# Diagnosis of maxillofacial tumor with L-3-[$^{18}$F]-fluoro-$\alpha$-methyltyrosine (FMT) PET: a comparative study with FDG-PET

Mitsuyuki Miyakubo,*,**** Noboru Oriuchi,** Yoshito Tsushima,** Tetsuya Higuchi,** Keiko Koyama,**
Kiyokazu Arai,** Bishnuhari Paudyal,** Yasuhiko Iida,*** Hirofumi Hanaoka,*** Tomohiro Ishikita,*
Yoshiki Nakasone,* Akihide Negishi,* Kenji Mogi* and Keigo Endo**

*Department of Stomatology and Maxillofacial Surgery;
**Department of Diagnostic Radiology and Nuclear Medicine;
***Department of Bioimaging Information Analysis;
****21st Century COE program, Gunma University Graduate School of Medicine

***Objectives:*** To compare L-3-[$^{18}$F]-fluoro-$\alpha$-methyltyrosine (FMT)-positron emission tomography (PET) and 2-[$^{18}$F]-fluoro-2-deoxy-D-glucose (FDG)-PET in the differential diagnosis of maxillofacial tumors. ***Methods:*** This study included 36 patients (16 males, 20 females; 31–90 years old) with untreated malignant tumors (34 squamous cell carcinoma, one mucoepidermoid carcinoma, one rhabdomyosarcoma) and seven patients (five males, two females; 32–81 years old) with benign lesions. In all patients, both FMT-PET and FDG-PET were performed within two weeks before biopsy or treatment of the lesions. To evaluate the diagnostic usefulness of FMT-PET and FDG-PET, visual interpretation and semiquantitative analysis were performed. PET images were rated according to the contrast of tumor uptake as compared with background, and were statistically analyzed. As a semiquantitative analysis, standardized uptake values (SUV) of the primary tumors were measured, and the SUV data were analyzed using receiver operating characteristic (ROC) curves. ***Results:*** The mean SUV of the malignant lesions were significantly higher than those of the benign lesions in both FMT-PET ($2.62 \pm 1.58$ vs. $1.20 \pm 0.30$, $p < 0.01$) and FDG-PET ($9.17 \pm 5.06$ vs. $3.14 \pm 1.34$, $p < 0.01$). A positive correlation ($r = 0.567$, $p < 0.0001$, $n = 46$) was noted between FMT and FDG. ROC analysis revealed that there was no statistically significant difference in SUVs between FMT and FDG for differentiating malignant tumors. In 27 of 36 patients, FMT-PET had better contrast of malignant tumor visualization to the surrounding normal structures by visual assessment ($p < 0.005$, binomial proportion test). ***Conclusions:*** Differential diagnosis of FMT-PET based on the uptake in maxillofacial tumors is equivalent to FDG-PET. However, the contrast of FMT uptake between maxillofacial tumors and the surrounding normal structures is higher than that of FDG, indicating the possibility of accurate diagnosis of maxillofacial tumors by FMT-PET.

**Key words:** L-3-[$^{18}$F]-fluoro-$\alpha$-methyltyrosine (FMT), 2-[$^{18}$F]-fluoro-2-deoxy-D-glucose (FDG), maxillofacial tumor, PET