Theranostics integrates diagnostics and therapeutics in order to provide the right drug and the right dose to the right patient at the right time. Molecular targeted therapeutic drug (radioactive or non-radioactive) with a companion diagnostic imaging technique (PET or SPECT) provides a strategic link to the promise of personalized medicine. In nuclear medicine, thyroid scan with I-123 or I-131 followed by therapy with I-131 provides the best example of theranostics. In the last 10 years a number of target specific diagnostic and therapeutic radiopharmaceuticals (labeled with In-111, Zr-89, Tc-99m, Y-90, Lu-177) have been developed for the treatment of neuroendocrine tumors, lymphoma and prostate cancer. This talk will focus on the design and development of target specific molecular agents and translational research from preclinical studies to investigational phase I, II, and III studies necessary for marketing a therapeutic drug with a companion molecular imaging diagnostic radiopharmaceutical.