

## A Portable PET camera for tumor perfusion imaging.

Measurement of the washout of *in situ* activated O-15 provides a non-invasive approach to study tumor perfusion. At 200 cGy, a 29 MV beam from a Elekta medical accelerator produces about 0.2 to 0.4  $\mu\text{Ci}$  of O-15 per cc of water. Previous washout studies of *in situ* activated animal tumors were limited to the determination of decay constants due to the low activity and short (2 min.) half-life of O-15. Spatial information was not available. The difficulty can be overcome using a new portable PET camera capable of proximity imaging. The camera consists of a parallel-opposed pair of position-sensitive planar coincidence detectors. Three-dimensional (3D) tomography is produced by resolving the depth of field information through parallax imaging. The detection efficiency is greater than 10 times that of conventional PET scanners. A reconstructed spatial resolution of 3 mm FWHM has been obtained for a high activity line source. Using a pair of 6 cm x 6 cm detector modules, 3D PET images were obtained for plastic spheres containing radioactive  $\text{H}_2\text{O}$ -15 in a 14 cm-cubed water phantom. A 1 cc sphere with an initial activity of 0.4  $\mu\text{Ci}$  per cc was readily visualized. Work is on going to optimize the spatial and temporal resolution of the system for 3D imaging of O-15 washout.