

PETT; QUANTITATIVE IN VIVO MEASUREMENT OF HUMAN FUNCTION AND METABOLISM *

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fig. 1

Positron emission transaxial tomography (PETT) is a new and rapidly evolving analytical technique for accurate quantitative measurement of regional radioactivity levels in animals and humans. The application of this technique is one of the most interdisciplinary and multidisciplinary efforts that scientists are involved in today. The relationship between the various disciplines is shown in Figure 1. Physicists, chemists, biologists, biochemists, computer specialists and physicians all working in a coordinated way are required to realize the information that can be produced by PETT. The nature of the analytical technique and its instrumentation, how a biological model (which is perhaps as sophisticated as the instrumentation itself) needed to be developed, how the compounds, materials and techniques for applying the model and the instrument were developed, and finally some results of this type of research constitute the framework of these efforts.

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PETT scanning is related to the more familiar CAT scanning which is now in common use in radiological practice. A description of the first CAT scanner by its inventor G. N. Hounsfield¹ was published in 1973. In a CAT scanner the radiation seen by the detectors is produced in an x-ray tube. The photons coming out of the x-ray tube are "seen" by detectors on a side opposite to the photon source. In PETT the radiation source is a radioactive isotope in the animal or human (introduced by injection or other methods) and the radiation being emitted by this source is sensed by rings of detectors external to the body. The information these detectors

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