ASNC CONSENSUS STATEMENT:
MOLECULAR CARDIOVASCULAR IMAGING

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Molecular imaging is an emerging discipline involving a synthesis of the principles of cell biology, molecular biology and molecular genetics with those of conventional imaging. This approach has been utilized by a number of imaging modalities including nuclear medicine, magnetic resonance imaging and ultrasound. Nuclear techniques, by virtue of substantial technique sensitivity and the flexibility of radiochemistry approaches, are ideally suited for this endeavor. There is general enthusiasm concerning the great potential of this advancing and relatively new field. With respect to nuclear techniques, greatest strides have been made in molecular oncology imaging. Federal funding has been obtained for the creation of centers of excellence in this area.

At the present time substantial interest has developed for the application and expansion of molecular cardiovascular imaging. This represents a potential paradigm shift from a physiology-based imaging discipline to a biology-driven one. The recent Lake Tahoe Invitational Retreat was devoted almost entirely to molecular imaging. At the mid-winter Society of Nuclear Medicine meeting an entire symposium was based in cardiovascular molecular imaging. In May, 2004 a two day symposium will be held at the National Institutes of Health focusing on molecular cardiovascular imaging.

Several areas of interest are apparent as new techniques are developed based upon novel molecular imaging strategies. Current topics and areas for molecular imaging research include: novel approaches to ischemic myocardium, myocyte integrity, gene therapy and gene product imaging, imaging of cell death, new approaches to hibernating and stunned myocardium, angiogenesis, receptor occupancy, vascular integrity, imaging of unstable plaque and imaging for early atherosclerosis. Such approaches can form the basis for the key translational research necessary for moving adeptly from bench to bedside as new therapeutic approaches such as gene therapy are developed. Molecular imaging may provide an ideal vehicle for assessing therapeutic efficacy of newly developed biologically-based therapies.

For the field of molecular imaging to develop there is a need for new radioactive tracers, new instrumentation, microinstrumentation suitable for imaging small animals, use of genetically engineered animals, intravascular detectors and other novel imaging devices, and a recognition of the importance of multimodality fusion imaging. Funding for such instrumentation advances is critical. For the field to advance the nuclear cardiology community must enter into new interactive and collaborative research programs with individuals involved in the basic biology of cardiovascular disease, chemistry and radiochemistry, instrumentation and physics. New Federal funding initiatives are critical for the advancement of the field. Development of centers of excellence such as has been done in molecular oncology imaging are of fundamental importance. New training paradigms are necessary for the development of a new generation of imaging scientists and clinicians who utilize the principles of modern biology to diagnose and evaluate cardiovascular disease. Such physician-scientists will need expertise in multiple imaging area as well as nuclear cardiology and modern molecular and cell biology. Funding is necessary for institutional training grants targeting this need. New investigative partnerships with other disciplines and with industry also will be extremely helpful and necessary in developing this field.