

《Featured Research Session (FRS) II Nuclear Cardiology》

Key Note Lecture

**Cardiovascular Molecular Imaging:
From Gene Expression to Physiologic Function**

Frank M. Bengel

(Nuklearmedizinische Klinik der TU München)

Innovative approaches for cardiovascular molecular therapy are rapidly evolving, and translational efforts from experimental to clinical application are increasing. But despite progress in areas such as gene and cell therapy, some basic principles are still under development. This emphasizes the need for powerful noninvasive methods to characterize therapeutic mechanisms, success and efficacy in more detail.

The use of reporter genes and specific radiolabeled reporter probes for cardiac imaging provides methodology to address open issues by assessment of location, magnitude and persistence of gene expression in the heart and the whole body. Coexpression of a reporter gene allows for indirect imaging of the expression of a therapeutic gene of choice. Furthermore, reporter genes may be

transferred to stem cells prior to transplantation for serial monitoring of cell viability using gene product imaging. Additional functional markers of contractility, blood flow, metabolism or innervation/receptors can be obtained and linked with these novel molecular genetic imaging approaches to define functional effects of therapy.

By integrating information from multiple tracer techniques, nuclear imaging and especially the novel hybrid imaging approaches, have the potential to dissect cardiovascular mechanisms from gene expression to physiologic function and morphology. This is expected to refine understanding of pathophysiology, identification of therapeutic mechanisms and translation of experience from the experimental to the clinical setting.