SPECT Imaging

The established clinical power of nuclear imaging can now be applied to early preclinical decisions with SPECT through quantitative biodistribution, kinetics, targeting and functional imaging.

Greater Confidence in Early Drug and Biologic Candidate Assessment

Single Photon Emission Computed Tomography (SPECT) is a 3D nuclear medicine imaging technique that provides quantitative physiologic measurements. With the sensitivity required to track drug and biologies biodistribution, pharmacokinetics and pharmacodynamics, this non-invasive method provides significantly richer data than traditional approaches, such as autoradiography and mass spectrometry. The use of an increasing array of SPECT tracers provides access to a broad suite of functional and molecular biomarkers, for imaging of disease and drug response mechanism. This clinically relevant and robust data like longitudinal biodistribution/PK data in a single animal over time can assist in a better characterization of a drug or biologic candidate. It will provide:

• Non-invasive, fully 3-dimensional information with tissue/organ localization
• Accurate, fine kinetics which can be assessed through repeat imaging at short duration time points
• Simultaneous answers to multiple questions using multiple isotopes
• Increased imaging time window in the same animals, due to longer tracer half-life
• Functional biomarkers and molecular end points through SPECT tracer imaging

Clinically Translatable

Successful preclinical studies in animals quickly translate to clinical studies on humans given:

• The ability to use the same isotopes or radiotracers in mice as used in the clinic for humans
• The wide field of view
• Millimeter resolution and picomolar sensitivity which allows for performance of similar biomarker studies across species

This can result in significant improvements in efficiency and time and cost savings compared to alternative approaches required to obtain biodistribution information. For example, autoradiography (non-clinically translatable) requires significantly more animals and resources to complete the time consuming ex vivo evaluation process.

SPECT cameras detect gamma rays resulting from radionuclide decay. A compound labeled (tracer, biologic, antibody, etc) with a gamma-emitting isotope is injected into the subject. These labeled compounds and radiotracers can be used effectively in both clinical and pre-clinical settings.

Molecular Imaging, Inc. has access to commercial radioisotope labeling and tracer production through professional alliances, and is currently approved for use of the following SPECT isotopes:

• Technetium-99m
• Indium-111
• Iodine-123
• Iodine-125
• Thallium-201
• Gallium-67
• Lutetium-177
• Tin-117m

Applications include:

• Drug and biologics biodistribution and targeting
• Pharmacokinetics and pharmacodynamics
• Cell labeling
• Imaging specific biomarkers and molecular end points
• Receptor occupancy
• Tumor anatomical and functional imaging
• Cardiac and respiratory gating
• Osteoporosis (bone turnover)

Equipment

Imaging is done on the BioScan Nano-SPECT/CT™ platform, which features the latest in multi-pinhole SPECT imaging technology and image reconstruction and processing software.