

AbstractID: 7518 Title: MR Imaging of Gene Expression

The human genome project has influenced almost every aspect of biological study. The ensuing revolution has enabled a more comprehensive understanding of the molecular basis of disease and for the first time gene therapy approaches to correct “defects” have been attempted. The impacts of these developments on molecular imaging have been realized in two ways. First, implicit in the evolution of these approaches is the development of efficient gene delivery vehicles for *in vivo* delivery of “corrective/additional” genes and the need to identify ways of monitoring gene delivery and expression non-invasively and *in vivo*. Second, molecular profiling (determining the specific expression pattern of genes in a given tissue or cell) of normal and diseased tissues has begun to identify molecular signatures (informative patterns of gene expression) that may be diagnostic for disease or predictive of drug response. Development of non-invasive imaging technologies to exploit these molecular signatures would have a profound impact on the practice of medicine.

Over the past few years several different imaging technologies have evolved to address these needs. These include developments of newer technologies, such as near infrared (NIR) optical imaging, and novel applications and innovations of more conventional technologies, such as nuclear imaging, and magnetic resonance imaging (MRI).

This presentation will be dedicated to describing the recent advances for utilizing MRI to image gene expression and will discuss the impact of the genomics revolution on molecular imaging.

Educational Objectives:

1. Provide basic information regarding gene therapy approaches
2. Convey needs for monitoring gene expression *in vivo*
3. Convey problems associated with *in vivo* imaging by MRI
4. Gain insight into ways to solve potential imaging roadblocks
5. Understand the molecular dissection of biology and disease
6. Understand the influence of molecular dissection on the field of Molecular Imaging