

## **PET-CT In Oncology – The Best Techniques Exploiting Molecular Imaging Modalities**

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Molecular imaging utilizing dual markers approach is now being accepted by many physicians as an important platform in translating genetic defect through aberrant protein function and cellular transformation and development. Nevertheless, the sensitivity of molecular imaging techniques are varied depending the type of radiopharmaceutical marker used in signaling the biological processes. In particular, the use of FDG as a ligand PET-CT has many limitations. The most obvious example of this is in the brain where high glucose utilisation by the normal cerebral cortex can mask brain tumours, particularly those of well differentiated. In addition, some tumours with high metastatic potential can have relatively low FDG-uptake. Similarly, the specificity of FDG-PET is also imperfect with some benign conditions, particularly granulomatous lesions i.e. tuberculosis, having high FDG uptake . These very real limitations of FDG used in the molecular imaging technique have enticed the search for alternative radiotracers which signal different biological disease process. Several alternative PET-radiopharmaceuticals are currently being investigated, which have the potential to reveal the proliferation rate, oxygen utilization, drug resistance properties and the viability of the tumours. Examples of new PET tracers include fluoroethyltyrosine (FET) for brain tumour imaging; the proliferation marker 18F-fluorothymidine (FLT) to assess bone marrow reserves and the exploitation of dual tracer strategy i.e. FDG and 68 Ga DOTA –octreotate for staging and therapeutic response in neuroendocrine tumour would promise a more specific signaling that reflect the inert cellular alteration. The choline analogue 18F-fluorocholine (FCH) for patients with rising prostate specific antigen levels have been found effective in the management strategy and thus improve the overall patient survival. The molecular imaging technique employing integration of structural and functional imaging modalities denotes the new era in molecular imaging whereby the advancement in science technology has impacted the way physicians personalizing treatment plan in a more effective strategy and cost effective manners for the patient.