



## Molecular and Cellular MR Imaging

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The ability of molecular and cellular imaging to track the survival, migration, and differentiation of cells *in vivo* as well as monitor particular gene expression in living subjects is rapidly moving from the research laboratory into daily clinical settings. The interdisciplinary nature of the field mandates a constant dialogue among molecular and cellular biology, chemistry, physics, image analysis, and drug discovery to develop and translate promising approaches into reliable scientific applications and viable clinical diagnostic tools.

Bringing together a select panel of internationally recognized authors, *Molecular and Cellular MR Imaging* provides a state-of-the-science overview of the multidisciplinary nature of the field and illustrates the application of these various sciences to investigate specific biological processes in animals and humans. Using a systematic organization to present diverse information, the text begins with an introductory chapter that defines cellular and molecular imaging and explains why magnetic resonance imaging (MRI) is the most versatile approach for noninvasive, *in vivo* studies. The first section examines the physicochemical principles of various contrast agents including paramagnetic, superparamagnetic, CEST, and PARACEST agents, as well as smart and sensing agents. The second section summarizes the wide variety of applications for molecular imaging of genes and of disease states. Contributions cover cancer, apoptosis, cardiovascular and neurodegenerative disease, and the use of pharmacological MRI. The third section is devoted to cellular imaging under a variety of applications, and the final section discusses the translational aspects and future directions of cellular and molecular MR imaging.

*Molecular and Cellular MR Imaging* highlights the diversity of skills required to translate advancements in various fields of research into practical applications that promise to revolutionize *in vivo* imaging as a diagnostic tool.

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