

《Special Lecture》

Advances in Nuclear Medicine

Henry N. Wagner, Jr., MD

The Johns Hopkins Medical Institutions

Baltimore, Maryland

Nuclear medicine is moving rapidly into the mainstream of medicine. The increasing competition in health care delivery has resulted in emphasis on the quality of patient care. More than in the past, the effectiveness of what we do is being examined by referring physicians, our patients, and the public. As evidence-based medicine becomes more widespread, the advantages of nuclear medicine are becoming better known.

The essence of molecular nuclear medicine is *in vivo* measurement of regional function and biochemistry. On the basis of the measurements made in the patient as an individual, the nuclear medicine physician is asked to predict possible health problems for the patient in the future, that is, the risk of future disease. In sick patients, the basic questions include: What is wrong? How did it happen? What is going to happen? What can be done about it? Is the treatment effective? The practice of medicine is based on probability models involving the patient as an individual, but in the context of what has happened previously to patients with similar problems. The nuclear medicine physician needs to know how to apply a particular probability model to his specific patient.

The two disciplines most basic to nuclear medicine advances are pharmacology and genetics. Translating genetic advances in measurements of functions, such as amino acid and carbohydrate transport, ionic gradients, and detoxification processes has been called “Functional Genomics.” Research in molecular nuclear medicine can be viewed as “a search for function,” based on the examination of “*In Vivo* Molecular Homeostasis.” Nuclear medicine helps determine what genes do and what happens when they go wrong.

Often we don’t know the cause of a measured dysfunction or regional biochemical process, but we can find a process in the pathway of the dysfunction that can be favorably affected by a pharmaceutical. No field is better able than nuclear medicine to help satisfy the hunger for new drugs. Nuclear medicine is the road to “smart” medicine and surgery. The key is in the lock but hasn’t been turned all the way.

My presentation will give examples to illustrate these concepts.