutic stem cells, cancer stem cells.

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