**Noninvasive Evaluation of Metabolic Tumor Volume in LLC Tumor Bearing C57 Mice With PET and the Radiotracers 18F-Alfatide and 18F-FDG: A Comparative Analysis**

*S. Yuan, Y.C. Wei, X. Hu, L. Wei, J. Zhang, W. Hou, J. Yu, Y. Gao, Z. Fu, and H. Zhang*

**Purpose/Objective(s):** Arginine-glycine-aspartic acid peptide (Arg-Gly- Asp, RGD) can specifically bind with avb3, which is highly expressed by new tumor angiogenesis, to achieve non-invasive PET imaging for angiogenesis. Angiogenesis plays an important role in the regulation of tumor growth, local invasiveness, and metastatic potential. In this study, we aimed to explore the value of a simple lyophilized kit for labeling PRGD2 peptide (18F-ALF-NOTA-PRGD2, denoted as 18F-alfatide) PET for the evaluation of metabolic tumor volume (MTV) in Lewis lung carcinoma (LLC) tumor-bearing C57 mice verified by pathologic examination and compare the results with those using 18F-fluorodeoxyglucose (FDG) PET.

**Materials/Methods:** Lewis lung carcinoma tumor-bearing C57 mice underwent attenuation-corrected whole-body 18F-alfatide PET (n=33) and 18F-FDG PET (n=35). 18F-alfatide emission images were acquired on a 10-min micro-PET 60 min after the injection of 2.4-3.5MBp 18F-alfatide. 18F-FDG images were acquired on the same scanner 60 min after the injection 2.6-3.6MBp of 18F-FDG. 18F-alfatide metabolic volume (VRGD) and 18F-FDG metabolic volume (VFDG) were calculated using circular region of interests (ROIs) in the tumor planted site. Pathologic volume (VPath) was measured in vitro after the xenografts were removed.

**Results:** The mean standard deviation of VPath, VRGD, and VFDG were 0.59 ± 0.32 cm3 (range, 0.13-1.64 cm3), 0.61±0.37 cm3 (range, 0.15-1.86 cm3), and 1.24±0.53 cm3 (range, 0.17-2.20 cm3). VPath versus VRGD, VPath versus VFDG, and VRGD versus VFDG were t= -0.145, P = .885, t = -6.239, P < .001, and t = -5.661, P < .001. No significant difference was found between VPath and VRGD. VFDG was far larger than VRGD and VPath. VRGD seemed more approximate to the pathologic gross tumor volume; furthermore, VPath had a stronger significant correlation with VRGD (R = 0.964, P < .001) than VFDG (R = 0.584, P < .001).

**Conclusion:** 18F-alfatide PET provided closer estimation of gross tumor volume than 18F-FDG PET. 18F-alfatide PET is promising and effective and merits additional study in noninvasive delimiting of the target volume margin for lung carcinoma.